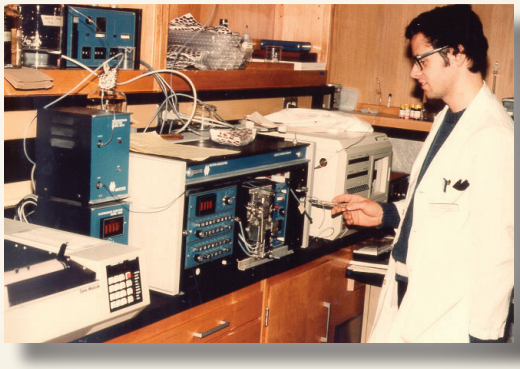
Wisconsin State Laboratory of Hygiene
UNIVERSITY OF WISCONSIN–MADISON



FORWARD


FY 2014 Annual Report

July 1, 2013 - June 30, 2014

From the Director

Fiscal Year 2014 has been a wonderful year for your Wisconsin State Laboratory of Hygiene!!
I am amazed by the accomplishments of our staff during the laboratory's 112th year at the University of Wisconsin-Madison.


Dr. Charles Brokopp

The theme of this report, FORWARD, is not only the motto for the state of Wisconsin, but a single word that clearly describes our accomplishments in testing, research, education and consultation. The citizens of Wisconsin benefit each day from the efforts of our diverse employees and their contributions to public, environmental, and occupational health programs throughout Wisconsin.

The WSLH takes the "Wisconsin Idea" forward to the edges of the state and beyond every day.

The WSLH provides critical laboratory services to support the Department of Health Services (DHS) and the Department of Natural Resources (DNR) as part of our statutory mission. The WSLH also supports the Department of Justice and the Department of Transportation's mission to enforce operating while intoxicated (OWI) laws. Blood alcohol and drug testing is provided to state and local law enforcement and to coroners and medical examiners throughout Wisconsin.

Not all laboratory programs can be highlighted in our annual report; however, examples of the important work of each of the five divisions are included.

During any week of the year, our staff will screen for metabolic diseases in infants, vaccine-preventable diseases in children and adults, and cancer and gene mutations in children and adults.

During the same week we may test for biological or chemical threat agents, assess occupational exposures to industrial chemicals, and monitor discharges into surface waters.

Other staff may be enhancing our laboratory information management systems, providing proficiency testing materials to other laboratories, conducting research, or fulfilling our academic mission by mentoring students and teaching classes.

A special note of appreciation goes to the WSLH Board for their ongoing support, direction and oversight during Fiscal Year 2014.

I express my appreciation to all the technical and support staff who contributed to the successful year just completed.

We look FORWARD to Fiscal Year 2015, and the exciting opportunities to be part of the University FOR Wisconsin.

Charles Brokopp, DrPH
Director, Wisconsin State Laboratory of Hygiene
Professor, Population Health Sciences
University of Wisconsin School of Medicine and Public Health

Celebrating 50 Years of Saving Babies' Lives

July 12, 2013, was a big day as more than 125 people joined the Wisconsin State Laboratory of Hygiene (WSLH) and Wisconsin's Newborn Screening (NBS) Laboratory and Program staff in celebrating the 50th anniversary of newborn screening.

In 1963, Dr. Robert Guthrie developed a method to easily screen newborn babies for phenylketonuria (PKU). Nationally, all state newborn screening programs celebrated the anniversary in 2013.

Wisconsin started performing PKU testing in hospitals in 1965 and consolidated all newborn screening testing at the WSLH in 1978.

Today, our NBS Lab staff screen the approximately 65,000 babies born each year for 44 rare, serious disorders that, left untreated, can lead to severe health issues and sometimes death. We find about 125-135 babies each year who have one of the disorders. As part of the state's comprehensive newborn screening program, babies also have their hearing and hearts tested before leaving the hospital (or at home for home births).

As NBS celebrates its first 50 years, testing technology and medical treatment advancements mean an exciting next 50 years for Wisconsin's babies and their families.

Clara Neubert, the daughter of WSLH Newborn Screening Laboratory Co-Director Dr. Patrice Held, hangs out with UW-Madison mascot Bucky Badger.

Dawson Bornheimer (shown with his mom Missy on right) is the first baby the WSLH identified with Severe Combined Immune Deficiency (SCID) after Wisconsin became the first place in the world to begin routine newborn screening for SCID in January 2008.

Dawson received a bone marrow transplant, giving him a functioning immune system. Without a bone marrow transplant, babies with SCID generally don't live past the age of 2. Dawson had turned 5 just prior to the event.

Holding Dawson is WSLH Newborn Screening Laboratory Co-Director Dr. Mei Baker. Dr. Carla Cuthbert from the Centers for Disease Control and Prevention (CDC) is on the left. Bucky Badger is in the back.

Newborn Screening Laboratory and Program staff on the steps of the WSLH's Henry Mall facility.

Protecting Our Liquid Assets: Lake Michigan

Lake Michigan featured prominently in environmental research conducted by WSLH scientists in 2013-14.

Dr. Curtis Hedman collaborated with researchers from the University of Wisconsin-Milwaukee School of Freshwater Sciences on a project that found pharmaceuticals and personal care products (PPCPs) contaminating Lake Michigan two miles offshore from Milwaukee, indicating a potential threat to the health of the Great Lakes, particularly near shore aquatic organisms. Prior to these findings, researchers had long assumed that the Great Lakes' size would dilute compounds flowing into them from sewage outfalls.

Research conducted by Dr. Martin Shafer and WSLH scientists discovered key factors in predicting how and at what levels copper and cadmium harm the shoreline environment of the Great Lakes and what protective measures coastal organisms adopt in response. Their results are helping regulatory agencies determine how to better protect Great Lakes coastal regions from these metals.

The metals for the project were analyzed in the Trace Elements Clean Laboratory, an ultra low-level clean laboratory. The Reactive Oxygen Species (ROS) assays were performed in the Environmental Toxicology Laboratory.

The WSLH is one of the few laboratories in the country that has both these capabilities under one roof.

What's Old is New Again: Measles and Mumps

Measles and mumps might sound like diseases of the past, but they're making a comeback.

Measles and mumps are categorized as vaccine-preventable diseases (VPD). These diseases – along with rubella, pertussis, meningitis, chickenpox and others – can be prevented or have their disease impact limited by vaccinations.

This 1963 photo shows a boy with a measles rash. Photo: Courtesy of CDC Public Health Image Library

As cases declined through the years, many public health laboratories shifted away from VPD testing to other more immediate public health priorities.

The Centers for Disease Control and Prevention (CDC) and the Association of Public Health Laboratories (APHL) recognized that while public health laboratories need VPD testing capability, perhaps not every lab needs to be doing the testing.

So they created the VPD Project as a pilot and designated four state public health laboratories — including the WSLH — as VPD Reference Centers.

The WSLH is not only performing viral and bacterial VPD testing for 18 state and local public health laboratories across the country, it is also the only VPD Reference Center providing test performance evaluation panels to public health laboratories. The VPD Reference Centers also provide surge capacity for CDC, if needed.

According to WSLH Communicable Disease Division Director Dr. Peter Shult, the idea of regional reference centers makes sense both economically and practically.

"These VPDs are resurging, but the capabilities and capacities in public health labs have waned over time," Shult explains. "For some of these diseases, there aren't many testing technologies, and it doesn't make sense for all public health laboratories to ramp up capabilities, which costs money, for all these diseases. Regional reference centers provide enhanced capacity for the public health laboratories and the millions of people they serve, as well as for CDC."

A year at the Wisconsin State Lab of Hygiene

July 2013: WSLH and many stakeholders celebrate the 50th anniversary of Newborn Screening

September 2013: Kids explore with Cytology and Cytogenetics staff at the WI Science Festival

November 2013: The Wisconsin Clinical Laboratory Network presents an audio conference entitled "Implementation of MALDI-TOF in a Clinical Microbiology Laboratory". The WSLH sponsors eight WCLN training audio conferences annually.

August 2013: Wisconsinites learn about genetics with Cytogenetics staff at UW Day at the State Fair

October 2013: Organic Chemistry staff solve the mystery of a petroleum smell in a Milwaukee grade school's water: Chemicals from urinal cakes being used in air dispensers in the bathrooms were wafting out to water fountains located outside the bathroom doors.

December 2013: The WSLH Bureau of Labor Statistics/ Occupational Safety and Health Statistics Unit releases the results of its 2012 Survey of Occupational Injuries and Illnesses (SOII) and 2012 Census of Fatal Occupational Injuries (CFOI) .

How the WSLH Helps the WI Dept. of Health Services Fulfill its Mission

- Analytical Services and Testing
- Technical Consultation and Laboratory Expertise
- Outbreak Response
- Emergency / Terrorism Response
- Laboratory Networks – WCLN, Local PH Lab Network
- DHS Program Support
- DHS Infrastructure Support
- Education and Training
- Electronic Laboratory Reporting (ELR) / Wisconsin Electronic Disease Surveillance System (WEDSS)
- Applied Research / Technology Evaluation / Test Method Development

July 1, 2013 - June 30, 2014

January 2014: New WSLH website goes live

March 2014: WSLH confirms mumps cases in Wisconsin. Outbreak grows to 53 lab-confirmed cases by end of June and rising.

May 2014: WSLH PT Coordinators meet with current and potential customers at the WSLH PT exhibit at CLMA's KnowledgeLab conference, one of the largest gatherings of clinical laboratory managers in the U.S.

February 2014: The WI Association of Hazardous Materials Responders (WAHMR) gave the WSLH its Coordinators Service Award. WSLH Chemical Emergency Response staff work closely with the state's HazMat teams.

April 2014: Three Cytotechnology Certificate Program students earn scholarships from state and national associations.

June 2014: WSLH "two-peats" as CDD Deputy Director Dr. Dave Warshauer receives the National Tuberculosis Controllers Association (NTCA) Ed Desmond Award. WSLH TB Program Coordinator Julie Tans-Kersten received it in 2013.

How the WSLH Helps the WI Dept. of Natural Resources Fulfill its Mission

- Response capabilities for spills
- Water testing to help ensure safe drinking water
- Technical training and consultation to agency scientists
- Research support for agency projects
- Enforcement case sample testing
- Beach and recreational water monitoring
- Fish contaminant monitoring for fish consumption protection
- Contaminated site clean-up monitoring
- Air contaminant testing

WSLH at a Glance

Communicable Disease Division

The Communicable Disease Division (CDD) provides reference and specialized testing services in support of local, state, and national public health agencies and ensures access to laboratory expertise and capabilities in the disciplines of bacteriology, mycobacteriology, virology, parasitology, molecular microbiology, and serology.

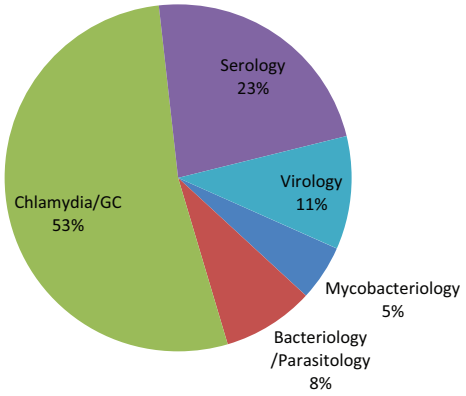
CDD staff also coordinate a network of clinical laboratories in Wisconsin for emergency and public health response.

The Centers for Disease Control and Prevention (CDC) has designated the WSLH as a regional reference center for influenza testing. The testing CDD scientists perform enables us to provide detailed information to public health agencies about respiratory viruses circulating in communities, as well as identify emerging pathogens that could cause severe illness and/or outbreaks.

New technologies being implemented in CDD include MALDI-TOF, a fast and specific test method to identify bacteria by their protein profile. MALDI-TOF reduces testing time (by days) to allow for faster public health response to foodborne outbreaks and TB cases.

CDD also will be implementing whole genome sequencing. This technology allows for in-depth characterization of microorganisms associated with disease and outbreaks. This will enable us to better detect clusters of infections, identify antibacterial and antiviral drug resistance, and characterize virulence determinants.

Communicable Disease Division
(tests by unit)



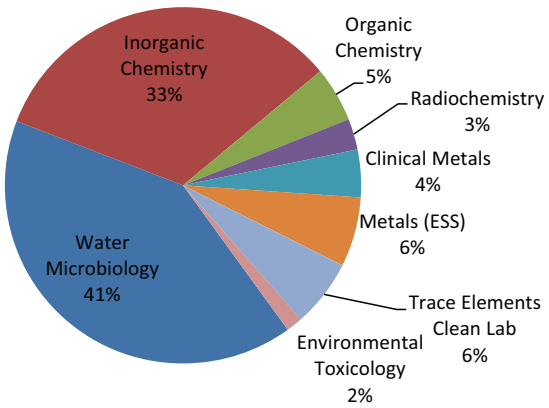
Environmental Health Division

The Environmental Health Division (EHD) serves as the testing laboratory for the Wisconsin Department of Natural Resources and other agencies. Scientists test for many substances and organisms such as pathogenic microbes, pesticides, nutrients, metals, radionuclides, industrial chemicals, and air pollutants. Many types of samples are tested such as water, wastewater, groundwater, air, sediment, solid wastes, and clinical specimens. Although most testing is done only for government agencies, a few tests of public health significance are available to Wisconsin residents.

EHD scientists also engage in research worldwide on the effects of environmental contamination on human health. A new testing technology being implemented in EHD will enhance this capability.

The Multi-Collector ICP-MS (MC-ICP-MS) has several detectors that can each measure a specific isotope of an element. For example, the element lead has four different isotopes. By isolating and measuring the different isotopes, EHD researchers can determine the origin of contamination – a capability not possible with more common testing methods. This is important since airborne pollution can travel thousands of miles and cause environmental contamination and possible negative human health effects far from its original source. The MC-ICP-MS is also being used for clinical (human) health and biomedical research.

Environmental Health Division
(tests by unit)



WSLH at a Glance

Disease Prevention Division - Newborn Screening

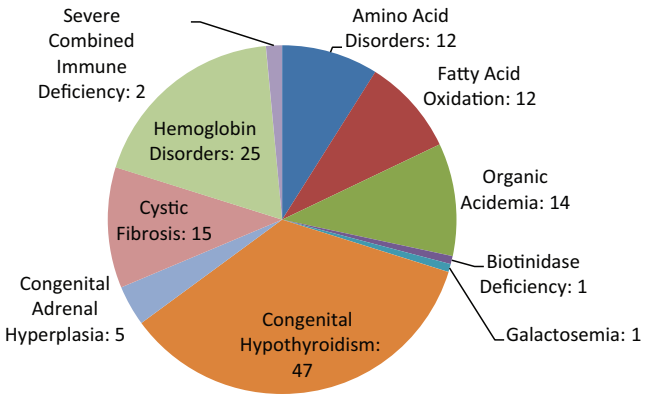
The Wisconsin Newborn Screening (NBS) Program is a collaborative partnership between the WSLH, the Wisconsin Department of Health Services, hospitals, midwives, physician consultants, genetic counselors and nutrition professionals from around the state.

The WSLH NBS Laboratory screens the approximately 65,000 babies born in Wisconsin annually for 44 rare, serious disorders that, left untreated, can lead to severe health issues and sometimes death. Nearly all these disorders are unrecognizable at birth by routine physical examination and require specialized testing to detect. Babies also have their hearing and hearts tested at the hospital or home (if a home birth) as part of the newborn screening program.

Because of the importance of newborn screening to babies' health, it's crucial for hospitals and midwives to send specimens to the WSLH quickly. More than 99% of babies' specimens arrive at the WSLH within 4 days of collection. The WSLH also sends hospitals and midwives a monthly quality report showing how quickly specimens are sent and whether there are any quality problems with the specimens.

In 2008 Wisconsin became the first place in the world to routinely screen newborns for Severe Combined Immune Deficiency (SCID). Babies with SCID are born without functioning immune systems. Since then, WSLH scientists have worked with staff at newborn screening laboratories in numerous other states and foreign countries to help them implement SCID screening.

Newborn Screening Affected Infants Identified (66,252 total screened)



Disease Prevention Division - Biochemical Genetics

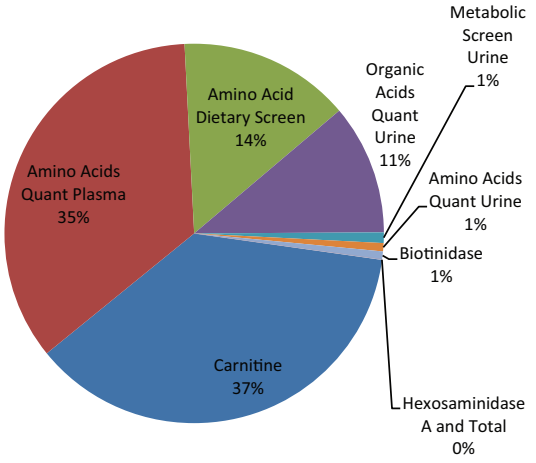
The WSLH Biochemical Genetics Laboratory specializes in the diagnosis and monitoring of inborn errors of metabolism, including disorders such as propionic acidemia, phenylketonuria (PKU), maple syrup urine disease and many others.

Laboratory tests include amino acid analysis, amino acids dietary screening, quantitative organic acid analysis, free and total carnitine, and enzymology for Biotinidase Deficiency.

Most of the patients for whom our laboratory performs testing had their disorder identified in infancy, either through newborn screening or other testing.

Scientists at the WSLH Biochemical Genetics Laboratory and the metabolic specialist physicians who treat these patients will monitor their health and conditions throughout the patients' lifetimes, including transitioning into adulthood.

Biochemical Genetics (by test type)



WSLH at a Glance

Disease Prevention Division - Cytology

The WSLH Cytology Laboratory was started in the 1940s after a WSLH medical technologist was sent to study with Dr. George Papanicolaou — the founder of clinical pathology and the creator of the Pap smear test to diagnose cervical cancer.

Today the WSLH Cytology Laboratory provides conventional and liquid-based cervical cancer screening (Pap tests), Human Papillomavirus (HPV) testing, and surgical biopsy testing (histology).

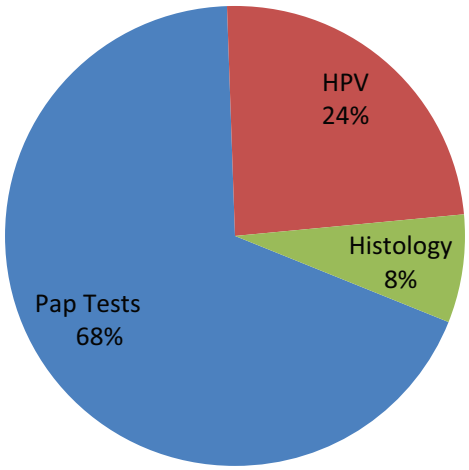
Not only do WSLH scientists perform cytology testing, we also train the cytotechnologists of the future.

The WSLH, in collaboration with the UW-Madison College of Agricultural and Life Sciences Laboratory of Genetics, offers a Cytotechnology Certificate program.

The 12-month program is one of 25 cytotechnology training programs in the United States and trains up to 12 students annually.

Some graduates also pursue careers as physicians, pathology assistants, physician assistants and nurse practitioners.

Cytology (by test type)



Disease Prevention Division - Cytogenetics

Scientists in UW Cytogenetics Services at the WSLH look for genetic abnormalities in patient specimens using microscopic and molecular testing methods.

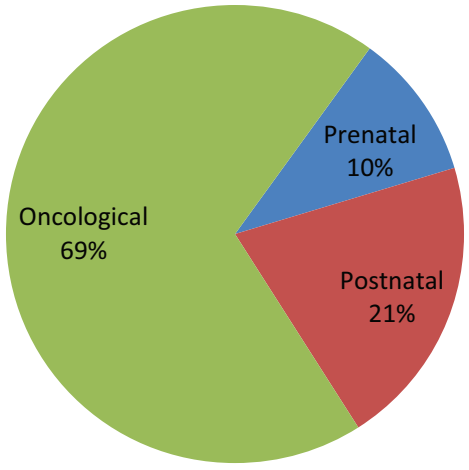
Genetic analysis is an important laboratory diagnostic procedure in the diagnosis and treatment of patients with cancer (oncological), in prenatal diagnosis, in determining possible causes of some cases of infertility or multiple miscarriages, and in the diagnosis of certain patients with developmental disabilities and/or multiple birth defects (postnatal).

The WSLH is collaborating with the UW-Madison Biotechnology Center and the University of Wisconsin Hospital and Clinics to create the University of Wisconsin Collaborative Genomics Core. This new collaborative core will provide clinical and research testing using novel technologies including NextGen sequencing.

UW Cytogenetics Services at the WSLH, in conjunction with the UW Department of Pediatrics, is home for the American Board of Medical Genetics fellowships in Cytogenetics and Molecular Genetics.

The Molecular Genetics fellowship is also a partnership with PreventionGenetics and the BloodCenter of Wisconsin.

Cytogenetics (by test type)



WSLH at a Glance

Occupational Health Division

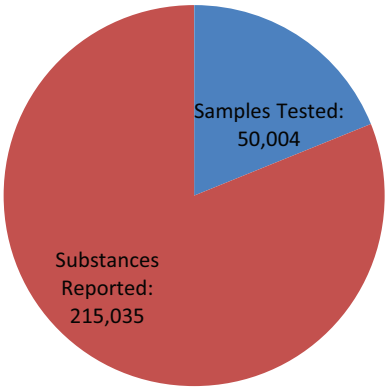
Wisconsin Occupational Health Laboratory (WOHL)

The Wisconsin Occupational Health Laboratory (WOHL) has been actively involved in industrial hygiene chemical analysis since the mid-1930s.

WOHL is a full-service industrial hygiene chemistry and environmental microbiology laboratory, and has served as the central laboratory for OSHA's voluntary health and safety consultation program since 1977. In addition, WOHL provides laboratory services to a wide spectrum of public agencies and private sector clients.

WOHL supplies customers with an extensive list of analytical capabilities and industrial hygiene expertise.

WI Occupational Health Laboratory (WOHL)

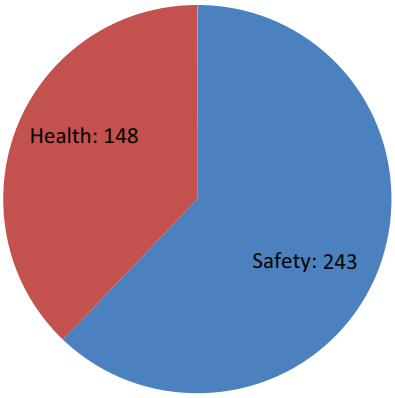


WisCon Onsite Safety and Health Consultation Program

The WisCon program, in conjunction with the U.S. Department of Labor, provides free safety and health consultations to small businesses in Wisconsin.

WisCon industrial hygienists, safety specialists, engineers, ergonomic specialists, and occupational health nurses help business owners provide their employees with safe and healthy workplaces and meet their obligations and responsibilities under the federal Occupational Safety and Health Act (OSHA).

WisCon Consultation Visits (by type)



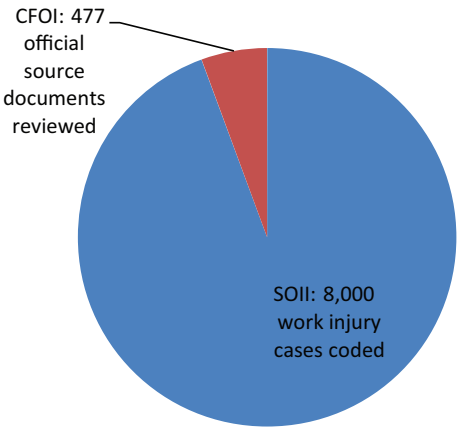
Bureau of Labor Statistics/Occupational Safety and Health Statistics (BLS/OSH)

BLS/OSH holds a cooperative agreement with the U.S. Department of Labor's Bureau of Labor Statistics (BLS) to collect occupational injury, illness and fatality data for the State of Wisconsin.

BLS/OSH analysts conduct the Survey of Occupational Injuries and Illnesses (SOII) and the Census of Fatal Occupational Injuries (CFOI) annually. Staff publish the data collected and disseminate educational materials through media outlets and safety conferences. They also fulfill specific data requests for public and private stakeholders.

Staff also provide OSHA recordkeeping training for employer representatives within the state.

Bureau of Labor Statistics / Occupational Health Statistics



CFOI = Census of Fatal Occupational Injuries
SOII = Survey of Occupational Injuries and Illnesses

WSLH at a Glance

Forensic Toxicology

The WSLH Forensic Toxicology section provides alcohol and drug testing, interpretation of test results, and court testimony to law enforcement agencies and coroners/medical examiners in Wisconsin.

Testing for law enforcement agencies is for traffic safety and other motor vehicle matters (boats, ATVs and snowmobiles) in support of Wisconsin's impaired driving (Operating While Intoxicated - OWI) laws.

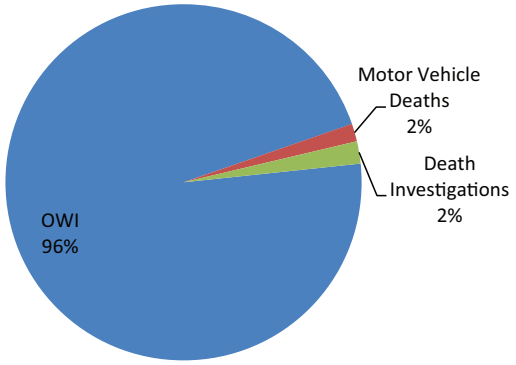
Testing provided to coroners/medical examiners assists these county officials in routine death investigations.

WSLH toxicologists test about 18,000 blood specimens for alcohol OWI cases and about 4,000 for drug OWI cases annually. In addition, they perform alcohol and drug testing on approximately 2,000 specimens annually for death investigations by coroners/medical examiners.

Toxicologists also testify in more than 300 OWI trials annually.

The Toxicology Section performed a Lean Six Sigma process improvement initiative in 2013 and 2014 to decrease the turnaround time for drug testing. Drug testing turnaround time decreased by nearly 75% in 2014 after process improvements, including utilizing new technology and adding additional toxicologists, were implemented.

Forensic Toxicology (by test type)



WSLH Proficiency Testing - Laboratory Improvement Division

WSLH Proficiency Testing (WSLH PT) provides proficiency testing services to help more than 3,000 clinical laboratories in all 50 states and internationally provide quality patient care and meet their laboratory accreditation and quality assurance requirements.

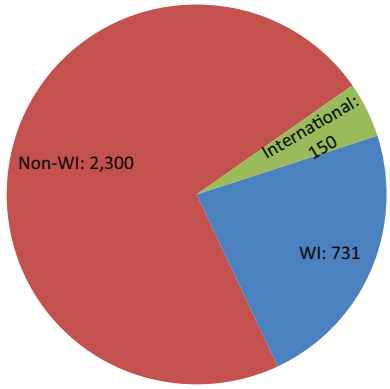
WSLH PT offers 180 different products in Bacteriology, Blood Bank, Chemistry, Coagulation, Hematology, Immunology, Mycobacteriology, Mycology, Parasitology, Point of Care Testing, Urinalysis/Microscopy, Virology, and Waived Testing.

Proficiency testing (PT) is the practice of testing samples of unknown values sent from an external PT program. These samples are shipped to a laboratory at various times throughout the year. The samples are analyzed within a specified time frame by testing personnel who must treat them like a patient sample. Once the samples have been tested, results are sent to the PT program for evaluation. The evaluated results are sent back to the laboratory in a report that both compares the results obtained with the actual results and rates the laboratory against other laboratories using identical or similar methodology.

Participation in PT allows a laboratory to identify procedural problems and take corrective action before patient results are affected.

Successful completion of proficiency testing can serve as a benchmark for quality.

WSLH PT Customers (by location)

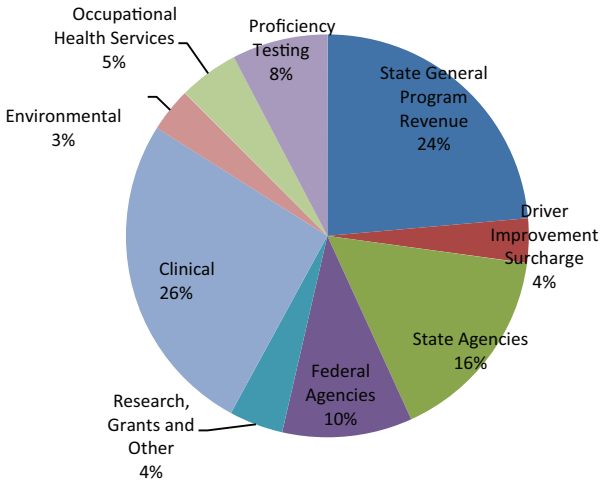


WSLH Financial Information - FY 2014

Revenues

State General Program Revenue	$10,853,322	24%
Driver Improvement Surcharge	$1,637,150	4%
State Agencies	$7,362,897	16%
Federal Agencies	$4,790,863	10%
Research, Grants and Other	$1,987,758	4%
Laboratory service fees from:		
Clinical	$11,978,304	26%
Environmental	$1,628,580	3%
Occupational Health Services	$2,210,920	5%
Proficiency Testing	$3,526,013	8%
Total Revenues	**$45,975,808**	100%

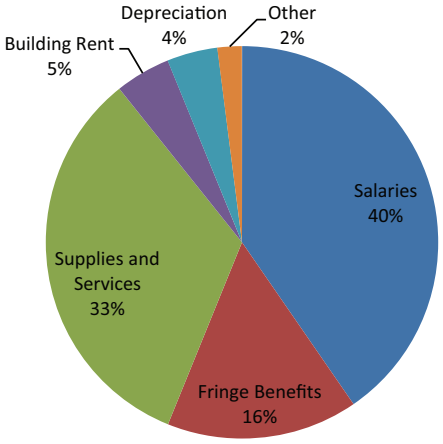
Revenues



Expenses

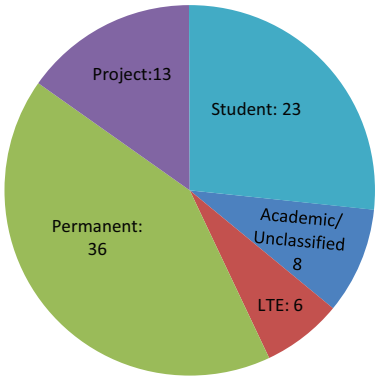
Salaries	$17,860,950	40%
Fringe Benefits	$6,960,459	16%
Supplies and Services	$14,652,787	33%
Building Rent	$2,010,328	5%
Depreciation	$1,843,843	4%
Other	$886,887	2%
Total Expenses	**$44,215,254**	100%
Net Increase/(Decrease) in Equity	**$1,760,554**	

Expenses

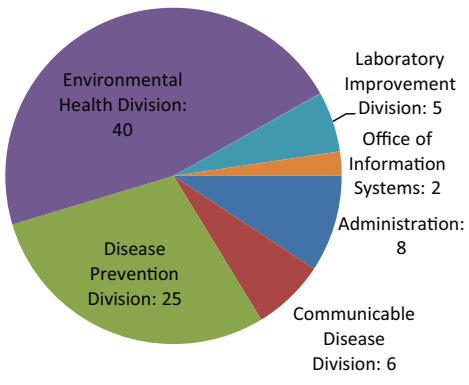


WSLH Staffing Changes

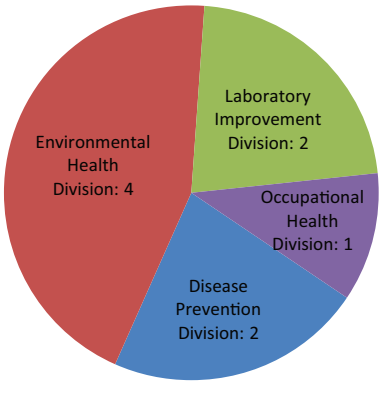
Employees Hired by Type (Total = 86)



Employees Hired (by area)



Employees Retired (by area)



WSLH Board of Directors

Appointed by Governor Walker

Member	Representing
Robert Corliss, MD	Clinical Laboratory Physicians
Ruth Etzel, MD, PhD	Public Member
Carrie Lewis	Public Member
Barry Irmen	Medical Examiners/Coroners
Jeffrey Kindrai	Local Public Health Departments
James Morrison	Occupational Health
Vacant	Private Environmental Testing Laboratories

Appointed by University of Wisconsin-Madison or Wisconsin State Agency

Member	Representing
Darrell Bazzell	Chancellor, UW-Madison
Karen McKeown	Secretary, Department of Health Services
John Sullivan	Secretary, Department of Natural Resources
Susan Buroker	Secretary, Department of Agriculture, Trade and Consumer Protection

WSLH Key Staff Contacts

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Steve Marshall, MS	**WSLH Assistant Director** and Research Epidemiologist and Laboratory Systems Coordinator	**steve.marshall@slh.wisc.edu**	**608-890-1093**
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Cynda DeMontigny	**Human Resources Director**	**cynda.demontigny@slh.wisc.edu**	**608-890-3008**
Jan Klawitter, MA	**Public Affairs Manager**	**jan.klawitter@slh.wisc.edu**	**608-265-2529**

Wisconsin State
Laboratory of Hygiene
UNIVERSITY OF WISCONSIN–MADISON

Clinical Laboratories and Administration:

465 Henry Mall
Madison, WI 53706

Environmental and Occupational Laboratories;
WSLH Proficiency Testing:

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