

The Environmental Side of Public Health

By Jason Loughrin
WSLH Senior Chemist, Wisconsin
Occupational Health Laboratory

One of the best things about working in a laboratory is investigating the unknown. At heart, we all like to think we're something akin to CSI's Gil Grissom, using our brains full of scientific knowledge and forensics skills to solve the mysteries of the day -- albeit on a smaller scale and with far less mess.

So it was with interest that I listened to EHD Inorganic Supervisor George Bowman's description of a peculiar sample while conducting interviews for an article I wrote for the April issue of Wisconsin Natural Resources Magazine. Here are some excerpts from the article:

The golden yellow liquid in the clear plastic bottle was unlike any drinking water sample George Bowman had seen in more than 30 years of service at the Wisconsin State Laboratory of Hygiene (WSLH).

Drawn from a north-central Wisconsin well, the sample looked and smelled more like it should have been sent out for urinalysis rather than a contaminant screening.

The water chemistry supervisor wasn't quite sure what to make of it.

"It looked like someone tried to sabotage the sample," Bowman said, referring to its obvious physical characteristics. "It didn't look like the typical sample."



The first battery of tests on the sample turned out OK -- it was relatively free of typical contaminants like nitrates and bacteria. So Bowman delved deeper. He initiated more tests, consulted with WSLH colleague Sharon Kluender, contacted DNR water supply specialist Chuck Fitzgerald to learn more about the sample's origin, and even contacted the state crime lab to find out if the sample could have been ... man-made.

"The goal was to find what was wrong, because it clearly was not something people should be drinking," Bowman said.

As it turns out, the sample had not been sabotaged, nor was it a prank. The well from which the sample had been drawn had been drilled into a filled-in bog, in violation of state law. The yellow color? Organic compounds, including an extremely high concentration of iron caused by boring through several feet of muck. The putrid smell? Swamp water.

On the advice of the DNR, the well was abandoned.

And you thought environmental science was dull? (See page 4 to find out more about the history of environmental health in Wisconsin.)

Table of Contents

Director's Column.....	page 2
New Hepatitis C Guidelines	page 3
A Century of Environmental Laboratory Support	page 4
Virus Views	page 6

Promoting Life-Long Healthy Living Habits



WSLH Associate Director Peggy Hintzman has worked at the State Laboratory of Hygiene for nearly 20 years. Her interest in quality management and systems improvements resulted in her participation as a member of the Steering Committee for Wisconsin's State Health Plan for 2000-2010. Hintzman is an active member of the Wisconsin Public Health Association, serving as president in 1999-2000. Currently, she is working with the National Model Public Health Statutes Collaborative project, serving on the Medical College of Wisconsin's public and community health oversight advisory committee and co-chairing a technical advisory committee for the information technology elements of the CDC grant for bioterrorism preparedness. She holds a Masters of Business Administration degree from the University of Wisconsin-Madison.

The week of April 7-13 was National Public Health Week (NPHW). Tommy G. Thompson, federal Health and Human Services Department secretary, said this "is a time to recognize and to thank the thousands of public health professionals and practitioners across this great nation for their efforts...."

So, we thank each and every one of you for the work you do every day to make Wisconsin a safer, healthier place to live, work and play. Whether you work in a hospital or clinic laboratory, a public health department, an environmental protection agency, a community-based service organization, or another place that protects and promotes health, we are happy to count you among our public health partners.

National Public Health Week also presents an annual opportunity for public health partners to highlight one topic for simultaneous nationwide attention. The theme of the 2003 NPHW observance was overweight and obesity, and the goal was to educate American adults and children about the health risks associated with this fast-growing epidemic and to suggest ways for communities and individuals to take action to improve their health.

According to the American Public Health Association, nearly two-thirds of all American adults are overweight or obese with the number of overweight having tripled since 1980*. According to Wisconsin's Behavioral Risk Factor Survey, the prevalence of overweight Wisconsinites has increased steadily over the past decade from 23 percent in 1989 to 34 percent in 1998 (Wisconsin Department of Health and Family Services, Bureau of Health Information, 1998). Since excess weight is a risk factor in

many chronic diseases such as cardiovascular disease, type 2 diabetes, hypertension and stroke, taking action to maintain a healthy weight for our children and ourselves can have a dramatic impact on health and quality of life.

Two relatively inexpensive interventions--exercise and a healthier diet--can make a difference. "Healthiest Wisconsin 2010: A Partnership Plan to Improve the Health of the Public," selected "Overweight, Obesity and Lack of Physical Activity" as one of eleven health priorities to receive statewide attention in this decade. You can view the state's implementation plan at <http://www.dhfs.state.wi.us/Health/TurningPoint/index.htm>.

For a tool kit of resources on how to address this important public health issue in your community, you may want to visit a special APHA Web site at: <http://www.apha.org/NPHW>. As we welcome spring back into our state and toss our boots to the back of our closets, let's also dust off our sneakers, and go for a walk. As Hippocrates said around 400 BC, "Walking is man's best medicine."

*Body Mass Index (BMI) is used to define overweight, using a ratio of weight and height correlated with body fat (kg/m²). Here are a couple of Web sites with BMI calculators for adults and children. Please note that I cannot vouch for the security of these sites.

<http://www.keepkidshealthy.com/welcome/bmicalculator.html>

<http://www.halls.md/body-mass-index/bmi.htm>

Update on CDC Guidelines for Hepatitis C Virus Testing and Reporting

By Brent Haase
WSLH Advanced Microbiologist

Although tests for the detection of the antibody to the hepatitis C virus (HCV) have been licensed since 1990, confusion still exists among healthcare professionals concerning which tests should be ordered and when a patient can be considered to have been infected with hepatitis C.

Recommendations for HCV diagnosis have been to use an antibody screening assay such as the enzyme immunoassay (EIA) or an enhanced chemiluminescence immunoassay (CIA) followed by supplemental testing of reactive specimens. Supplemental tests include the recombinant immunoblot assay (RIBA) or a nucleic acid amplification test (NAT) such as the reverse transcriptase polymerase chain reaction (RT-PCR) assay. Many laboratories report a positive HCV result to submitters based solely on a reactive EIA screening test.

Depending on the prevalence of HCV infection in a particular population, many of these reactive results may in fact be false-positives. Further testing is indicated to confirm a reactive screening result.

On February 7, 2003, the CDC published "Guidelines for Laboratory Testing and Result Reporting of Antibody to Hepatitis C Virus." These guidelines address many of the important issues involved with HCV testing, including screening, supplemental assay options and testing algorithms.

One of the most significant changes in the guidelines involves the use of S/Co (signal to cutoff) ratios when interpreting EIA screening results. CDC has determined that a S/Co of ≥ 3.8 is highly predictive of a true positive result and in most cases does not require further supplemental testing to confirm HCV infection.

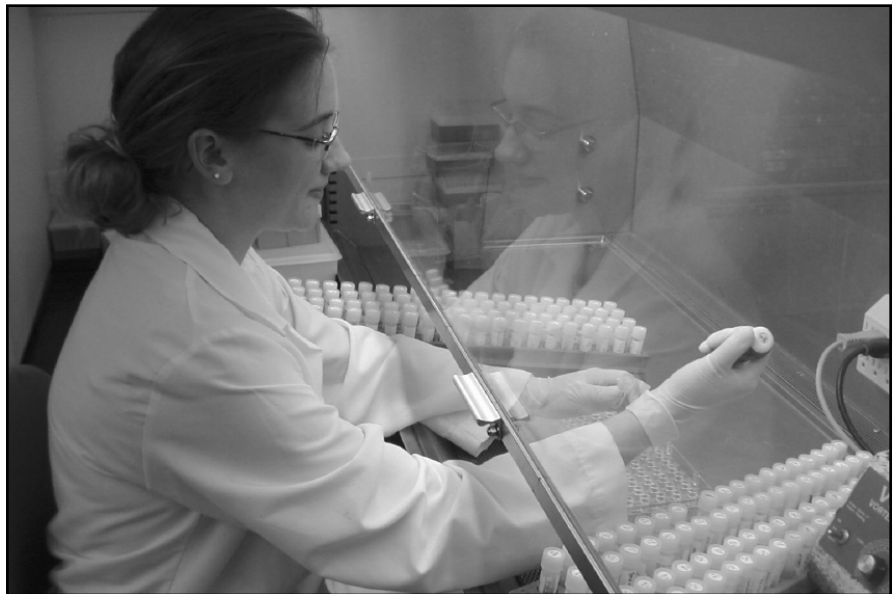
Specimens with a ratio of ≥ 3.8 may be considered as anti-HCV positive without additional testing provided that a statement is included on the report. This statement must indicate that supplemental testing was not performed and that samples with high S/Co ratios usually ($\geq 95\%$) confirm.

Therefore, only those specimens with a S/Co ratio of < 3.8 would need supplemental testing by either NAT and/or RIBA testing. For these specimens, CDC suggests performing RIBA testing on the

same specimen or testing an appropriately collected specimen by NAT. If the NAT test is negative, then test by RIBA.

The CDC Guidelines are an excellent source of information on HCV testing and reporting and should be read by all laboratory personnel and clinicians involved in HCV testing. The Wisconsin State Laboratory of Hygiene and the Bureau of Communicable Diseases, Division of Public Health have met to discuss the new guidelines and the WSLH will report EIA results to customers with appropriate comments as determined by the S/Co ratios.

The guidelines can be found on the Web at www.cdc.gov/ncdod/diseases/hepatitis/. RT-PCR testing will remain available at the WSLH for those who wish to confirm by this method.



Amy Sagen, a microbiologist for the Communicable Disease Division at the Wisconsin State Laboratory of Hygiene, prepares samples for Hepatitis testing.

Great Moments in Environment

*By Jason Loughrin
WSLH Senior Chemist, Wisconsin
Occupational Health Laboratory*

Improving the environmental health of Wisconsin's citizens has been a primary concern of the State Lab since its inception as the Wisconsin State Hygienic Laboratory on October 1, 1903. In fact, the legislation initiating funding for the lab cited its use in the "chemical and bacteriological examination of water sup-

plies and of the cases of infectious and contagious diseases peculiar to man and animals."

As the lab has grown and expanded—from a few scientists working with an annual budget of \$1,500 in 1903, to 320 employees operating under a \$28 million budget today—it has held fast to its original purpose, and today serves as a model institution for the examination and analysis of environmental health concerns. Even as we enter a dan-

gerous new era under the threat of chemical and biological terrorism, the State Lab holds its place at the front lines of the never ending fight against environmental hazards.

But before forging into the battle ahead, let's pause for a moment to look back at some of the State Lab's notable environmental health victories from its first century of service.



A statewide rabies epidemic results in the acquisition and administration of the Pasteur treatment for individuals bitten by rabid animals.

Research conducted by UW professor M. Starr Nichols at the WSLH leads to Wisconsin becoming one of the first states to chlorinate its water supplies, greatly reducing health hazards associated with contaminated drinking water. Water testing at the State Lab encouraged the move from unsafe water supplies to safe water supplies in the rural sector, particularly in the farming industry.



The Wisconsin State Hygienic Laboratory opens on the University of Wisconsin-Madison campus.

The State Lab Occupational Health program is founded.

Wisconsin Department of Natural Resources is formed and officially splits from the WSLH; however, the partnership continues and the State Lab forms the Environmental Sciences Section to provide all laboratory services for the DNR. The partnership with the DNR and other state agencies is based on effective coordination and cooperation.

The WSLH's new building on Henry Mall is dedicated to the lab's longtime director, Dr. William D. Stovall. An addition was completed in 1974.



The State Lab begins distribution of a vaccine for typhoid.

Public Health History at the WSLH



The State Lab takes a lead role in the research and analysis of polychlorinated biphenyls (PCBs). Some of the pioneering research on PCBs was done at the University of Wisconsin, and the WSLH developed analytical testing techniques. Today the WSLH is a center for PCB analysis.

The Environmental Health Division moves into its new building on Madison's east side on Agriculture Drive. The new facility has a unique "open" design and houses some of the most state-of-the-art testing equipment. Laboratory managers from around the world tour the facility to gain laboratory design insight.



The Wisconsin Occupational Health Laboratory (WOHL) at the WSLH becomes the central analytical laboratory for the Occupational Safety and Health Administration voluntary consultation program. The relationship continues to this day and includes over 40 states and territories.

Toxicology, WOHL and ESS merge to form the Environmental Health Division (EHD) at the State Lab.

WOHL, asbestos section and ESS relocate to Jonathan Drive facility in Madison.

The WSLH becomes one of the first labs in the nation to earn accreditation for environmental mold analysis.

The WSLH received funding from the Centers for Disease Control and Prevention to prepare for potential public health emergencies. The EHD prepares its facility to respond to a chemical terrorism event.

The State Lab tests thousands of samples for cryptosporidium from the world's largest single-point outbreak in one of Milwaukee's water treatment facilities.



A Look Back at the 2002-3 Influenza Season

By Carol Kirk
WSLH Virology Program Coordinator

The 2002-3 influenza season was a notable one, not because of the influenza strains that circulated in Wisconsin, but because of concerns about the potential for avian influenza and the emergence of Severe Acute Respiratory Syndrome (SARS).

Influenza

The first Wisconsin influenza isolates of the 2002-3 season were detected during the week ending December 7, 2002, a bit later than in recent years. While both of the first two isolates were influenza A viruses, one was influenza A(H1) and the other influenza A(H3), which left us wondering which subtype would predominate. Influenza A(H1) finally established its predominance over influenza A(H3) in mid-January, about the same time

that influenza B viruses arrived on the scene.

Influenza A(H1), influenza A(H3) and influenza B detections all reached peak levels in Wisconsin during late February.

In Wisconsin, slightly more than 13% of all respiratory specimens tested since the last week of September were positive for influenza. During the peak, influenza A and B were detected in 20% and 11% of respiratory specimens, respectively. Nationally, slightly less than 12% of respiratory specimens were positive for influenza during that same time period.

In Wisconsin, 65% of the reported influenza viruses were influenza A, and 35% influenza B. Nationally, 56% of influenza viruses were influenza A, and 44% influenza B, although this varied among the dif-

ferent regions.

Of the influenza A isolates that were subtyped, approximately 68% were influenza A(H1), while 32% were influenza A(H3). Nationally, 50% of influenza A viruses were subtyped, with 78% influenza A(H1) and 22% influenza A(H3).

Avian Influenza

Wisconsin instituted enhanced surveillance for influenza in late February in response to reports of two human cases of avian influenza in Hong Kong. Both of the human cases of influenza A(H5N1) had recently returned to Hong Kong from China.

Although no additional cases were detected, there was concern that the virus could cause widespread outbreaks if it was able to spread easily among humans or if it recombined with a human strain of influenza.

The CDC is also monitoring an outbreak of another avian influenza virus, influenza A(H7N7), in the Netherlands. For more information, refer to the CDC Web site at www.cdc.gov/ncidod/diseases/flu/H7n7facs.htm.

RSV

While the three strains of influenza battled for predominance, respiratory syncytial virus (RSV) detections increased from sporadic levels in November to peak levels in early February. As we go to press, RSV detections continue in Wisconsin, but at very low levels.

As we anticipate the warmer days of summer, we can also anticipate the usual seasonal change in circulating viruses.

WORKSHOP NOTICE:

Thursday, June 19, 2003
8:30 a.m. - 4:15 p.m.
Olbrich Botanical Gardens
Madison, WI

Speaking at the workshop:

Janet Fick Hindler
MCLS, MT(ASCP), F(AAM)
Senior Specialist, Clinical
Microbiology
UCLA Medical Center
Los Angeles, CA

Edward A. Belongia, M.D.
Director, Epidemiology
Research Center
Marshfield Medical Research
Foundation
Marshfield, WI

Sponsored by the WSLH and the National Laboratory Training Network (NLTN). Registration information for this one-day workshop can be obtained at the NLTN Web site at www.phppo.cdc.gov/nltN/default.asp and on the WSLH Web site at www.slh.wisc.edu under the "Training and Outreach" heading.

Wisconsin SARS Update

The outbreak of Severe Acute Respiratory Syndrome (SARS), which originated in China and has since spread to other countries, has prompted a global response to curb the spread of the disease.

In addition to efforts to curb the spread of the virus, investigators have collaborated to identify the cause of the disease and develop diagnostic tests. It appears that the cause of the disease is a previously unknown coronavirus.

In Wisconsin, the Wisconsin Division of Public Health (WDPH) has been monitoring

for cases of SARS. Healthcare providers in Wisconsin have been asked to notify the WDPH if they see patients who meet SARS case criteria and present with illness consistent with SARS.

Laboratories should also be alert to SARS cases, as SARS specimens require additional biosafety precautions.

Information about SARS is changing rapidly. Current information about SARS can be found on the CDC Web site at <http://www.cdc.gov/ncidod/sars/>.

Gearing Up for Arbovirus Season

*By Carol Kirk
WSLH Virology Program Coordinator*

Along with the warmer temperatures will come mosquitoes, which translates into the potential for arbovirus infections.

Until 2002, the most common arbovirus in Wisconsin had been California Encephalitis (CE), which typically infects children. During 2002, 27 cases of CE were reported.

Like much of the rest of the country, however, Wisconsin is also expecting to see West Nile Virus (WNV) infections again this summer.

During 2002, 45 people in 20 Wisconsin counties were infected with WNV. As an indication of the possible range of this virus in Wisconsin, WNV-positive birds were detected in 62 of Wisconsin's 72 counties.

West Nile Virus Testing Capacity at the State Lab

The Wisconsin State Laboratory of Hygiene will have increased testing capacity for WNV this year due to the commercial availability of reagents for the IgM antibody MAC-ELISA test. Commercial availability of these reagents will allow the WSLH to provide fee-for-service testing in addition to supporting the WDPH surveillance program.

Clinical criteria will not be required to submit patient samples for fee-for-service arboviral screening.

Cerebrospinal fluid (CSF) and/or serum from patients can be submitted to the WSLH for testing after May 1. The WSLH requests that a serum sample be submitted with a CSF sample, as the volume of CSF samples are often insufficient for complete testing.

New CSF Test Available

The WSLH is now offering a "real-time" RT-PCR test for enteroviruses, in addition to viral culture. This test method offers a highly sensitive and rapid approach for the detection of enteroviruses in CSF samples.

The test requires 2.0 ml of CSF, collected in a sterile container, with no additives. Specimens should be transported at refrigerator temperature.

The assay does not detect echovirus 22 or 23, recently reclassified as parechoviruses 1 and 2, respectively.

A negative result does not rule out infection with enterovirus and relevant clinical information should be taken into consideration when interpreting the results.

Test Name: Enterovirus PCR
Test Code: 1507 PCR
Price: \$175.00

For more information, contact the WSLH Customer Service Department at (608) 262-6386.

Mailing kits and requisition forms for submitting samples for arboviral testing may be requested from the WSLH Communicable Diseases Customer Service Department at 1-800-862-1088. Please request "CDD Requisition Form (B) 01-01-03."