

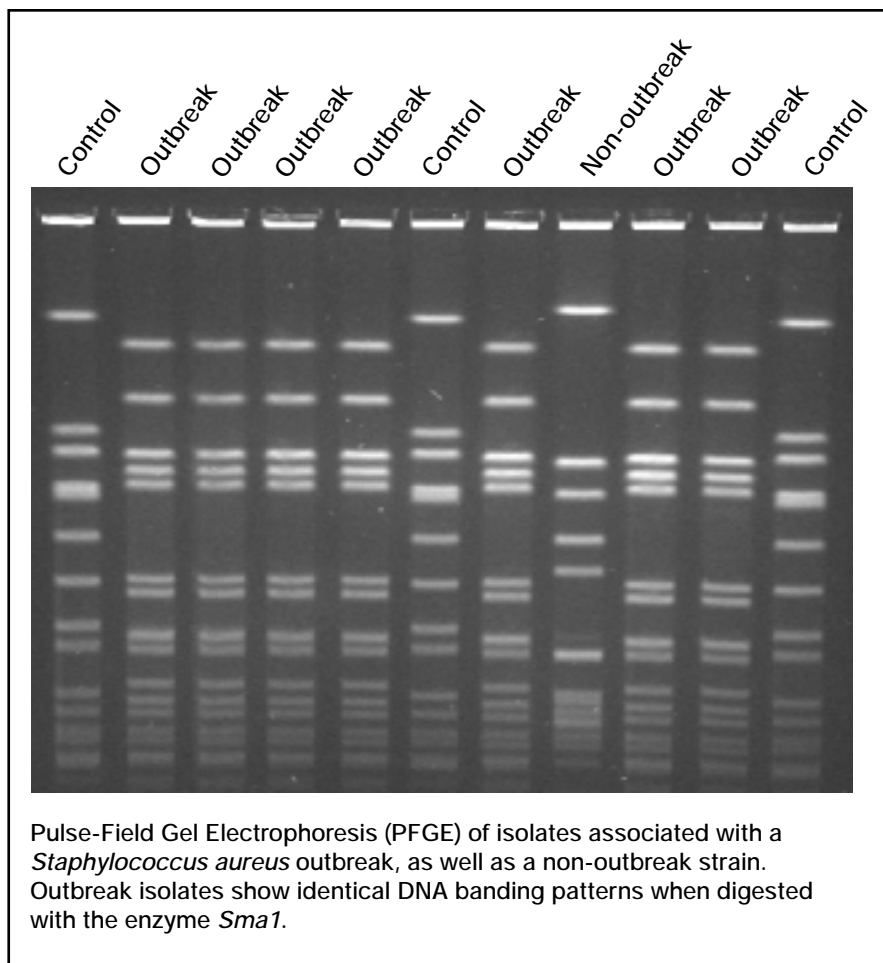
When good foods go bad, WSLH'S PFGE lab starts cookin'

By Stephanie Kuenn,
WSLH Public Affairs

Eating is an essential part of life, but sometimes the food we eat can come back to haunt us. Certain foods—including undercooked red meat, sprouts, cheese curds and certain fruits—can become contaminated with bacteria and other micro-organisms, causing food-borne illnesses in the people who consume them.

When local public health officials notice similar symptoms in a group of patients, they report it to the state Division of Public Health (DPH) to investigate. If a food-borne illness is suspected, the DPH relies on the Wisconsin State Laboratory of Hygiene to determine if a single-point foodborne outbreak is occurring by using pulse-field gel electrophoresis (PFGE), one method of DNA fingerprinting.

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Editor's Note

The WSLH has changed its *After-Hours Emergency Alert Paging System* phone number. To reach WSLH staff for emergency assistance outside our routine business hours (Monday-Friday from 7:45 a.m. to 4:30 p.m.), please call **608-263-3280**. Thank you.

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"We can't wait for the storm to blow over. We've got to learn to work in the rain." *Pete Silas, Phillips Petroleum*

This is my last "Director's Column" as I am retiring this July with 28 years in the laboratory field. So, what to write about? After struggling for several days to find a topic, it came to me - I hear managers talking about it all the time - recruiting, hiring, managing and retaining the new generation of people coming today to work in our labs (and other businesses,) the generation of X's, Y's and maybe even what I call Z's!

Surveys say American companies lose half of their employees every four years. My father-in-law worked for General Motors for 42 years. Resumes I see today show some people changing jobs every two years. A third of American workers, 34 million, are "contingency workers." They are part timers, temps, consultants, and



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free-lancers. Nine percent of the adult working population, 10 million, is now starting their own business. And in some professions, health care for example, the number of young people entering educational programs has dropped dramatically.

Since the old "employee contract" is no more and people generally won't stay with one company their entire career(s), how do we successfully manage in this environment? To complicate matters even more, we are managing today in a climate of incredible budget tightening. (I'm glad I had a chance to experience laboratory management in the "good old days", before DRG's, when labs were profit centers and funding was plentiful.) Today we see reduced staff, reduced funding for travel to meetings and seminars and on and on. The good news is that management styles have changed and "boss" terminology and the military model are old and out-of-date, thank goodness. A focus on teams and quality management concepts is the winning style for leading the new generations.

Material things motivated us baby boomers, house, Volvo, etc. The Xer's are more of an independent spirit. They want clearly defined goals and the freedom to achieve them in their own way. Most of all they want to acquire skills to make them more marketable later on. They care about where the job is going to lead them.

Since these people grew up in the computer age, they are very adept at using different data and terminology to solve problems. Hoarding information from these people stifles one of the greatest resources Xer's bring. One Xer I

know left a job because he wasn't allowed access to the Internet!

Probably their number one priority is a work-life balance. Work isn't everything to them. They value flextime and on-site daycare. They also have a distrust of institutions, the *Dilbert* factor. They want honesty from everyone and especially those in charge. What may come across as arrogance is really self-reliance. I've noticed that Xer's prefer constant informal feedback rather than periodic formal performance reviews. With their independent nature they sometimes refuse to stick to procedures. Personally though, I've found Xer's to be some of the most delightful people I've worked with. I agree very much with their work-life balance approach. People that have worked this out for themselves seem to be the most satisfied employees.

Now that generation X is familiar to us, along comes generation Y, those born after 1977. What are they looking for? Some of the same certainly, but also a fun environment that offers growth opportunities and competitive salaries. They look for jobs offering a wide range of projects to work on, travel opportunities and again, those flexible work schedules. Not only do they expect to change employers several times, but also careers. To manage them while you have them, accept them, don't micro-mange but set specific standards and expectations, offer training, be there to support them and make work fun!

As I see it, managing generation Z should be easy. You'll never see them! Not only will they work

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PFGE... from page 1

PFGE is a simple 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 the technology since 1995 and performs about 1,000 PFGE tests per year.

PFGE is an important tool for investigating foodborne outbreaks, said Terry Kurzynski, an advanced microbiologist at the WSLH.

"It supplements epidemiological investigations and supports their findings," he said. "It also detects otherwise undetectable outbreaks, linking sporadic cases that seem epidemiologically unrelated. It's especially helpful in the detection of multi-state outbreaks through posting PFGE band patterns on PulseNet."

PulseNet is a database run by the CDC that catalogs bacterial band patterns obtained by PFGE. Almost all state public health laboratories submit band patterns to the database to determine if their PFGE results match those from other states. If so, it may indicate that a

multi-state outbreak is occurring. It was especially helpful in investigating a *Salmonella muenchen* outbreak in the fall of 1999, which was traced to sprouts and sickened people in as many as five states.

"Almost all state public health labs, the FDA, the USDA and several labs in Canada participate in PulseNet," Kurzynski said. "We're also working with new software to make PulseNet more efficient, and I'll travel to the CDC this spring for software training."

PulseNet is also helpful in investigating more extensive outbreaks, such as those involving *Escherichia coli* O157:H7. *E. coli* O157:H7 and *Salmonella typhimurium* are the two most common organisms the lab receives, but the PFGE lab also performs tests on *Listeria*, *Shigella*, other types of *E. coli*, other types of *Salmonella*, *Neisseria meningitidis* and *Campylobacter*, to name a few. Kurzynski said the lab develops new methods for testing other organisms, as needed.

"We'd like to intensify our surveillance efforts by soliciting clinical

labs to submit all of their *E. coli* O157:H7 and *Salmonella* isolates to us for confirmation and PFGE testing," Kurzynski said. "We also will be monitoring the incidence of non-O157 *E. coli* strains that produce shiga toxins."

Some states report high incidences of such non-O157 *E. coli* strains, which can cause severe diarrheal disease.

"Currently, we don't know the incidences of these strains in Wisconsin and it is critical to make this determination," Kurzynski said. "The surveillance of the causative agents of severe diarrheal diseases is an ever-expanding field. State public health labs need to play a leading role in this complex area."

The WSLH's PFGE activities are supported, in part, by funding provided by the Centers for Disease Control and Prevention through the Wisconsin Division of Public Health's Infectious Diseases Epidemiology and Laboratory Capacity (ELC) cooperative agreement (U50/CCU514391-01).

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from home, that home could be in another state or another country! As we have distance learning, we will have distance working. Technology offers no limits to the possibilities ahead in the workplace of the future. However, as Tom Peters and Nancy Austin say in *A Passion For Excellence* man-

agers have to know where they're going, be able to state it clearly and concisely and they have to care about that vision and their people passionately. I don't think that will ever change, no matter what we call the current or the next generation.

I will end by saying so long. Good-bye. It's been a wonderful and challenging 28 years, and I am grateful for all the opportunities I've had. I wish you all the best!

WSLH investigates the EPA's 'Most Wanted'

By Stephanie Kuenn and Jan Schneider,
WSLH Public Affairs

The government might not display Microsporidia's picture in the post office, but the waterborne parasite is still one of its "most wanted" offenders.

Dr. David Battigelli, who oversees the Wisconsin State Laboratory of Hygiene's Environmental Virology section, has received grants totaling more than \$600,000 from the Environmental Protection Agency (EPA) and the American Water Works Association Research Foundation (AWWARF) to develop effective testing methods that can be used to detect Microsporidia in a number of different environments.

As part of the 1996 amendments to the Safe Drinking Water Act, the EPA established a list of chemical and microbiological contaminants to help set drinking water research priorities. The result was the EPA's contaminant candidate list (CCL).

Established in 1998, the CCL divides contaminants into three categories—regulatory determination priorities, research priorities and occurrence priorities. Microsporidia is a parasite listed under both the research and occurrence priorities, as little is known about its distribution in the environment and there are no standardized methods for its detection.

"We know something about the severity of Microsporidiosis as a disease in humans, but we know very little about its potential for waterborne transmission," Battigelli said. "We know little about its environmental distribution and hence aren't in a position to determine the true impact of waterborne microsporidiosis on the public health."

According to Battigelli, it's been listed as a research and occurrence priority for a number of reasons:

- ❖ There are currently no detection methods for Microsporidia. As a result, little is known about its occurrence in the aquatic environment.
- ❖ Microsporidia can contribute to relatively severe human disease, including the "wasting" syndrome observed in AIDS patients.
- ❖ It is an opportunistic pathogen, commonly attacking the immunosuppressed, including chemotherapy patients, transplant recipients, the elderly and the very young.
- ❖ It is not clear what Microsporidia's true impact is on the general human population. "Part of the reason for this is that it isn't possible to perform a risk assessment in the absence of robust environmental detection methods," Battigelli said.
- ❖ The parasite forms spores and "the spore stage is extremely resilient in water," Battigelli said. "When ingested it breaks down and drills itself into cells of the gastrointestinal tract where it can cause severe illness."
- ❖ Doctors may not diagnose microsporidiosis illness effectively because its symptoms are somewhat similar to those exhibited by patients suffering from other diarrheal diseases, including foodborne illnesses. If a doctor does suspect it, it is often because of a patient's recent travel or health history. Even then, there are few good ways to diagnose Microsporidiosis in a patient. And even a

small amount can be infectious, meaning that low levels of contamination may lead to illness in humans.

Battigelli's first priority is to develop sensitive detection methods for Microsporidia in water.

"They need to be sensitive and efficient," Battigelli said. "We also need a method that will work across a wide variety of water qualities, from tapwater to polluted lake water."

This section of Battigelli's work will unfold in three stages. First, he'll concentrate on devising a sample collection method, and then his team will focus on developing purification methods designed to render the water samples compatible with a diagnostic assay, such as the polymerase chain reaction or gene probes. Finally they will examine sample concentrates to identify if the species present are pathogenic and infectious to humans.

The two projects include collaborators from across the country (the University of Arizona – Tucson, and a private consulting firm, Clancy Environmental Consultants, Inc.), as well as a team from within the state (Marshfield Medical Research Foundation). The research team will be evaluating a number of biotechnological approaches to devise a finished method, including flow cytometry, continuous flow centrifugation and gene probes.

"Right now, our goal is to gauge what we perceive to be the true impact of Microsporidia on the public health," Battigelli said. "We want to be able to devise strategies aimed at minimizing the adverse consequences of infections in humans."

UW-Green Bay student takes advantage of WSLH's PCB analysis expertise

By Jan Schneider, WSLH Public Affairs

Taking classes, studying and teaching are often enough to fill up a graduate student's days without having to be on-call to race to a clinic to pick up a blood specimen for her master's thesis project, run to the lab, isolate neutrophils from the whole blood and then perform a superoxide anion generation test after the neutrophils are isolated—all of which must happen within five hours. But that's exactly what Amy Chong, a UW-Green Bay master's degree student in Environmental Science and Policy, is doing.

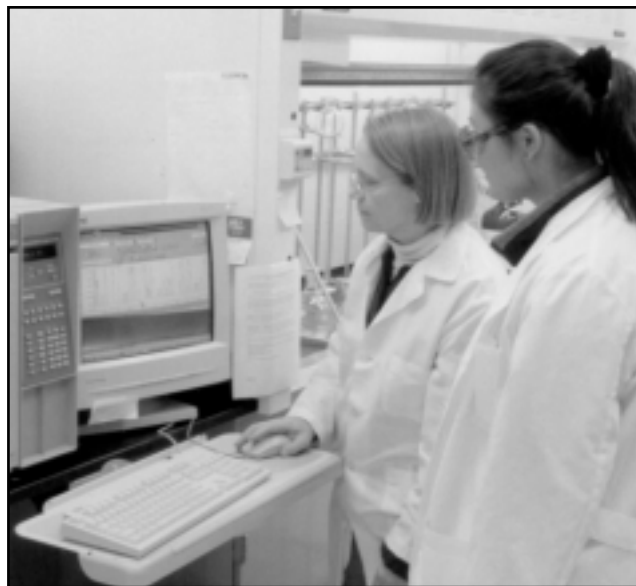
Chong's thesis research is examining PCB levels and neutrophil competence in northeastern Wisconsin women in their 28th week of pregnancy. A neutrophil is a type of granulocyte. Granulocytes represent a category of leukocytes (white blood cells). Neutrophils act as a first line of defense against infectious agents and foreign stimuli. Chong is studying PCB levels and neutrophil competence by measuring the superoxide anion generation and degranulation that occurs as a response to phagocytosis (engulfment of foreign stimuli).

Chong is working with staff in the WSLH Organic Chemistry Unit to determine if PCBs are in the serum of the women in her sample population and at what concentration.

PCBs are polychlorinated biphenyls, a family of man-made chemicals that contain 209 individual compounds with varying toxicity. PCBs are known to cause cancer in animals and are strongly suspected of causing cancer and other serious health problems in humans. The WSLH Organic Chemistry Unit has been performing PCB analysis for many years and staff members have been very willing to share their expertise with Chong.

According to Chong, her project cannot show a one-to-one causal relationship between PCBs and neutrophils, but she should be able to determine if there is any correlation between the two based upon previous research data.

"There have been very few studies done on PCB levels and neutrophil competence in humans," says Chong. "I hope this study will raise some more questions on the effects of PCBs on humans and possibly lead to future research."



Advanced Chemist Carol Buelow (left) and Amy Chong review a gas chromatogram display of a PCB analysis. Gas chromatographic analysis is used to separate and determine concentrations of individual PCB compounds.

According to Carol Buelow, advanced chemist in the WSLH Organic Chemistry Unit, staff members are also interested in what Chong finds.

"This will be an interesting project for us to see if there is a correlation and to see what PCB concentrations are present in this population," Buelow says.

As part of the University of Wisconsin-Madison, the WSLH has always been very active in research with UW-Madison faculty and students. Chong's UW-Green Bay connection provides the WSLH with another exciting research opportunity claims David Degenhardt, WSLH Organic Chemistry Unit supervisor.

"Working with Amy gives us an opportunity to work with a researcher from one of the UW System schools," says Degenhardt. "This project allows us to share our expertise and establish new research relationships in the process."

Chong hopes to have the project wrapped up by summer so she can defend her thesis.

Changing seasons bring change of viruses

As the snowdrifts give way to greenery and spring flowers, so do the influenza, respiratory syncytial virus and rotavirus seasons give way to the viruses of summer. While the change in scenery produces a sigh of relief and expectations of better weather, the change in viruses is not necessarily an improvement.

Looking Back

Influenza

As this newsletter goes to press, we are seeing only occasional sporadic cases of influenza A in Wisconsin. Influenza B continues to be detected in most areas of the state, but at decreasing levels. Both influenza A and influenza B were first detected in Wisconsin during the week of December 2, 2000.

Influenza A activity peaked during the last week of January 2001 and first week of February 2001, while influenza B activity produced a smaller peak during the week of February 24, 2001, based on laboratory reports.

Influenza A (H1N1) was the predominant influenza A subtype detected nationally and was the only influenza

A subtype detected in Wisconsin this season. Influenza A (H1N1) last predominated during the 1995-96 season; influenza A (H3N2) has predominated during the past four seasons.

During the week of January 27, 2001, influenza A and B were recovered from 19-22 percent of all respiratory specimens tested by the virology laboratories in Wisconsin and accounted for 70 percent of the respiratory viruses recovered.

Last season, influenza A was recovered from 36-40 percent of respiratory specimens tested during the peak weeks of January 1 and January 8, 2000, and accounted for approximately 87 percent of respiratory viruses recovered during those weeks.

RSV

Respiratory syncytial virus (RSV) detections are still being reported from most areas of the state, but are also decreasing. RSV detections maintained peak levels during February 24 through March 17, 2001. During those peak activity weeks, RSV was recovered from 18-25 percent of all respiratory specimens tested by virology laboratories. During the 1999-2000 season, RSV was recovered from 29 percent of respiratory specimens tested and reached peak levels during the week of February 12, 2000.

Rotavirus

Turning from the respiratory to the gastrointestinal viruses of winter, rotavirus detections in Wisconsin peaked during the week of March 17, 2001, and are now declining. Last year, rotavirus detections maintained near peak levels throughout April and into the first week of May 2000.

Looking Around

In the immediate future, we can expect to see the annual increases in rhinovirus activity and parainfluenza 3 activity. Although both groups of virus-

Similar name, different virus

One of the illnesses that is typically caused by enteroviruses produces lesions on the hands, feet and mouth and is therefore referred to as "hand, foot and mouth disease". This syndrome and the viruses which cause it are not related to the "hoof and mouth" or "foot and mouth" disease of animals which has been in the news recently. (See page 7.)

es have been detected through the winter, the end of influenza and RSV season typically signals an increase in activity by these viruses.

Looking Ahead

As we pass through spring into summer, we can expect to see the annual increase in enterovirus and arbovirus activity. While these virus groups are not related, they share the summer-fall seasonality and may cause similar illnesses.

The arbovirus most commonly detected in Wisconsin is the LaCrosse strain of California Encephalitis. This virus is transmitted by mosquitoes and is usually detected between June and November, when both mosquito activity and our exposure to mosquitoes are increased. See Summer 2000 issue of *Results* for more information.

The enteroviruses typically are detected during the same period as the arboviruses, usually producing activity peaks in August and September. Although enterovirus infections can be asymptomatic, infections can also result in a diverse range of illnesses from nonspecific febrile episodes to summer colds to meningitis. See Spring 2000 issue of *Results* for more information.



Carol Kirk is the WSLH Virology program Coordinator. She has 29 years of professional laboratory experience at the WSLH.

Foreign animal diseases grab U.S. headlines

By Bob Garrison, D.V.M., M.S.
WSLH Communicable Disease Division

Watching the daily news that emerges from the United Kingdom, one could easily get confused: "Which disease of cattle are they talking about now?" Just so there's no confusion, BSE (or "mad cow" disease, as it's termed in the popular press) is a human health risk. Foot and mouth disease, by contrast, is NOT an infection transmissible to humans (and it shouldn't be confused with the similar-sounding human disease known informally as "hand, foot and mouth disease").

Are we looking for BSE in Wisconsin? Absolutely yes! Under the supervision of the U. S. Department of Agriculture's Area Veterinarian in Charge, several categories of Wisconsin cattle are being tested for BSE. These include animals over 20 months of age in any of the following categories: those whose brains have tested negative for rabies at the WSLH; cattle identified as having possible neurologic disease by federal inspectors at slaughter facilities; cattle showing signs of progressive neurological disease on the farm; and animals presented for slaughter as a "downer cow". Brain tissue collected from these animals is sent to the National Veterinary Services Laboratory in Ames, IA for testing.

In regard to foot and mouth disease, the USDA and the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) routinely monitor for it in the state.

According to the DATCP website, the USDA also "...has prohibited importing from infected nations live swine or ruminants and unprocessed meat from those animals, and restricted some other animal products depending upon their risk of carrying the virus."

Excerpted from the Centers for Disease Control and Prevention website (<http://www.cdc.gov/ncidod/diseases/cjd/cjd.htm>)

What is bovine spongiform encephalopathy?

Bovine spongiform encephalopathy (BSE) is a progressive neurological disorder of cattle that results from infection by an unconventional transmissible agent.

As of November 2000, more than 177,500 cases of BSE were confirmed in the United Kingdom alone in more than 35,000 herds. Regularly updated numbers of reported BSE cases, by country, are available on the website of the Office International Des Epizooties at: http://www.oie.int/eng/info/en_esb.htm. ... The nature of the transmissible agent is unknown. Currently, the most accepted theory is that the agent is a modified form of a normal cell surface component known as prion protein, a pathogenic form of the protein that is both less soluble and more resistant to enzyme degradation than the normal form.

Is BSE occurring in the United States?

According to the Animal and Plant Health Inspection Service of the U.S. Department of Agriculture, BSE has not been detected in the United States, despite active surveillance efforts since May 1990.

Is BSE a foodborne hazard in the United States?

As indicated above, BSE has not been shown to exist in the United States. Thus, it is extremely unlikely that BSE would be a foodborne hazard in this country. Because the use of ruminant tissue in ruminant feed was probably a necessary factor responsible for the BSE outbreak in the United Kingdom and because of the current evidence for possible transmission of BSE to humans, the U.S. Food and Drug Administration instituted a ruminant feed ban in June 1997

Excerpted from USDA, Animal and Plant Health Inspection Service website (<http://www.aphis.usda.gov/oa/pubs/lfsfmdvac.html>)

What is foot-and-mouth disease (FMD)?

FMD is a highly contagious and economically devastating disease of cattle and swine. It also affects sheep, goats, deer, and other cloven-hooved ruminants. Many affected animals recover, but the disease leaves them debilitated. FMD causes severe losses in the production of meat and milk. Because it spreads widely and rapidly and because it has grave economic as well as physical consequences, FMD is one of the animal diseases that livestock owners dread most.

Can people get the disease from animals?

It is not believed to readily affect humans. The disease has no implications for the human food chain. People, however, can spread the virus to animals because it can remain in human nasal passages for as long as 28 hours.

Results

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Regents

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Readers are encouraged to
send comments and questions
to the address below:

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Health Careers Guide hits the Web

Those of you who do outreach with middle and high school students might be interested in a new website from Wisconsin AHEC (Area Health Education Center). The website is devoted to information on various health careers, including public health and laboratory sciences. The site also includes a Speakers/Mentors Bureau list. If you're interested in signing up to be a speaker or mentor, the contact information is listed on the site. The URL is <<http://www.wihealthcareers.org>>

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