

The Networker



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Pre-harvest food safety conference accomplishes its goal

National Food Safety & Toxicology Center

Director

Ewen C.D. Todd

Deputy Director

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To say that the conference recently held on pre-harvest food safety on Michigan State University's campus was a success says a lot, but perhaps the significance of its success lies in the fact that the conference goals were not only met but exceeded.

"It's not only the presentations given at the conference that are noteworthy," said Ed Mather, National Food Safety and Toxicology Center deputy director and conference co-chair, "It's the networking, the reacquainting of familiar relationships and the forging of new alliances that are invaluable."

The NFSTC and the Joint Institute for Food Safety Research (JIFSR) joined forces to host "The Science of Pre-Harvest Food Safety--Bringing Sound Science to the Table" on May 8-10 at MSU's Kellogg Hotel and Conference Center. The conference brought together scientists and food safety specialists from around the globe and across the nation to network and exchange information on the issue of pre-harvest food safety.

"I was extremely pleased to see so many representatives from government, academia and industry at the meeting," Jerry Gillespie, director of JIFSR and conference co-chair said. "I've always said that good conferences lead to productive conversations. This diverse representation laid the groundwork for much thought-provoking discussion."

Catherine Woteki, former under secretary for food safety in the U.S. Department of Agriculture, kicked off the conference with a historical perspective on the National Food Safety Strategic Plan. Woteki stated that there was a lot of public dialogue and input during the three-year development process of the plan, which was presented in January 2001. Woteki included among her observations that foodborne illnesses are a major cost to society and vulnerable populations such

as the elderly and the very young are increasing. She said that public concerns about a global safe food supply remain high and offered that changing laws and structures would strengthen public health protection and improve the efficiency of research and regulation.

NFSTC's new director, Ewen Todd, and Tari Kindred from the Pan American Health Organization in Buenos Aires added international perspectives. Their insight gave new meaning to world trade, reiterating the fact that food safety is a highly complex issue and that there are huge differences in food technologies and practices at all levels of the food chain. They both pointed out, however, that local issues--wherever they occur-- may have international impact.

Nick Hether, director of product safety at Gerber Products Company, told conference participants that the consumer is in the driver's seat.

"Listen to them," Hether said. "What they say is important--it's important regardless if it is rational or can be 'squared' with scientific knowledge." Hether presented a challenge to the research community to conduct the best possible, comprehensive research and to actively participate in educating the public on sound science.

In his summation, Gillespie gave participants another challenge: Where do we go next? He asked for thoughtful deliberations that could be used as stepping stones for next year's conference. Clearly, the answers will supply food for thought and continued research.



Left to Right: Ed Mather, Nick Hether, Ewen Todd, Catherine Woteki, Jerry Gillespie



The Director's View



Ewen Todd

It has been just a few short months since I began my new career as director of the National Food Safety and Toxicology Center, and the adage about time moving at the speed of light has never rung truer. Since I began in April, I have participated in food safety related conferences and meetings in Korea, Italy, Scotland and our pre-harvest food safety conference here at MSU. As I travel, it is clear that the interest and concern over food safety are far-reaching, and it is apparent that global partnerships must play a significant role in our quest to reduce the incidence of foodborne illness.

To that end, I met with several scientists and researchers during my trip to Scotland, where I was invited as a University of Glasgow graduate to give a presentation on May 11 at the Microbiology Golden Jubilee Symposium 2001 on the topic of microbiological food safety in North America. There were another five presentations by former graduates and chair of the Microbiology Department, which sponsored the event.

As well as participate in this symposium, I wanted to champion the strengths of the NFSTC with colleagues there and in other institutions in Scotland. From my discussions, it is obvious that food safety is a big issue in Scotland as well as in Ireland and England. Specific issues include *E. coli* O157:H7, BSE in cattle, scrapie in sheep, antibiotic resistance in humans

and animals, resurgent TB, and *Cryptosporidium* in water supplies. (Cryptosporidiosis is the disease, often called "crypto," caused by a one-celled parasite that is too small to be seen without a microscope. When people are infected with *Cryptosporidium* they can have watery diarrhea, stomach cramps, an upset stomach, or a slight fever. It is often transmitted through cattle manure into water supplies. Scotland has one of the highest rates of cryptosporidiosis in the world.)

Some of the highlights I would like to share include meetings with the Food Standards Agency Scotland, the Scottish Agricultural College and the Scottish Centre for the Infection and Environmental Health (SCIEH).

The Food Standards Agency Scotland, recently set up under the leadership of George Paterson, formerly of Health Canada, and Sir John Arbuthnott, operating in cooperation with the UK Food Standards Agency, handles issues in Scotland involving food standards, nutrition and diet, general food hygiene; fish, shellfish and milk hygiene; meat and meat products hygiene; regulation of animal feeding stuffs; and novel foods, radiological safety and emergencies. Although, there are limited opportunities for independent action outside EU regulations, there are some specific Scottish issues, including control of *E. coli* O157:H7 in the food supply and reduction of cases, which are the highest in the UK especially in the aftermath of the largest UK outbreak in 1996 when a butcher served prepared meat products at a variety of social events and institutions (520 cases and 20 deaths). Risk assessments are documented at www.maff.gov.uk/animalh/bse/bse-science/level-4-seac.html and www.bsereview.org.uk.

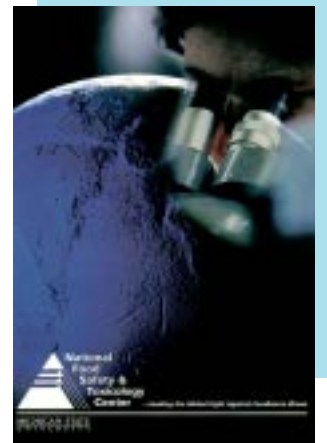
At the Scottish Agricultural College, I discussed some issues that are common to the NFSTC: 1) The SAC has a program of distance learning for rural Scotland covering areas such as improved farming, tourism and starting an e-commerce business. The SAC is interested in cooperating in distance

learning programs in other areas, including food safety. 2) There is a desire to explore a graduate or postgraduate exchange program with MSU. 3) Research is a major component of the SAC with a focus on foodborne pathogens, epidemiology and social science. One of the main areas of research is for *E. coli* O157:H7 at the pre-harvest level. There was agreement that this could be a fruitful area for cooperative research with MSU, as could be antibiotic resistance in pathogens. Communicating risk and social science linkages in food safety are strengths of both MSU and the SAC.

I also met with John Cowden, an epidemiologist at the Scottish Centre for the Infection and Environmental Health, which is responsible for the national surveillance of communicable diseases and environmental health hazards and the provision of expert operational support on infection and environmental health to health boards and local authorities in Scotland. Similar to the NFSTC, the SCIEH is a multi-disciplinary organization with a wide range of expertise. Of particular interest, is the surveillance data Cowden has collected on *E. coli* O157:H7 showing increases in the prevalence rate and changing geographic distribution within the country. Cowden also described a distance learning program in microbiology that is being set up with the University of Glasgow that would include some food safety components.

These initial meetings with former colleagues and new contacts were not only informative but will prove to be very useful in linking the NFSTC to other research groups and government agencies to establish it as a world-class

center. I look forward to sharing information gleaned from exchanges with scientists in future visits I have with universities and government departments.





Little-known disease affects millions

Though relatively unknown to the public, the *Campylobacter* bacteria affects seven million people in the United States each year. That is why Linda Mansfield wants to find out more about this potentially life-threatening disease in her research at the National Food Safety and Toxicology Center.

Campylobacter often resides in fecal material, which gets dispersed by rain and wind into groundwater, animal feeds and the soil where edible plants are growing. The bacteria can then get into human foods including meat, milk and water.

A campylobacteriosis attack causes gastrointestinal problems ranging from mild stomach flu symptoms to severe gastroenteritis, lasting seven to 14 days. Of those affected, one in 1,000 will develop a related neurological disease, Guillain-Barre syndrome, which causes ascending (starting at the feet and progressing up the body) paralysis, and potentially, death. In some people, *Campylobacter* is an opportunistic bacterium that can colonize and be dormant for a long time, then strike when the person is weakened in some way. Others will become very ill on the first exposure.

“Children and older people, and people that are immune-compromised in any way, are highly susceptible to it,” said Mansfield. “If a virulent form of campylobacteriosis hits one of these people, they’ll get the disease (gastroenteritis).”

Campylobacteriosis, considered an emerging disease, was discovered in 1978, yet little is known about it. Mansfield is trying to discover the virulence factors (those factors that make the bacteria cause the disease), what it is about the host that turns the factors on and starts the disease process, where exactly it resides in the body, and what it does on a cellular level that makes people sick.

One of the main challenges in studying *Campylobacter* in humans is caused by its invasive nature. In human infections, biopsies must be performed in order to find the cells it inhabits, and tissue cultures used to study it outside the body conditions rarely reflect actual conditions in the body. Mansfield was the first to develop an appropriate animal model--an animal that was not resistant to the disease and would succumb to the bacteria as humans do. She had been working on a different project involving whipworms and pigs, and noticed that only the pigs with whipworm would develop campylobacter disease. The worms appear to produce an enormous antibody response, which prevents the cellular immune response needed to fight off *Campylobacter*. Studying the relationship between the pigs, the whipworms

and the bacteria has led to increased understanding about why reactions to the disease range from mild to severe in humans.



Mansfield’s research has also produced a breakthrough in the diagnosis of the disease. In the past, if doctors wanted to find out if *Campylobacter* was the cause of their patient’s symptoms, it took almost four days to get back the test results. Using genetic technology, she and her colleagues have patented a new test that identifies the organism in about four hours. This allows doctors to begin appropriate antibiotic treatment much quicker, which significantly reduces the effects of the disease.

Another challenge Mansfield faces is tracing the path of a *Campylobacter* outbreak. She wants to understand better how it affects humans, but the public health system has not yet developed a good way to track and monitor this disease.

“We’re trying to be able to track this organism all the way from the farm—from the animals that are contaminated, up to the food processing plant and then to the human outbreak, to understand how it is that that track occurs. We’re sure that it happens through food, but nobody’s ever actually documented that.”

Mansfield noted that 80 to 90 percent of chickens found in markets are contaminated with the bacteria. She recommends using the same measures you would use to prevent salmonella, which actually affects fewer people each year than campylobacter. Never thaw meat on the counter, use separate cutting boards for meats and vegetables and don’t let them touch each other, wash anything that has come in contact with the meat with antibacterial cleanser when finished preparing the food, and cook the food thoroughly before eating.

“It’s important stuff—it can lead to serious consequences,” said Mansfield. “Right now, until we have even better ideas about where all the contamination is coming from, it’s the best people can do to protect themselves.”



Microscopic *Campylobacter*

NFSTC members are recognized for excellence

NFSTC's new director was selected as a recipient of the International Association for Food Protection Fellows Award. **Ewen Todd** will receive his award at the IAFP's annual meeting on August 5 in Minneapolis. Todd was selected for his many contributions he has made to the IAFP and its affiliates, whose mission it is "to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply."

Patricia Stewart, the NFSTC's director of communication and education services, won an Award of Excellence for the center's 1999-2000 annual report cover and an Achievement Award for the NFSTC brochure. The publications were among the 151 entered in the 2001 Superb Printing Awards competition, which is a production of the Lansing Club of Printing House Craftsmen in Lansing, Michigan.

The Board of Directors of the Slater Center for Environmental Biotechnology at the University of Rhode Island approved **Muralee Nair's** appointment to the Slater Center's Scientific Advisory Panel. The Slater Center promotes the development of innovative environmental biotechnologies through technology transfer, business services, strategic partnerships and collaborations.

Kirsten Fertuck was awarded the 2001 Covance Corporation-Society of Toxicology Graduate Fellowship at the 40th annual meeting of the SOT in San Francisco and an honorable mention for her poster "Preferential Interaction of PAH-Related Compounds with the Beta Form of the Estrogen Receptor." At the same meeting, **Mark Fielden** was awarded the 2001 Robert L. Dixon International Travel Award and first place for the 2001 Reproductive and Development Toxicology Specialty Section Student Award at the same meeting for the poster "Male Reproductive and Genomic Effects of Gestational and Lactational Exposure to Diethylstilbestrol in Mice," and **Jason Matthews** received the third place award in the same category for his poster "Identification of Residues Within the Human Estrogen Receptor Alpha and Rainbow Trout Estrogen Receptor that Contribute to Temperature Sensitivity and Interaction with Estrogenic Compounds. All three are graduate students of NFSTC faculty member **Tim Zacharewski**.

Check out our 1999-2000 Annual Report at www.foodsafe.msu.edu

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