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Food Protection Trends

Science and News from the International Association for Food Protection



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"VICKIE'S VIEW" FROM YOUR PRESIDENT

had the opportunity to attend IAFP's Fifth European Symposium on food safety, held in Berlin, Germany, October 7-9, 2009. It was a very good meeting, clearly fulfilling IAFP's mission: "To provide food safety professionals worldwide with a forum to exchange information on protecting the food supply." The symposium was successful. thanks in large part to the efforts of the organizing committee, led by Dr. Michele Storrs. It takes a vast amount of time to plan a meeting as comprehensive as this one. It also takes financial resources, and I'll take this opportunity to once again thank the symposium sponsors for their generosity.

The presentations and posters were excellent and generated a lot of engaging and open discussion. There was one presentation, however, that I found to be particularly thoughtprovoking, entitled, "Food Safety versus Food Security: A Global Challenge." This presentation by Ms. Sarah Cahill of the Food and Agriculture Organization (FAO) of the United Nations, was a little unique in that it was not just about food safety, but more so about the affect of food safety on food security. (IAFP members can find Ms. Cahill's presentation at www.foodprotection. org/events/european-symposia/53/ speaker-presentations.)

What impressed me about the talk was Sarah's obvious passion and dedication to this issue, which was conveyed not only in her words but in the strength of her voice. She began by defining food security as the access to a sofe and secure food supply. "Food security exists when all people, at all times, have physical, social and economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO World Food Summit, 1996). This very basic human right has long been recognized, yet the number of undernourished people



By VICKIE LEWANDOWSKI PRESIDENT

"Food safety is a contributing, integral part of food security"

continues to rise. According to the FAO, there were approximately 848 million undernourished people in 2005 and that number increased to approximately 923 million in 2009, with a projection of 963 million undernourished in 2010. I'm sure there may be a couple of "logical" reasons such as worldwide population increase or natural disasters. But with all of the amazing advances in food technology and agricultural practices and processes, how can this number continue to grow at this rate?

This is an issue that is near and dear to my heart. I have spent time in countries where there is little or no food security and the standard of living is sub-par. On every October 16 since 2001, my family celebrates my son Max's birthday, and coincidentally, on that same day we celebrate his adoption day. Max was adopted from an impoverished orphanage in Yekaterinburg, Russia. Russia is a country that deals with poverty, lack of food security and malnutrition on a daily basis. Each year, on October 16, 1 am grateful that Max is now fortunate to have access to a sufficient supply of safe and nutritious food, unlike so many of the children that were left behind in his orphanage and countless others all over the world. Although malnourished eight years ago, today Max is a thriving, healthy nine-yearold! Now, I'm not advocating that everybody run out and adopt a child from a developing country, but there are definitely other things that we, as food safety professionals can be doing to make an impact on food security issues.

Is it really food safety versus food security? Ms. Cahill concisely pointed out that the two are in fact very much entwined, that food safety is a contributing, integral part of food security. Three main ways that food safety contributes to food security were detailed: (1) prevention and reduction of foodborne illness among already vulnerable populations; (2) reducing food losses, and increasing available food; and (3) increasing market access, thereby increasing purchasing power. It is likely that for the majority of us, our day-to-day activities do not directly influence these three areas for those in developing countries. Fortunately, programs and partnerships exist to facilitate our desire to help. A great example is Kraft's partnership with the United Nations Volunteers (UNV) program, called the Corporate/ Private Sector Program (CPSP). The UNV is the volunteer arm of the United Nations and has provided hands-on-assistance in at least 140 countries since 1970. Through UNV's CPSP, current and retired management executives and professionals put their expertise to good use in the field of development. These volunteers bring a wide range of competencies and technical expertise such as planning, engineering, financial management, industrial design, product development, food processing, marketing, quality control Information and Communication Technology (ICT), waste management, etc. The volunteers serve on advisory missions lasting from one week up to a maximum of three months. UNV's Corporate/Private Sector Program aims at creating jobs, raising production efficiency, supporting technology, socioeconomic growth and environmental protection, introducing information and communication for development (ICT4D), and aiding market expansion.

In 2001, Kraft Foods became the first company in the United States to form a partnership with the UNV CPSP. Kraft is currently the only major food company participating in CPSP. From the first mission in 2001 to the close of the 2008 missions, 114 Kraft volunteers have served 40 clients over 47 missions, in 29 developing countries. These missions have covered a wide range of processes and products including peanuts and cashews, readyto-eat meals, ready-to-serve meals, dairy products, jams and jellies, meat and sausages, cocoa, flour and pasta, and fruit, just to name a few. Volunteers help with process development, product development, packaging technology, HACCP development, GMPs, and equipment design. I have heard many of the Kraft volunteers talk about their experience; following are just a couple of quotes:

- "I don't think I will ever become frustrated again, knowing that people with great limitations and much less resources manage to do wonders with little and still enjoy what they do."
- "When I look back at the mission... I'm reminded that most of the world does not live like us and yet the basic human nature is the same. We all have the same feelings of caring and providing for our family and where we live. We should not be waiting for people to ask for help, we should be asking where else we can help. I think that by becoming a better global citizen, one becomes a better employee of a global company."

 "It was refreshing to work hard for the benefit of others. Helping others who need your help is the most satisfying feeling. Seeing people hunger and thirst after knowledge humbles me and motivates me to want to do more."

This is not an exclusive Kraft-UNV partnership. I encourage each of you to determine how you and/ or your corporation, association or government institution can become part of a program like this and contribute to the attainment of food security globally. Any parties interested in contributing corporate volunteer services or funding are encouraged to contact the UNV office in Bonn, Germany at the following address:

> United Nations Volunteers Postfach 260 111 D-53153 Bonn, Germany Tel: +49 228 815-2000 Fax: +49 228 815-2001 Internet: www.unvolunteers.org Email: hq@unvolunteers.org

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"COMMENTARY" FROM THE EXECUTIVE DIRECTOR

ecember brings to the close another year; another year in which IAFP has been very active in achieving its mission around the world. In this column, I'll review the various activities IAFP undertook this past year.

Normally, this is the issue where we would report on the financial outcome, however, our financial audit is not completed in time to allow for this report. I can tell you that the preliminary results do not look promising for a good outcome. With losses from our investments and disproportionate expense incurred at IAFP 2009, we are sure to incur an overall loss for our fiscal year. More will be reported on this subject later upon completion of the audit.

One thing we can do now is review the successes IAFP has achieved in 2009. We launched the newly designed IAFP Web site in April which allows more options in the "Members Only" section. In addition, the Membership renewal system was tied in with the new site and for a Member just joining; they can now have immediate access to the Members Only section. This was a vast improvement over our old, outdated system.

There are a number of factors producing this result, but our Membership (total numbers of Members) steadily increased over the year. We can now boast that Membership increased by close to 100 Members in 2009. Just think of this, 100 increase in Membership for IAFP when many other organizations are decreasing in their number! This is surely rewarding to know. There are so many IAFP Members who help to spread the word about IAFP. I'm sure this is a big factor in our increase. Also,



By DAVID W. THARP, CAE EXECUTIVE DIRECTOR

"There are so many people that come together to help IAFP achieve our goals and our mission"

it is wonderful to see the number of Sustaining Members increase as they have this past year. Our Gold and Silver Sustaining Members have also increased which is excellent news!

During the year, IAFP directly provided five educational opportunities for Members to come together to discuss food safety issues. Plus, there were two conferences where IAFP supported conference organizers in their program development. Those two, of course, are the Dubai International Food Safety Conference (DIFSC) and the China International Food Safety and Quality Conference (CIFSQ). Both conferences were very successful this past year and we are happy to be involved with them.

The IAFP conferences this year included: the Raw Milk Consumption Symposium, the Salmonella in Peanut Products Symposium, IAFP 2009, European Symposium (held in Berlin), and the International Symposium (held in Seoul). Each of these conferences had excellent attendance and participation by IAFP Members. As stated earlier, organizing and holding conferences and symposia provides, as our mission statement says,"a forum to exchange information on protecting the food supply." It is so very important that we are able to bring together food safety professionals from government, industry and academia; to gather all concerned parties when issues are discussed.

Our Affiliate organizations continue to grow with three new groups chartered this year. New Affiliate organizations formed in Arkansas, Colombia and Hungary, This provides further opportunities for more people to learn about IAFP and to become actively involved in either their local Affiliate or within IAFP. There are now 47 Affiliate organizations with 13 from outside of the United States. One Affiliate, our newest, was organized to address food safety issues in China, but is organized and based in North America. Members are made up of those individuals who are interested in relations with China.

So, you can again see that IAFP has made great progress in pursuing our mission. There are so many people that come together to help IAFP achieve our goals and our mission. At this time of year, we want to extend our thanks to all IAFP Members from around the world. Thank you to each and every one of our Members for what you do each day to help protect the public's health.

Best holiday wishes to all. Please enjoy this time together with family members and best of all, enjoy safe food on your table!



ARTICLES

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Food Protection

Frequency and Type of Food Safety Infractions in Food Establishments with and without Certified Food Handlers

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ABSTRACT

North Americans consume food from food service establishments frequently; therefore, restaurants may be a significant source of foodborne illness. Food Handler Certification provides food handlers with knowledge to control factors that may contribute to foodborne illnesses. Food Handler Certification is mandatory in a number of provinces in Canada as well as several states in the United States. This study compared two groups of food establishments, one with mandatory Food Handler Certification for staff and management and one without. Establishments in which Food Handler Certification was mandatory were 1.97 times less likely to receive infractions during inspections (P = < 0.0000001; OR: 1.97, 95% C.L: 1.54–2.50). The types of infractions commonly noted during inspections between the two study groups were similar, but the mandatory Food Handler Certification group had fewer infractions noted during inspections in almost all of the infraction categories, indicating that Food Handler Certification should be implemented in all food establishments because it has a positive effect on inspection scores.

Further research comparing food service establishments with mandatory Food Handler Certification of both staff and management to establishments that have at least one certified person in charge should be conducted to determine which system is more effective.

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INTRODUCTION

According to the Canadian Restaurant and Food Association (CRFA), the average Canadian household patronizes a restaurant for a meal or snack 536 times per year (8). In the United States, 44% of adults eat out at a restaurant daily, and more than 40% of foodborne illness outbreaks reported from 1993–1997 were linked to public food establishments (14). A United Kingdom government report indicated that "eating out is a very important source of food poisoning" (5). Therefore, ensuring the safety of food consumed outside the home should be a priority.

The potential economic impact of foodborne illness is indeed substantial in both Canada and the United States. In Canada, it is estimated that approximately 11–13 million cases of foodborne illness occur annually (11). Toronto Public Health reported over 16,700 cases of enteric foodborne illness between 2000 and 2004 (25). In the US, foodborne illness causes approximately 76 million illnesses each year (17). The costs associated with foodborne illness in the US are an estimated \$7.7–23 billion per year to consumers, the food industry and the economy (7).

Some of the risk factors that contribute to foodborne illness include improper reheating and heating, inadequate hot-holding, and cross-contamination (5). According to Taylor, most food poisonings result from food handler error, which may be mitigated with food safety training (22). These factors may be directly controlled and influenced by food handlers. Therefore, Food Handler Certification courses are beneficial because they provide participants with the knowledge to identify and mitigate the risks that may contribute to foodborne illness (18). The Ontario Ministry of Health and Long Term Care (MOHLTC) has identified the benefits of food handler training to include a reduction in foodborne illness; prevention of hazards during food preparation; early identification of potential hazards; and a decrease in consumer complaints (18).

The Ontario MOHLTC Programs & Services Guidelines require the local Public Health Unit to provide a food handler training course or to refer members of the public to a resource that provides training. In Ontario, the minimum food-handler training course requirements must include these components: The Role of the Local Health Department, Public Health Legislation, Safe Handling, Preparation and Storage of Food, Food Handler Hygiene and Food Premises Sanitation (18).

Since 1999, the Ontario MOHLTC has examined proposals for mandatory Food Handler Certification, but to date these proposals have not been implemented. Despite this, a number of provinces in Canada, including British Columbia, Saskatchewan, Nova Scotia and Alberta, have mandatory Food Handler Certification. As an alternative, Food Handler Certification programs may also be implemented at the municipal level. This is the case in Brantford, Winnipeg and Toronto, where mandatory Food Handler Certification was implemented in September 2006. The by-law (City of Toronto, Municipal Code, Chapter 545) requires that "every owner or keeper of an eating and drinking establishment shall ensure that there is, at all times when the establishment is operating, at least one certified food handler working in a supervisory capacity in each area of the premises where food is prepared, processed, served, packaged or stored"(2).

In the US, most states rely on local public health departments to provide training for food handlers. Training programs sponsored by the health department are made available, but, in most cases, the training is the left in the hands of the operators/owners of food service establishments (1). As of 2004, seventeen states, including California, Washington, D.C., Florida, Pennsylvania and Washington State, had introduced mandatory Food Handler Certification in the US. Other states are in the process of developing programs (1).

Research has been conducted in an attempt to determine if there is a correlation between certified food handlers and inspection scores (Table 1). For example, Riben et al. (20) conducted a critical appraisal of literature pertaining to the effectiveness of food handler training and routine restaurant inspections. As a result of this literature appraisal, the following recommendations were made; more research should be conducted to prove the effectiveness and efficiency for both routine inspections and training, and training should continue because, although weak, there is evidence that suggests a positive correlation between Food Handler Certification of managers and staff and inspection scores (20).

Since this appraisal of the literature, a number of studies have concluded that food-handler training may have a significant impact on inspection scores (6, 12, 14, 15, 21, 23). In contrast, studies such as those of Frash et al. (9) and Powell et al. (19) have determined that training has no substantial impact on inspection scores (Table 1).

In Canada, Mathias (15) conducted one of the largest studies of its kind with 630 restaurants across three provinces and twenty-one health unit jurisdictions. The formal education and level of food safety training and certification of food handlers were surveyed. It was determined that the restaurants with certified food handlers had better inspection scores than restaurants with staff that were uncertified (15). Similarly, another Canadian study completed by Thompson et al. (23), analyzed data from the Toronto Healthy Environments Information System (THEIS) to determine the impact of Food Handler Certification on inspection results. Analysis of 8,498 inspection records found an association between having at least one certified food handler and obtaining a pass notice during an inspection; premises with at least one certified food handler were 2.2 times more likely to receive a pass notice that those without (23). In fact, 93% of premises with at least one certified food handler received a pass notice on initial inspection, in comparison to 85.7% of those without at least one certified food handler (23).

In another study conducted by Hedburg et al. (12) and the Environmental Health Specialists Network working group, a comparison was made between food-handling practices and characteristics in outbreak and non-outbreak restaurants. Differences that impacted food safety were noted (12). Data collected included food-handler training and certification. The presence of certified kitchen managers was associated with decreased risk for an outbreak; 71% of non-outbreak restaurants had certified kitchen managers, in comparison to 32% of outbreak restaurants (12).

Lead Author	Frash	Hedberg	Thompson	Kassa	Smith	Cotterchio	Powell	Mathias
Year	2006	2006	2005	2001	2000	1998	1997	1995
Sample size	I,000	347	8,948	70	28	94	12	630
Personnel trained	Managers	Managers	Managers & staff	Managers & staff	Staff	Managers	Staff	Managers & staff
Criteria	Inspection scores	Outbreaks	Inspection scores	Inspection scores & micro.	Post-test & inspection	Inspection scores	Test scores and inspection	Inspection scores
Significant impact?	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Country	US	US	Canada	US	US	US	UK	Canada

In the US, the largest national study to date was conducted by Frash et al. (9) to determine the impact of Food Handler Certification on inspection scores. The study, conducted in eight states (Alabama, Arizona, California, Delaware, Georgia, Indiana, Michigan and Minnesota), surveyed one thousand food service managers. Data were collected regarding the managers' food safety credentials and food safety knowledge as well as specific information about the restaurant. The inspection reports for the establishments were then matched to the manager surveys. Statistical analysis revealed that the presence of certified managers did not have a substantial impact on inspection scores (9). Powell et al. obtained similar results after examining twelve small catering and retail food establishments and comparing the level of staff food safety knowledge and inspection ratings; no correlation was found between the inspection rating and the level of staff knowledge in regard to food safety (19).

TABLE 1. Summary of studies reviewed

The purpose of our study was to determine whether or not the frequency and type of food safety infractions noted in food establishments with mandatory Food Handler Certification differed from those noted in food establishments without any certified food handlers. This was accomplished by comparing a group of food service establishments with mandatory Food Handler Certification of management and staff to a group that had did not have certified food handlers. The overall goal of our study was to gain insight into the effect that mandatory Food Handler Certification has on inspection scores and, ultimately, the health of consumers.

MATERIALS AND METHODS

Two study groups from the City of Toronto, Ontario were selected. The groups consisted of 104 premises from a National Pizza Chain (NPC) and 60 randomly selected pizza establishments (RSPs). The study groups selected were similar; members of both were medium risk establishments, served similar food products and received two routine compliance inspections annually. Medium risk premises are defined as premises that prepare hazardous foods without meeting the criteria for high risk, or premises that prepare a non-hazardous food with a great deal of handling and volume (3). The defining difference between the two study groups was that the NPC had mandatory food handler training of management and staff, while the RSPs selected did not have any certified food handlers.

The data selection criteria for both study groups included food premises that were in operation every year between 2001 and 2005. Data were collected for the north, south, west and east regions of the City of Toronto. The information captured in the data reports consisted of compliance inspection dates, infraction descriptions, and infraction categories. Infraction categories were food temperature control, food protected from contamination, employee hygiene and hand washing, maintenance and sanitation of non-food contact surfaces/equipment, maintenance and sanitation of food contact surfaces/equipment, maintenance and sanitation of washrooms, storage and removal of wastes, pest control, conditions for closures and the disclosure posting by-law. The information in the Toronto Healthy Environments Information System (THEIS) database captured inspections results from Toronto Public Health's standardized Food Safety Inspection Reports that are utilized by Toronto Public Health Inspectors to conduct compliance inspections.

The analysis of data provided a description of the following for both study groups: total number of premises, total number of inspections, number of inspections with and without infractions, number of infractions per inspection, and type of infractions.

OpenEpi Open Source Epidemiologic Statistics for Public Health, Version 2,[®] Dean AG, Sullivan KM, Soe MM was utilized to determine the statistical significance of the results; 2×2 table statistics produced Chi-square and exact measures of association and an odds based estimate with confidence limits.

TABLE 2. National pizza chain (NPC) and randomly selected pizza places (RSPs)

Summary	National Pizza Chain (NPC)	Randomly Selected Pizza Places (RSPs)	Total
Total number of inspections	920 (65%)	497 (35%)	1417
Inspections without infractions	725 (79%)	325 (65%)	1050
Inspections with infractions	195 (21%)	172 (35%)	367
Total number of infractions	388 (45%)	475 (55%)	863
Infractions/Inspections ratio	0.4	0.9	0.6

RESULTS

Frequency of infractions

As indicated in Table 2, a total of 1,417 inspection results were analyzed, comprised of 920 (65%) NPC and 497 (35%) RSPs. A total of 367 (26%) of these inspections detected infractions while 1,050 (74%) did not. Where infractions were identified during inspections, the NPC and RSPs had 195 (21%) and 172 (35%), respectively, while 725 (79%) of the inspections without infractions were NPC, compared with 325 (65%) of RSPs. The NPC establishments were 1.97 times less likely to be associated with infractions (P = < 0.0000001) than RSPs (Table 3).

A total of 863 infractions were identified from the 1,417 inspection records that were analyzed. The overall ratio of infraction/inspection was 0.6, while the individual ratios for the NPC and RSPs were 0.4 and 0.9, respectively (Table 2).

Types of infractions

The most common infraction categories for both study groups, in order of their frequency of occurrence were: Maintenance/Sanitation of Non-Food Contact Surfaces/Equipment (24.7% and 21.1% for RSPs and the NPC establishments, respectively); Employee Hygiene and Hand Washing (7.4% and 4.8% for RSPs and the NPC establishments, respectively); and Maintenance/ Sanitation of Washrooms (5.4% and 5.2% for RSPs and the NPC establishments respectively) (Table 4).

Another infraction category worth noting is the Food Protected from Contamination category. The results for both study groups were 5.4% and 4.5% for RSPs and the NPC, respectively (Table 4). Also important is the food temperature control category; the NPC had more infractions in this category, 1.4%, versus 1.2% for the RSPs.

While the differences between NPC and RSP establishments were not statistically significant in any infraction category, the P value for the maintenance and sanitation of food contact surfaces category was almost significant, with a Pvalue of 0.06 (Table 4).

DISCUSSION

Frequency of infractions

The Toronto Public Health Food Safety Inspection Report includes ten infraction categories (Table 4). In these categories, various infractions may be categorized as crucial, significant or minor. A crucial infraction is defined as one that poses an immediate health hazard to the public and may be associated with foodborne illnesses, such as the contamination or adulteration of a food product (3). A significant infraction has the potential to pose a health risk and is only indirectly related to the handling, preparation and storage of food, such as failure to have an indicating thermometer present in a refrigeration unit (3). A minor infraction is unlikely to pose a serious or immediate health risk to the public and includes dirty floors, walls or ceilings in a food establishment (3).

Given the numerous studies that have found a positive correlation between certified food handlers and inspection scores (6, 12, 14, 15, 21, 23), it was expected that the NPC would have more inspections without infractions (725, or 79%) than the RSPs (325, or 65%). Food Handler Certification should increase the knowledge of food handlers and translate into safe food handling practices. In fact, the results of our study suggest a positive correlation between the presence of certified food handlers and better inspection scores. The NPC was 1.97 times less likely to have infractions noted during inspections (Table 3). In 2005, Thompson et al. also found an association between having at least one certified food handler in a food establishment and obtaining a pass notice during inspections; establishments with at least one certified food handler were 2.2 times more likely to receive a pass notice than those without (23). This further supports the theory that certified food handlers may have a positive impact on inspection scores in a food premises.

The association between certified food handlers and reduced food safety infractions was replicated in several other studies with various measurement criteria (Table 1). Most notable and quite large in sample size (n = 630), was the Mathias et al. (15) study that involved the certification of managers and staff and resulted in better inspections scores in their restaurants.

Also, the study by Cotterchio et al. (6) noted a significant impact on inspection scores for both mandatory and voluntary Food Handler Certification groups. Cotterchio and the Boston Inspection Services Division compared pre/post training inspection scores for three different groups of managers for 94 restaurants. Groups that had low baseline inspection scores were selected and randomized into groups; a mandatory food handler certification group, a voluntary group and a control group. The group that was mandated to obtain Food Handler Certification saw an improve-

TABLE 3. Statistical analysis

		2×2 Table Sta	2×2 Table Statistics			
		NPC	RSPs			
		(+)	(-)			
No infraction	(+)	725	325	1050		
Infraction	(-)	195	172	367		
		920	497	1417		

Square and Exact Measures of Association

Test	Value	P-value (I-tail)	P-value (2-tail)	
Uncorrected Chi square	30.24	< 0.0000001	< 0.0000001	
Yates corrected Chi square	29.55	< 0.0000001	< 0.0000001	
Mantel-Haenszel Chi square	30.22	< 0.0000001	< 0.0000001	
Fisher exact		< 0.0000001	< 0.0000001	
Mid-P exact		< 0.0000001	< 0.0000001	

Risk-based Estimates and 95% Confidence Intervals

Point Estimates		Confidence Limit	s
Туре	Value	Lower, Upper	Туре
Risk in exposed	69.05%	66.19,71.77	Taylor Series
Risk in unexposed	53.13%	48.02, 58.18	Taylor Series
Overall risk	64.93%	62.4, 67.37	Taylor Series
Risk ratio	1.3	1.171, 1.442	Taylor Series
Risk difference	15.91%	10.09, 21.73	Taylor Series
Etiologic fraction in pop. (EFp)	18.16%	11.42, 24.9	
Etiologic fraction in exposed (EFp)	23.05%	14.59, 30.67	

Odds-based Estimates and Confidence Limits

Point Estimates Type	Value	Confidence Limits Lower, Upper	Туре
CMLE Odds Ratio	1.967	1.542, 2.509	Mid-P Exact
		1.53, 2.527	Fisher Exact
Odds Ratio	1.968	1.543, 2.509	Taylor Series
Etiologic fraction in pop. (EFp/OR)	38.75%	28.12, 49.38	
Etiologic fraction in exposed (EFe/OR)	49.18%	35.19, 60.15	

ment in their mean inspection scores (6). The voluntary food handler training group also saw improvement in their mean inspection scores (6). Although the study demonstrated a positive correlation between training and scores, the authors acknowledged that the results might have been biased in that the improvement may have resulted from the perceived threat of restaurant closure, be-

cause some restaurants had closed since the study began (6).

Last, Kassa et al. (14) examined inspection reports and microbiological testing to determine the impact of certified food handlers. Seventy full-service restaurant inspection reports (1998– 1999) from the Toledo, Ohio, Health Department were reviewed. The results indicated the premises without certified food handlers had more infractions noted than restaurants with certified staff (14). It was concluded that restaurants with certified staff had significantly better inspection scores. However, microbiological testing did not correlate with better inspection scores.

In contrast, Frash et al. (9) conducted a study with certified food establishment managers and found no signifi-

	Infrac RSF	ction Ps	Infr N	Actions –	SPs &	values	ds Ratio	ifidence rvals
Infraction Category	no.	%	no.	%	R	d	РО	95% Con Inte
Maintenance and sanitation of non-food contact surfaces/equipment	213	24.7%	182	21.1%	395	0.54	0.9	0.7 – 1.2
Employee hygiene and handwashing	64	7.4%	41	4.8%	105	0.19	1.3	0.8 - 2.0
Maintenance/sanitation of washrooms	47	5.4%	45	5.2%	92	0.41	0.8	0.5 - 1.2
Food protected from contamination	47	5.4%	39	4.5%	86	0.93	0.9	0.6 - 1.5
Maintenance/sanitation of food contact surfaces/equipment	46	5.3%	24	2.8%	70	0.06	1.6	0.9 – 2.7
Posting bylaw 574-2000	27	3.1%	26	3.0%	53	0.53	0.8	0.4 - 1.4
Storage/removal of waste	16	1.9%	15	1.7%	31	0.69	0.8	0.4 - 1.7
Food temperature control	10	1.2%	12	1.4%	22	0.35	0.6	0.2 - 1.5
Pest control	5	0.6%	3	0.3%	8	0.67	1.3	0.3 - 5.7
Condition(s) for closure	-	-	1	0.1%	1	0.26	0	-
Grand total	475	55%	388	45%	863			

cant impact on health inspection scores. The authors concluded that transfer of training did not take place; therefore, no impact was seen on inspection scores (9). The transfer of training refers to the degree to which the knowledge, skills, behavior and attitudes gained in training are applied to the job (27). Barriers to transfer of training may include, but are not limited to, a lack of feedback and encouragement from supervisors, insufficient time to complete tasks, and the lack of opportunity to put skills acquired into practice (27).

Several of the studies that found a positive correlation between certification of food handlers and improved inspection scores involved the certification of managers only, as opposed to both management and staff (6, 12). Taylor states that in the US, many programs focused on the certification of management as opposed to staff, because of the belief that manager certification had a greater influence on food-handling practices in the workplace (22). Similarly, McElroy and Cutter concluded that "the commitment of managers to food safety directly affects how employees transfer their training" (16). Also, in the study by Mathias et al., certification of both management and staff was recommended in order to obtain better inspection scores in restaurants (15). Our study presents a good argument for all management and staff to be certified in a food premise, since the frequency of infractions was lower in the NPC, where certification was mandatory for all food handlers.

Conversely, the Frash et al. study focused on certification of managers and did not observe any significant improvement in inspection scores (9). Therefore, the question arises as to whether the certification of management or of staff is more effective. Perhaps the certification of one person in charge (regardless of job descriptions) is sufficient to improve inspection scores. In the US, one state program that mandates the certification of more than one person (including management) is the South Carolina program, the Food Safety Seal of Commitment program. This program requires the certification of at least 75% of employees in addition to one manager on duty (9). In contrast, the US Food and Drug Administration Food Code 2001 requires

only that the person in charge receive Food Handler Certification (1). The same holds true in Canada, where the City of Toronto requires only one person per shift in a supervisory position to be certified (2). It has yet to be determined which type of certification program is most effective.

The average infractions/inspection ratio for all premises in the City of Toronto for 2001-2005 was 1.4 infractions/ inspection (26). The majority of the infractions included in this ratio calculation were classified as minor. The ratio of infractions/inspection was highest in 2001 (1.7) and decreased during 2002-2005 (26). The decrease in the ratio between 2002 and 2005 may be attributed to the implementation of the City of Toronto's Food Premises Inspection and Disclosure Program in 2001 (26). This is a standardized inspection program that involves the posting of inspection results in food premises and on the City of Toronto Web site (23). The ratio of infractions/inspection subsequently decreased with this program's progression and a heightened awareness of food safety (26). Both study groups had ratios that were

lower than the City of Toronto average of 1.4 for 2001–2005; 0.4 for the NPC and 0.9 for the RSPs, respectively (Table 2). In the case of the NPC, it was 1.97 times less likely to receive notice of infractions during inspections (Table 3). Therefore, the low ratio of infractions/inspection observed for the NPC is consistent with this odds ratio. These ratios (infractions/ inspection) were used to compare the two study groups because the number of inspections per year was not the same for all study groups. Thus, the ratio served as the method of standardization for comparison.

Type of infractions

The RSPs had more infractions in the top three categories than the NPC (Table 4). Results similiar to these were also seen with inspection reports examined from the Toledo Health Department, 1998–1999. In restaurants without certified food handlers, more infractions were noted for food safety and hygiene, compared with restaurants with certified food handlers (14). In fact, 97% of premises without certified food handlers had one or more critical violations, in comparison to only 3% of restaurants with certified food handlers (14).

The NPC had a lower frequency of infractions in all of the top three infraction categories: maintenance and sanitation of non-food contact surfaces; employee hygiene and handwashing; and maintenance and sanitation of washrooms. These categories are topics that are covered extensively in the NPC Food Handler Certification Program. Perhaps the NPC were able to achieve better inspection scores because their staff were trained in these areas. Harris et al. conducted a study comparing the training materials provided in Food Handler Certification to food safety inspection results and found that the amount of information included in the Food Handler Certification training manual impacted on inspection scores (10). In fact, it was suggested that the Food Handler Certification course should cover the main areas highlighted during an inspection. In Harris' study, critical infractions were observed in areas that were excluded from the training materials. In this study, the NPC's Food Handler Certification Program was, in fact, modelled after the inspection categories in the Toronto Public Health Food Safety Inspection Report. As Harris suggests, infraction categories that are highlighted on the inspection form can be used to guide training for food handlers (10). Therefore, if the RSPs had certified food handlers, it may have been possible to reduce the frequency of infractions.

The maintenance and sanitation of non-food contact surfaces/equipment category was the most common infraction category; this is consistent with Toronto Public Health findings that indicated that this category accounted for the highest percentage of infractions for all food premise types from 2001-2004 (26). The employee hygiene and handwashing category, the second most common infraction category, includes infractions such as "employee failed to wear headgear while working with food" and "employee failed to wash hands when required." This is important because it relates directly to the safety of food and is emphasized in the NPC Food Handler Certification course because employees may be a source of infection during food preparation and thus cause foodborne illness (24). The maintenance and sanitation of washrooms category, the third most common infraction category, included infractions defined as minor such as "operator failed to clean toilets as often as necessary" and "operator failed to provide washroom supplies." These infractions are defined as minor because they may impact on the overall condition of the premise, but they do not directly impact on food safety.

Another infraction category, although not in the top three, that warrants discussion is the "food protected from contamination" category. This category includes infractions such as "operator failed to ensure that food is not contaminated and adulterated." Infractions in this category may be defined as crucial or significant. Protecting food from contamination is a key topic in the NPC Food Handler Certification course. The concept of preventing cross-contamination during food preparation is taught in the course, including the use of separate utensils for raw and cooked foods, hand washing and washing/sanitizing of utensils. This is important because cross-contamination is a risk factor for foodborne illness (5).

The NPC results in the "food protected from contamination" category are interesting; even though all their food handlers were certified they still had infractions in this category. This suggests that the transfer of training did not occur; perhaps food handlers did not put their knowledge into practice even though they were trained. Clayton et al. conducted a study on food-handler beliefs and self-reported practices and found that, despite being aware, food handlers did not practice safe food handling methods because of constraints on time, staff and resources (4). In fact, 85% of respondents who received certification training admitted that they were not putting into practice what they had learned (4).

Another category with results that suggest that the transfer of training may not have occurred is the food temperature and control category. This is the only category in which, although the differences were not statistically significant, the NPC had more infractions than the RSPs during inspections (12 vs. 10) (Table 4). In theory, the NPC should have received better inspection scores, since food temperature control is a key concept taught in Food Handler Certification (24). However, the assumption that the transfer of training did not take place cannot be substantiated, because the Food Safety Inspection Report detailing the specific infraction details (e.g., observed food handlers storing chicken in the danger zone) was not examined in this study.

Although "no deficiency found" is not an official category, it was included for comparison to the other categories. Most of the inspections conducted for both NPC and the RSPs fell into this category. These results may be attributed to the city of Toronto's Food Premises Inspection and Disclosure Program, as a result of which the number of infractions per inspection decreased after 2001(23) and there was a reduction in the number of crucial infractions for all types of premises (23). Therefore, the impact of this public disclosure program on the results of this study cannot be overlooked.

One establishment from the NPC group was ordered closed by Toronto Public Health because of a pest infestation; pest control is a component of Food Handler Certification. The Food Safety Inspection Report for the premise that experienced the closure was not examined as part of this study. Therefore, the specific conditions and circumstances surrounding the closure are unavailable.

It should be noted that the P values for all the infraction categories did not indicate any statistical significance in regard to the likelihood of their occurrence. Therefore, the occurrence of infractions in each category may be attributed to the intervention of mandatory Food Handler Certification (P =0.0000001) (Table 3).

Limitations

The data were retrieved from reports generated on the Toronto Healthy Environments Information System (THEIS) database. The data collection was limited by the requirement that the establishments had to have been in operation every year between 2001 and 2005. This greatly limited the sample size for both study groups; as a result, the sample sizes were small. Also, for the RSP study group, another additional parameter set in the reports was the absence of certified food handlers; this also may have contributed to the small sample size that the report generated.

Other variables that may have impacted on the infractions noted during inspections included a change in the area Public Health Inspector, changes in regulations, different food suppliers, changes in management, employee turnover and language barriers (10). Although the researchers were aware of these variables, they could not explore them further, because the data for these variables were not available for the study groups selected.

CONCLUSION

The results indicate that having mandatory Food Handler Certification for both management and staff in food service establishments is more beneficial than having no certified food handlers. Mandatory Food Handler Certification has the effect of lowering the frequency of infractions and the number of crucial and significant infractions noted during inspections. In Canada and the US, most Food Handler Certification legislation requires at least one person in charge to be certified (1, 2). Further research comparing the inspection scores of food service establishments with one certified person in charge to those that have both staff and managers certified is needed. This may provide insight into the differences that may impact on inspection scores. Food Handler Certification is indeed beneficial and should be implemented in all food service establishments, since it has a positive effect on inspection results and ultimately on food safety.

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Food Safety Labels and Education for Meals-on-Wheels Participants

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ABSTRACT

Delivered meals for Meals-on-Wheels (MOW) recipients usually do not have food handling/safety labels that provide information on proper storage and later use of uneaten foods. Six food safety labels and five food safety handouts were developed for seniors and cooks to analyze during five focus groups conducted at senior centers where MOW meals are prepared. After data analysis, one label was developed and the food safety handouts were revised for testing with MOW recipients. Interviews were conducted with MOW recipients to determine their effectiveness. Forty-three seniors and nine cooks participated in focus groups. Responses to sample labels included: keep it simple, use large black print, concerns about how to date the label and the reheating statement. Comments about the educational materials included: liked large print, liked colored picture, and keep statements simple. Of the 47 MOW recipients interviewed, 94% stated that they read the label on their delivered meals, whereas 91% read the educational materials. Only 19% stated the correct refrigeration temperature, but all felt that their refrigerators worked properly. Only 72% knew how long to properly store leftovers. Our study demonstrated that a food safety label for MOW home-delivered meals was needed to remind participants how to safely store uneaten foods.

INTRODUCTION

Meals-on-Wheels (MOW) recipients may be more at risk for foodborne illness than healthy elderly adults. Higher rates of foodborne illness occur in younger individuals, but older adults (60 years and older) are more likely to have more severe complications associated with these illnesses (6). Susceptability to a foodborne illness is related to the health status of the older adult (6). Poor nutrition and decreased food consumption, combined with decreased immune system function, contribute to older adults' lowered ability to fight foodborne pathogens (6). Coulston et al. (7) documented that the MOW population is at risk for poor nutritional status, which can increase their risk of foodborne illness. In addition, MOW recipients commonly save food from the delivered meal to eat later (1, 2, 8). Improper food storage of saved items can contribute to increased risk of foodborne illness for MOW recipients (1, 2, 8).

MOW meals are usually delivered by volunteers, and the resulting time lapse can contribute to increased growth of microorganisms if the food was contaminated and allowed to be in the temperature danger zone too long. The average meal was consumed 1.22 hours after delivery to the home, and the average

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*Author for correspondence: Phone: 402.472.8884; Fax: 402.472.1587 E-mail: jalbrecht1@unl.edu TABLE 1. Characteristics of focus group participants and senior center cooks pertaining to meal consumption

	Percentage of participants (n)
Senior focus group participants (n = 43)	
Females	72.1 (31)
Males	27.9 (12)
How many meals do you usually eat at the senior center?	
No meals per week	18.6 (8)
I meal per week	7.0 (3)
2 meals per week	7.0 (3)
3 meals per week	7.0 (3)
4 meals per week	7.0 (3)
5 meals per week	51.1 (22)
Missing	2.3 (1)
What types of foods have you taken home from a restaurant?	
Meats and Poultry	58.1 (25)
Bread	18.6 (8)
Vegetables	32.6 (14)
Salads	20.9 (9)
Casserole/hot dish	23.3 (10)
Fruit	14.0 (6)
Dessert	32.6 (14)
Senior center cooks (n = 9)	
Females	100.0 (9)
Meals prepared per day	
Average	66
Range	35–300
Meals delivered per day	
Average	80
Range	8–300

Percentages total more than 100% because participants could check more than one response.

time from packing at the preparation site to delivery was 1.95 hours, for a total of 3.17 hours, from on-site preparation to off-site consumption (2).

Seniors stated that foodborne illness was not likely to happen to them (15), an attitude that may lead to a false sense of safety. Boone et al. (4) reported that mature adults (over 65) generally had knowledge of safe food handling behaviors but did not translate this knowledge to practices such as refrigerating food promptly. Educators have many channels to reach seniors, and they need to help seniors understand the relationship between inappropriate practices and the risk to their health (9). Roseman and Hayek (16) reported positive changes in food safety behavior of seniors and home-delivered meal recipients after these individuals had received food safety education.

Delivered meals usually do not have food handling/safety labels that provide information on proper storage and later use of uneaten foods. Little food safety education is provided for MOW recipients. Almanza et al. (2), after conducting a survey, recommended that home-delivered meal recipients should be informed that it is best to eat the meals immediately, or refrigerate and then reheat when ready to consume the meal. A colorcoded sticker system was suggested by Mathieu (12) to be used to signify different days of the week for home-delivered meals. Roseman (15) recommended that delivery drivers encourage MOW recipients to eat their meal immediately or make sure that it is refrigerated upon delivery. In addition, home-delivered meal providers could implement strategies to encourage safe food handling practices in the home by changing food container types and providing storage information on containers (15). FIGURE 1. Food safety label developed based on focus group results and used to test with MOW recipients



Many commercial products contain storage labels; Lando and Fein (11) found that storage statements need to be easily found and understood by the consumer. Roe et al. (14) stated that focus group participants preferred labels with food safety information that emphasized the positive. Almanza et al. (2) also recommended that MOW clients would benefit from literature or training on proper handling of home-delivered meals. Mathieu et al. (12) also suggested that home-delivered meal providers use simple signs, checklists, and pictures to highlight the four most important concepts of food safety: washing hands often, keeping foods separate, cooking to proper temperatures, and refrigerating foods. Albrecht and Larvick et al. (1) recommended that when foods from delivered-meals were kept to eat later, proper storage and reheating directions may be needed.

Because of the need for an informative food safety label and food safety education, the objectives of this project were to develop user-friendly food safety labels for home-delivered meals and to develop user-friendly food safety education materials for MOW recipients.

MATERIALS AND METHODS

Instrument development

Five food safety labels (plus one commercial label, DayDots #10282-

01-11) was used, and five food safety handouts were developed for the seniors and cooks to react to during the five focus group sessions. The labels (Avery 5164: 3 $1/2 \times 4$ in) developed by the researchers contained various statements about eating instructions, refrigeration, handling leftovers, and a blank line for the date, which was to be filled in by the agency preparing the food. The BacDown[™] (18) logo was used on the five developed labels. The font used was Arial Black 14 point. The five food safety educational half-page handouts (Clean, Cook, Separate, Chill, and Fresh Fruit and Vegetables) were developed based on the FightBAC!® (18) messages. The font on the handouts was Arial Black 14 point. After content analysis of the focus group data, one label was developed and the food safety handouts were revised for testing with MOW recipients.

To collect data on food handling practices and meal consumption characteristics, surveys were developed for the seniors and cooks to complete at the end of the focus group session.

An instrument was developed for the interviewer who visited the MOW recipients in their homes. This instrument was used to collect data on MOW participation, practices associated with the home-delivered meals, two knowledge questions based on information presented on the label or the food safety handouts, and reactions to the label and food safety handouts.

Subject recruitment

After IRB approval was received from the University of Nebraska-Lincoln, senior citizens and cooks at five senior centers in Southeast Nebraska (five rural communities, population less than 10,000) were recruited for the focus groups. Senior centers who prepare home-delivered meals for the MOW program and on-site meals were selected for this study. Some of the seniors who eat at senior centers occasionally are MOW recipients because of health. Fliers were used to recruit seniors and cooks from these five centers. MOW participants were recruited from the same five areas where the seniors were recruited and from one MOW site in an urban community (population greater than 250,000). Prior to the home visit, a flier that explained the research project was delivered with the meals and invited MOW recipients to participate. A reminder letter was delivered one day prior to the home visit to inform the participant of the visit by the interviewer.

Focus groups

Five focus groups were conducted with cooks and seniors who ate at centers where meals were also prepared for MOW recipients. Each label was placed on a Styrofoam container used for meals that are delivered to MOW recipients. Seniors and cooks were asked to provide comments for each of the labels. Information was recorded. The five food safety educational handouts were provided to these participants, who were asked to provide comments on these handouts. Feedback was recorded. At the end of the focus group session, the participants were asked to complete the demographic survey. For participation, each person received a food safety kit (small plastic cutting board, refrigerator thermometer, food thermometer, and a magnet with proper cooking temperatures).

MOW interviews

For five consecutive days, the revised label (Fig. 1) was attached to the home-delivered meal. The five agencies that prepared the meals for delivery were instructed to write in the "Use by (date)." This date that they wrote on

Label Content	Focus Group Comments
Reheat before eating leftovers Eat within 2 hours Refrigerate leftovers and use by (day of week) (date)	Too much information/too wordy Information ok Don't want days of week on it Like large print
	Omit "Eat within 2 hours"
(Avery Label, 5164)	
Reheat before eating leftovers Eat or refrigerate immediately If not eaten, throw out after (date) (Avery Label, 5164)	Need date delivered Need training on microwave, because containers are Styrofoam Styrofoam Too much information/too wordy Meed more space for date Write day of week instead of number
Received Use by: (DayDots #10282-01-11)	Not easy to read Print too small Red color hard to read Not enough information Too simple Not enough information Date ok
Eat within 2 hours OR Refrigerate leftovers and use by (date)	Liked this Label 2nd best Suggested "Eat immediately or within 2 hours" Need day of week Easy to read
(Avery Label, 5164)	
Eat immediately OR Refrigerate leftovers within 2 hours	Add date Easy to read Liked this one Need more information,
(Avery Label, 5164)	Information not clear
Refrigerate leftovers Use by (date)	Liked this one Keep it simple Add "Eat immediately or refrigerate"
(Avery Label, 5164)	Very basic Easy to read Not enough information

The following week, an interview was conducted with MOW recipients who volunteered to be interviewed, to determine the effectiveness of the label and handouts, using the interview form.

Three trained interviewers conducted

Need reheating instructions

the interview in each MOW participant's home. An interview form was developed, and interviewers were given guidance on providing prompt questions if the participant did not understand the question.

the label was to be two days after the delivery date. One of the five food safety handouts was delivered with the meal each day that the label was used. All MOW recipients received the labeled meals and five educational handouts.

FIGURE 2. Alternative food safety label developed using the "Be Food Safe" chill graphic

Eat Immediately

Or

Refrigerate leftovers within 2 hours

Use by



Data analysis

Focus group data was analyzed using content analysis. Quantitative data from the surveys were entered into SAS (17) and analyzed for means.

RESULTS AND DISCUSSION

Focus groups

Forty-three seniors and nine cooks participated in the five focus groups (Table 1). Over half of the seniors (51.1%) ate five meals a week at a senior center. Results from the focus group testing of the six labels are listed in Table 2. Responses to all the labels, in general, included: keep it simple, use large print and black ink, and include some type of date. Concerns about what date to put on the label was the focus of much discussion. Should the date be the date received/delivered to the MOW recipient or the date the food should be discarded? For the revised label (Fig. 1), a "use by (date)" was selected. The reheating statement elicited many concerns, such as: (1) whether the statement should be on the label (2) the need to emphasize that Styrofoam delivery containers are not suitable as reheating containers in either a microwave or conventional oven (3) the need for additional directions for reheating the food in a microwave or oven, and (4) whether a temperature should be given for reheating. Because of these concerns and the request to keep the label simple, a reheating statement was not included on the revised label (Fig. 1). Additional information was suggested for inclusion on the label, such as "remember to take medications", which may be requested by family members of the MOW recipient. We determined that this information cluttered the label, and it was not included on the revised label.

Comments about the educational handouts included statements that the participants liked large print, colored pictures, and simple statements. Our results were similar to the findings of Gettings and Kiernan (9) that reported that seniors preferred the larger print size and less print. Interestingly, discussion focused on the educational content of the handouts, as the focus group participants easily understood the food safety messages.

MOW interviews

Forty-seven MOW recipients (32 rural and 15 urban) participated in the home interviews one week following the use of the labels on the delivered meals and handouts. Table 3 shows meal consumption characteristics for these recipients. Approximately one-third (36.2%) stated that they did not usually eat all the delivered food at lunch, although when asked about the previous week (this would be the week when the labels were used), over half (53,2%) stated that they did not eat all the food delivered for lunch. This conflicts with the responses to our next question, to which 75% of the MOW recipients responded that they saved food to eat later. The foods that are most likely to be kept for later consumption are meats and poultry, fruit, and casseroles/hot dishes. The foods that the seniors in the focus group (Table 1) reported taking home from a restaurant were meats and poultry, vegetables, and desserts. Meats and poultry leftovers are the common leftover foods among both groups and need proper refrigeration. Responses obtained by the interviewers indicate that participants may not always save or eat these leftovers, as some stated that they gave the meat to a pet. Participants stated that they saved bread to make sandwiches for a future meal, saved food to eat for the evening meal, and shared food with another family member or friend. Some participants who indicated they did not eat the food due to lack of appetite, small appetite, dislike of food or difficulty in eating saved the food for some other use. Similar concerns were listed by other researchers (3). People who were raised during the Great Depression generally do not waste anything (12).

Prior to the knowledge questions, MOW participants were asked how long they keep leftovers, such as meats and poultry. The time ranged between onehalf day to one week. Albrecht and Larvick (1) found that the average temperature of 74% of the refrigerators was above the recommended 40°F for those who stored meat and poultry items for later use. The long storage time combined with improper refrigerator temperatures increases the risk of food- borne illness for this population.

Of the 47 MOW recipients who were interviewed after one week, 94% stated that they read the label on their delivered meals. Only 19% of the participants stated that the correct refrigeration temperature was 40°F (information provided in the FightBAC![®] logo on the label) and an additional 12.8% indicated that a temperature of 35°F was the correct refrigeration temperature (Table 4). All participants stated that their refrigerators worked very well

TABLE 3.	Characteristics of	Meals-on-Wheels	participants (pertaining	to meal consum	otion
			Construction of the second sec			

	Percentage of participants (n)
Meals-on-Wheels participants (n = 47)	
Females	80.9 (38)
Males	19.1 (9)
Length of time receiving Meals-on-Wheels	
Less than I year	27.7 (13)
I to 5 years	51.1 (24)
6 to 10 years	17.0 (8)
More than 10 years	4.2 (2)
Do you usually eat all the food delivered?	
Yes	61.7 (29)
No	36.2 (17)
Missing	2.1 (1)
Last week, did you eat all the food delivered at lunch?	
Yes	36.2 (17)
No	53.2 (25)
Missing	10.6 (5)
Did you save some food to eat later?	
Yes	74.5 (35)
No	23.4 (11)
Missing	2.1 (1)
Types of foods that are kept:	
Meats and poultry	44.7 (21)
Bread	17.0 (8)
Vegetables	17.0 (8)
Salads	6.4 (3)
Potatoes, rice, pasta	8.5 (4)
Casserole/hot dish	19.2 (9)
Fruit	34.0 (16)
Dessert	17.0 (8)
Milk	10.6 (5)
Do you share your food with anyone?	
Yes	17.0 (8)
No	83.0 (39)

Percentages total more than 100% because participants could check more than one response

	Senior Participants (n = 43)	MOW Participants (n = 47)		
How long should you keep leftovers in your refrigerator?				
I day only	4.7 (2)	12.8 (6)		
I-2 days	34.8 (15)	59.6 (28)		
3-4 days	46.5 (20)	21.3 (10)		
5–6 days	4.7 (2) 0.0 (0)			
More than 6 days	0.0 (0)	2.1 (1)		
Don't know	9.3 (4)	2.1 (1)		
Missing	0.0 (0)	2.1 (1)		
At what temperature should food n your refrigerator be kept?				
50°F	0.0 (0)	0.0 (0)		
45°F	7.0 (3) 2.1 (1)			
40°F	46.5 (20) 19.1 (9)			
35°F	18.6 (8) 12.8 (6)			
32°F	7.0 (3)	12.8 (6)		
l don't know	20.9 (9)	53.2 (25)		

TABLE 4 Knowledge questions of seniors and MOW participa

or well; they apparently worked too well in some cases, because the temperature of some was so cold that items placed in them would freeze. In a previous study, Albrecht and Larvick et al. (1) found that MOW recipients reported that their refrigerators worked well, but the average refrigerator temperature recorded over a one week period was above the recommended temperature of 40°F for 53% of the MOW recipients surveyed.

The FightBAC!® logo on the label (Fig. 1) is a very colorful and busy graphic that includes a thermometer with a 40°F reading. This busy graphic possibly made it confusing for the MOW recipient to grasp this temperature message. In addition, when the graphic was used on this label, the written text on the graphic was difficult to read. Therefore, this component of the label was not effective. Since the FightBAC!® temperature logo was not effective on the label, the "Be Food Safe" (19) chill graphic (Fig. 2) was used in place of the FightB. C!® logo and tested with another group (data not shown). No differences were found when

this second group was asked the same question. In the focus groups, the participants stated that they liked the colorful graphics, but color and graphics mainly appealed to the overall appearance of the education piece rather than serving as a method of conveying information.

However, the rest of the label was effective. When interviewers asked the MOW participants to tell what the label (Fig. 1) was about, responses included: to refrigerate within 2 hours, eat right away or put in the refrigerator, and length of time to keep food in the refrigerator. Lando and Fein et al. (11) stated that people who read the food safety label had no trouble in making storage decisions, although reading labels requires literacy and motivation. The large print on the label was appreciated by our audience (Table 2). Johnson et al. (10) reported that 45% of the elderly people in their study had difficulty reading food labels, including the "use by" and "sell by" dates on commercially packaged food. They recommended that a larger, clearer label could contribute to food storage safety if the label was in a readable format for the audience. Reasons given for their difficulty in reading the label was that the print was too small and cramped. In another study, Brandt et al. (5) stated that the food label could be used as an educational tool to convey food safety messages critical to the product.

During the week prior to the interview, all MOW participants received one of the educational handouts on each of the five days. Of those who agreed to be interviewed, 91% stated that they read the educational handouts. The interviewers asked the MOW participants to share one thing they had learned from these educational handouts. Although several participants (19%) stated that they had already known all the information, several others (17%) stated that the information was a good reminder/refresher, and many gave specific examples of knowledge learned. Handwashing comments were given by 25% of the participants; proper temperature control (hot and cold) comments were given by 36%; and cross-contamination comments were given by 17%. Thirtyeight percent of the participants gave a statement about food storage. From the responses to the knowledge question asked of the participants, it appears that 72% knew how long to store leftovers properly (information given in one of the educational handouts), although from the practice question (Table 4) some of the participants are not putting this information into practice. From these data, it appears that the educational handouts were an effective tool for educating and reinforcing food safety knowledge. Educational material is available: "To Your Health! Food Safety for Seniors" (21) and "Food Safety for Older Adults" (20) but this information may be too extensive or complex for some MOW recipients. In our study, seven MOW participants (15%) stated that they could not remember receiving the educational handouts, and two MOW participants stated that they could not read very well. Moran (13) reported that dementia and less severe cognitive impairments among MOW recipients complicate the reliability of dietary intake data. It is possible that these conditions may have been a factor in the lack of responses or "don't know" responses from our MOW participants.

Our study demonstrated that a food safety label on home-delivered meals was needed to remind MOW participants how to store uneaten foods safely. Educational handouts that are easy to read are needed occasionally as a reminder of safe food handling practices.

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SPECIAL INTEREST

Critical Research Needs in Food Safety Microbiology

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ABSTRACT

Control of sporeforming bacterial pathogens and spoilage organisms; technology and processes to control *Salmonella* in low-moisture foods; and detection and mitigation strategies for viral causes of foodborne illness were identified as three critically important research areas by the ILSI North America Food Microbiology Committee during deliberations leading to its 2008 request for proposals (RFP). While the Committee received a number of pre-proposals in these areas, few proposals met the Committee's expectations. Therefore, the Committee is communicating the identified research needs to the larger food microbiology community to stimulate applied research, training, and funding in these priority areas. The ILSI North America Food Microbiology Committee has recently issued a 2009 RFP in one of the identified areas, "Technology and Processes to Control *Salmonella* in Low-moisture Foods." For more details on 2009 RFP for research support, please visit the ILSI North America Web page: www.ilsina.org.

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INTRODUCTION

The ILSI North America Food Microbiology Committee has a long history of funding research in the area of food microbiology and, since 1988, has issued calls for research proposals, typically every other year. Priority research areas for funding are identified after consultation with US government agencies (typically the US Department of Agriculture, US Food and Drug Administration, and the Centers for Disease Control and Prevention), food industry representatives, and academic advisors to the committee. The proposal solicitation and review process is as follows: ILSI North America issues a call for preproposals. The Food Microbiology Committee reviews and scores the proposals based on their relevance to the objectives defined in the RFP, and the innovativeness and scientific merit of the proposed research. Investigators who submitted highly ranked proposals are invited to submit full proposals. In 2008, the ILSI North America request for research proposals included three focus areas: Control of sporeforming bacterial pathogens and spoilage organisms. Technology and processes to control Salmonella in low-moisture foods, and Detection and mitigation strategies for viral causes of foodborne illness (2008 RFP). While the Committee received a number of pre-proposals in these areas, few met the Committee's objectives. The goal of this article is to communicate the critical research needs in the three areas identified by the ILSI North America Food Microbiology Committee during preparation of the 2008 RFP, proposal review, and subsequent committee discussions. The authors hope that this brief article will stimulate new research as well as funding in these important specific areas of need identified by this committee. Although this article clearly is not meant to be a complete review of all knowledge gaps in this area, it does provide a brief summary of critical research needs identified by a group of industry, government, and academic scientists with considerable expertise in food microbiology.

CONTROL OF SPOREFORMING BACTERIAL PATHOGENS AND FOOD SPOILAGE MICROORGANISMS

Sporeforming bacterial pathogens continue to be a major concern for public health and food safety. This concern is compounded by novel routes of transmission of these pathogens and previously unrecognized sporeforming pathogens. For example, recent cases of botulism in immunocompromised adults due to growth and toxin formation in the intestines of adult individuals with suppressed intestinal microflora (10) and of healthy children (9, 15) have raised new concerns with regard to C. botulinum as a foodborne pathogen. In addition, recognition of botulinum toxin-producing Clostridium species other than C. botulinum (e.g., specific C. sporogenes strains (14)) and foodborne toxin-producing Bacillus spp. other than B. cereus (e.g., specific B. thuringiensis strains (1)) represent important public health concerns. Further, sporeforming bacterial spoilage organisms also represent considerable concern for the food industry. While some sporeforming spoilage microorganisms are now well recognized and have received considerable research attention (e.g., Alicyclobacillus (13, 16, 17, 20)), knowledge of the ecology, physiology, and genetics of a number of sporeforming spoilage microorganisms is extremely limited (e.g., Thermoanaerobacterium and Thermoanaerobacter (2, 7). This severely limits the ability

to (i) detect these organisms, (ii) identify sources of these organisms, and (iii) control and eliminate these organisms in the production of food products in which their presence causes considerable spoilage problems.

The ILSI North America Food Microbiology Committee identified the following research needs in the area of sporeforming pathogens and spoilage organisms:

- (a) Sporeforming pathogens:
 - Control of toxin formation by proteolytic and nonproteolytic C. botulinum in extended shelf-life foods and beverages.
 - Genetics, physiology, and control of botulinum toxin-producing *Clostridium* species other than *C. botulinum*.
 - Genetics, physiology, foodborne transmission, molecular subtyping and epidemiology of other pathogenic *Clostridium* spp., in particular *C. difficile*.
 - Genetics, physiology, and control of foodborne toxin producing Bacillus spp. other than B. cereus.
 - Association between botulinum toxin formation and organoleptic changes in foods and beverages, including an understanding of competitive spoilage microorganisms that will cause spoilage before toxin formation can occur in a given food.
- (b) Sporeforming spoilage organisms:
 - Novel technologies, including non-thermal treatments and combination treatments, for control of heat-resistant sporeforming spoilage organisms in food and beverage products. Examples of treatments of interest are (i) pulse electric field treatment, (ii) radiation, (iii) microwave treatment, (iv) natural antimicrobials (including bacteriocins, natural extracts, etc.), and (v) bacteriophages. Research on other truly novel interventions is also of critical importance.
 - Genetics, physiology, and control of sporeforming spoilage organisms other than Alicyclobacillus, including Clostridium spp. that can cause spoilage (e.g., Clostridium laramie).

In regard to overarching research needs in the area of sporeformers, the ILSI North America Food Microbiology Committee identified the following:

- Control of spoilage and pathogenic sporeformers in refrigerated meals.
- Control of spoilage and pathogenic sporeformers in refrigerated extended shelf-life foods and beverages.
- Training of graduate students and new investigators in all aspects of biology, control, and transmission of spoilage and pathogenic sporeformers.

TECHNOLOGY AND PROCESSES TO CONTROL SALMONELLA IN LOW-MOISTURE FOODS

Two US outbreaks of Salmonella enterica subsp. enterica serotypes Tennessee and Typhimurium infections traced to contaminated peanut butter in 2006–2007 and 2008–2009, respectively, have once again highlighted the problem of Salmonella contamination of low-moisture food products (4, 5). Both were relatively large national outbreaks, and each caused illnesses in more than 500 persons. The cost to the economy of the most recent peanut butter outbreak in the US may exceed \$1 billion (18). On a global level, more than 20 foodborne disease outbreaks associated with low-moisture food products were documented in the developed regions between 1970 and 2008 (11). Foods implicated in these outbreaks included chocolate, infant cereals, milk powder, powdered infant formula, peanut butter and other peanut-containing products, raw almonds, and toasted oats cereal (12). At least four of these outbreaks occurred in the US.

Three major factors that exacerbate the problem of *Salmonella* contamination of low-moisture foods and their propensity to cause foodborne disease are the following:

- Salmonella cells appear to be more refractory to inactivation procedures in low-moisture foods
- Salmonella cells that survive inactivation treatments in low-moisture foods or that are introduced into lowmoisture foods after the inactivation step through post-process contamination (more likely) may persist in these foods for long periods of time (weeks to months).
- The infectious dose for Salmonella in low-moisture foods may be very low (often less than 10 CFU/g), as evidenced by outbreak investigations.

Taken together, these observations lead to the conclusion that the presence of even small numbers of Salmonella in lowmoisture foods may present a serious human health hazard and is therefore unacceptable. To address this problem, the Grocery Manufacturers Association has recently published a guidance document that identifies seven elements for the control of Salmonella in low-moisture foods (11, 12): prevention of introduction and/or spread of Salmonella in the food processing facility, enhancing the stringency of hygiene practices and controls in the primary Salmonella control area, incorporation of hygienic design principles in building and equipment design, preventing/controlling the growth of Salmonella in the processing facility, establishing a raw materials/ingredients control program, validating control measures to inactivate Salmonella, and establishing procedures to ensure that the Salmonella controls are working and for corrective actions. In March 2009, the US Food And Drug Administration issued the following recommendations to food manufacturers to address the risk of Salmonella contamination of foods containing a peanut-derived product as an ingredient (21):

- Purchase peanut-derived product only from suppliers who use validated processes to adequately (e.g., by 5 logs) reduce the numbers of Salmonella cells in their product.
- If the peanut-derived product is purchased in a form for which no validated process is available, or if there are questions concerning the presence of Salmonella in specific lots of peanut-derived products, ensure that the manufacturer's own manufacturing process would adequately reduce the numbers of Salmonella cells in their product

In regard to research needs in the area of controlling *Salmonella* in low-moisture foods, the Committee identified three specific areas and sub-topics within each area:

(a) Persistence of Salmonella in low-moisture foods and processing environment:

- Define and characterize mechanisms by which Salmonella develops and maintains resistance to drying, including the effects of different drying processes, food matrices and strain variation.
- Identify characteristics that may allow some strains to become entrenched and resident in a dry process environment.
- Develop rapid tools to map and "fingerprint" Salmonella strains in low moisture food environments, allowing for differentiation between potential transient and resident strains.
- Define optimized methods for recovery and detection of desiccated Salmonella from dry matrices and environments.
- (b) Salmonella mitigation processes for use in the production of low-moisture foods:
 - Generate relevant thermal death time data for a number of low-moisture food groups, and develop a model for Salmonella inactivation along a continuing A_/fat spectrum; publish to a database.
 - Evaluate the effectiveness of thermal processes and non-thermal process or hybrid thermal processes as pasteurization steps in the production of low moisture foods.
 - Develop strategies to adequately validate these mitigation processes.
 - Develop strategies to minimize Salmonella load in the raw agricultural commodities.
- (c) Non-aqueous sanitation processes that eliminate Salmonella from dry manufacturing equipment and processes, and strategies to validate the new processes.

This research funding initiative of ILSI North America Food Microbiology Committee resulted in the funding of one research project on the inactivation of *Salmonella* on raw nuts by use of low-energy X-ray. However, the Committee feels that much more comprehensive and targeted applied research needs to be conducted in this area to close knowledge gaps and to generate information that the food industry could use to control the problem of *Salmonella* contamination of low-moisture foods.

CRITICAL RESEARCH NEEDS ON DETECTION AND MITIGATION STRATEGIES FOR VIRAL CAUSES OF FOODBORNE ILLNESS

Viral pathogens, especially Norovirus and Hepatitis A virus (HAV), continue to be a major concern for public health and food safety. Both viruses are mainly transmitted from person to person, but food is also an important source when it becomes contaminated at its source from sewage, e.g., in oyster beds or produce fields, or during preparation by an ill or asymptomatic food worker. The connection to a specific food is most often apparent during outbreaks, and in the latest report on outbreaks of foodborne illness in the US states from 1998 – 2002 (3), Norovirus caused 33% of outbreaks and 41% of associated illness of foodborne infections with confirmed etiology, with an increasing trend over the period; likewise, HAV caused 2.4% of the outbreaks reported during the same period. Norovirus has been reported to account for 25% of produce-related outbreaks (6). The infectious dose of these pathogens is small and the viruses are hardy, being stable and surviving on dry surfaces and in food for prolonged periods; they are resistant to many sanitizers, freezing and temperatures up to 60° C; they are non-cultivatable, and no good animal infection models are available (8, 19). This severely limits the ability (i) detect these organisms, (ii) identify sources of these organisms, and (iii) control and eliminate these organisms in the production of food products, in which their presence is a major public health problem.

Based on the challenges outlined above, the members of the ILSI North America Food Microbiology Committee believe that considerable need exists for the food microbiology community to enhance research and teaching efforts in the area of foodborne viral pathogens. The Committee thus, in 2008, included a call for research proposals in the area of "Detection and Mitigation Strategies for Viral Causes of Foodborne Illness" in its 2008 RFP for research funding. Although the committee received eight preproposals in this area, relevance to the Committee's objectives was not met and none of the projects was funded.

In regard to research needs in the area of foodborne viral pathogens, the ILSI North America Food Microbiology Committee identified the following:

- Development and assessment of methods to detect and quantify infectious Norovirus and HAV in diverse food matrices, e.g., in seafood and produce. The method(s) should be applicable to the detection of infectious virus in foods following treatment(s) designed to reduce the risk of viral foodborne disease, such as through sanitation or processing (such as thermal processing, aseptic processing, ingredient mixing, ingredient handling, other).
- Development and assessment of methods to concentrate virus from food, e.g., by culture, filtration, adsorption, precipitation or other methods.
- Development and assessment of methods to control foodborne viral pathogens from entering the food production.
- Development and assessment of methods to control or inactivate virus from food without affecting its organoleptic quality, e.g., heat, sanitation, pressure, irradiation, other.
- Development and assessment of methods to inactivate foodborne viral pathogens from food preparation surfaces, e.g., sanitizers and disinfectants.

In regard to overarching research needs in the area of foodborne viral pathogens, the ILSI North America Food Microbiology Committee identified the following:

- Assessment of the burden of illness caused by foodborne viral pathogens.
- Development of a risk assessment for Norovirus and HAV in different food commodities.
- Training of graduate students and new investigators in all aspects of biology, control, and transmission of foodborne viral pathogens.

The Committee hopes that widespread dissemination of the research priorities identified above will stimulate researchers and investigators to focus their research in these areas and will persuade funding agencies to include these topics in their list of priorities for funding. Additional research in these areas will lead to closing of significant knowledge gaps in food safety and will allow food processors to enhance the safety of their products and processes. The ILSI North America Food Microbiology Committee has recently issued a 2009 RFP in one of three identified areas, "Technology and Processes to Control Salmonella in Low-moisture Foods" (for more details visit: www. ilsina.org). The Committee may issue additional RFPs in identified research areas in the future and may consider unsolicited proposals on these topics, if they are sufficiently innovative and promising.

ACKNOWLEDGMENTS

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International

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Request for Prepoposals for Research Support

The Technical Committee on Food Microbiology of the International Life Sciences Institute (ILSI) North America is accepting preproposals for financial support of research in the area of "Technology and Process to Control *Salmonella* in Low-Moisture Foods." The committee is prepared to fund research in the following research areas:

- Persistence of Salmonella in low-moisture foods and the processing environment;
- (2) Salmonella mitigation processes for use in the production of low-moisture foods; and
- (3) Non-aqueous sanitation processes that eliminate Salmonella from dry manufacturing equipment and processes, and strategies to validate the new processes.

The deadline for submission of preproposals is December 15, 2009. Preproposals can be obtained from the ILSI North America office or electronically from http://www.ilsina.org starting October 19, 2009.

For more information contact, Darinka Djordjevic, ILSI North America, 1156 15th Street, NW, Suite 200, Washington, D.C. 20005, USA.

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IAFP's Fifth European Symposium The Advancements in Food Safety October 7–9, 2009 Berlin, Germany



he International Association for Food Protection—in collaboration with the International Life Sciences Institute Europe, the World Health Organization, and the Food and Agriculture Organization of the United Nations—hosted IAFP's Fifth European Symposium at the Estrel Convention Center in Berlin, Germany, 7–9 October. Over the three days, the Advancements in Food Safety conference attracted 215 attendees from 27 countries.

On Wednesday, many attendees launched their symposium experience by participating in one of

the morning workshops, ComBase project of the Institute of Food Research, sponsored Predictive Modelling: Principles and Tools and ILSI Europesponsored Risk Assessment Approaches to Setting Thermal Processing, workshops were followed by a networking lunch and two afternoon seminars, Cronobacter (Enterobacter sakazaki) and Methods and Method Validation, both of which concluded with roundtable discussions. The evening's events included the keynote address by Wayne Anderson of the Food Safety Authority of Ireland, The Irish Dioxin Crisis: Six Days That Shook the Nation, and the Opening Reception in the Exhibit Hall, where 20 prominent companies shared their food safety expertise through innovative displays and demonstrations: AES CHEMUNEX, bioMérieux, Bio-Rad, BIOTECON Diagnostics GmbH, ConGen, DuPont Oualicon, Oxoid, ILSI Europe, International Food Hygiene, LGC Standards, MATRIX Microscience Ltd., Medical Wire, Neogen Europe, Ltd., R-Biopharm, Romer Labs Diagnostic GmbH, Silliker, Inc., Society for Applied Microbiology, Springer, 3M Duetschland GmbH, and WHO/FAO.

The Thursday and Friday plenary and parallel sessions featured a roster of globally renowned speakers delivering nearly 30 presentations, sparking ideas and discussions that continued during the coffee and lunch networking breaks throughout the conference. Among the session topics were Salmonella and Low-moisture Foods, Chemical Contaminants









in Foods, Water Quality and Its Relation to Food Quality and Safety, and Novel Processing Technologies and Food Safety. Most of these exceptional presentations, along with workshop and seminar presentations, are now accessible through the IAFP Web site.

In addition to the sessions, more than 70 poster presentations addressed research issues in food safety, with three presenters earning award recognition in the student and overall categories. Student winners were Mary Pia Cuervo of Texas A&M University, US and Antje Frohling of Leibniz Institute for Agricultural Engineering, Germany. Congratulations to Peter Rossmanith of the University of Veterinary Medicine, Austria for receiving First Place Overall.

The Hungarian Association for Food Protection (HAFP) received its official affiliate charter on Thursday morning. Csilla Mohacsi-Farkas, of the Corvinas University of Budapest, accepted the



charter and will serve as the organization's President and Delegate.

On Thursday evening, bioMérieux Industry invited attendees to enjoy hors d'oeuvres and socializing at the Museum for Communication Berlin, a building of magnificent architecture in Germany capturing the development of the postal service since the Middle Ages as well as telecommunications in Berlin.

IAFP is grateful to the Organizing Committee, chaired by Dr. Michele Storrs, for its time and efforts in planning our successful fifth annual symposium in Europe, and to the outstanding companies on whose generosity and enthusiastic contributions IAFP depends when seeking to extend its mission of facilitating food safety communications around the world. Be watching for details on IAFP's Sixth European Symposium on Food Safety to be held in the spring of 2010!





AWARD NOMINATIONS

ANNUAL MEETING AUGUST 1-4, 2010

The International Association for Food Protection welcomes your nominations for our Association Awards. Nominate your colleagues for one of the Awards listed below. You do not have to be an IAFP Member to nominate a deserving professional. Nomination criteria is available at:

www.foodprotection.org

Nominations deadline is February 16, 2010

You may make multiple nominations. All nominations must be received at the IAFP office by February 16, 2010.

- Persons nominated for individual awards must be current IAFP Members. Black Pearl Award nominees must be companies employing current IAFP Members, GMA Food Safety Award and Frozen Food Foundation Research nominees do not have to be IAFP Members.
- Previous award winners are not eligible for the same award.
- Executive Board Members and Awards Selection Committee Members are not eligible for nomination.
- Presentation of awards will be during the Awards Banquet on August 4, at IAFP 2010 in Anaheim, California.

Contact IAFP for questions regarding nominations.



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Nominations will be accepted for the following Awards:

Black Pearl Award

Award Showcasing the Black Pearl Sponsored by Wilbur Feagan and F&H Food Equipment Company

Presented in recognition of a company's outstanding commitment to, and achievement in, corporate excellence in food safety and quality.

Fellow Award

Distinguished Plaque

Presented to Member(s) who have contributed to IAFP and its Affiliates with distinction over an extended period of time.

Honorary Life Membership Award

Plaque and Lifetime Membership in IAFP

Presented to Member(s) for their dedication to the high ideals and objectives of IAFP and for their service to the Association.

Harry Haverland Citation Award

Plaque and \$1,500 Honorarium Sponsored by ConAgra Foods, Inc.

Presented to an individual for many years of dedication and devotion to the Association ideals and its objectives.

Food Safety Innovation Award

Plaque and \$2,500 Honorarium Sponsored by Walmart

Presented to a Member or organization for creating a new idea, practice or product that has had a positive impact on food safety, thus, improving public health and the quality of life.

International Leadership Award

Plaque, \$1,500 Honorarium and Reimbursement to attend IAFP 2010 Sponsored by Cargill, Inc.

Presented to an individual for dedication to the high ideals and objectives of IAFP and for promotion of the mission of the Association in countries outside of the United States and Canada.

GMA Food Safety Award

Plaque and \$3,000 Honorarium Sponsored by Grocery Manufacturers Association

This Award alternates between individuals and groups or organizations. In 2010, the award will be presented to a group or organization in recognition of a long history of outstanding contributions to food safety research and education.

Frozen Food Foundation Freezing Research Award

Plaque and \$2,000 Honorarium Sponsored by the Frozen Food Foundation

Presented to an individual, group or organization for preeminence and outstanding contributions in research that impacts food-safety attributes of freezing.

Maurice Weber Laboratorian Award

Plaque and \$1,500 Honorarium Sponsored by Weber Scientific

Presented to an individual for outstanding contributions in the laboratory, recognizing a commitment to the development of innovative and practical analytical approaches in support of food safety.

Larry Beuchat Young Researcher Award

Plaque and \$2,000 Honorarium Sponsored by bioMérieux, Inc.

Presented to a young researcher who has shown outstanding ability and professional promise in the early years of their career.

Sanitarian Award

Plaque and \$1,500 Honorarium Sponsored by Ecolab Inc.

Presented to an individual for dedicated and exceptional service to the profession of Sanitarian, serving the public and the food industry.

Elmer Marth Educator Award

Plaque and \$1,500 Honorarium Sponsored by Nelson-Jameson, Inc.

Presented to an individual for dedicated and exceptional contributions to the profession of the Educator.

Harold Barnum Industry Award

Plaque and \$1,500 Honorarium Sponsored by Nasco International, Inc.

Presented to an individual for dedication and exceptional service to IAFP, the public, and the food industry.

MEET THE IAFP AFFILIATE COUNCIL



Advancing Food Safety Worldwide® Through local efforts

Delegates from associations around the world converge at the IAFP Annual Meeting to express the voice of their colleagues, exchange perspectives and support, and return to their communities energized for progress.

GET CONNECTED WITH IAFP AFFILIATE LEADERS IN YOUR AREA

Visit the Affiliate resource pages at www.foodprotection.org.



International Association for Food Protection

6200 Aurora Avenue, Suite 200W Des Moines, Iowa 50322-2864, USA

December 2009

Fellow IAFP Members:

As we prepare for a new year, I want to encourage you to become involved in the International Association for Food Protection's (IAFP) Committees and Professional Development Groups (PDGs). Committees and PDGs are a vital part of the life of the Association. There are two types of committees within IAFP: Standing Committees and Special Committees. Standing Committees provide operational or functional support to IAFP. Individuals are appointed by the President-Elect and confirmed by the Executive Board. Special Committees provide support services to IAFP on a continuous basis. Individuals are recommended by the Chairperson of each committee, subject to the Executive Board's review. A list of Standing Committees and Special Committees can be found on the following pages, and on our Web site.

Professional Development Groups are intended to be a forum whereby professionals with common interests in specific aspects of food safety come together to share information and serve IAFP in the organization of symposia, preparation of white papers, and other scientific endeavors. IAFP currently supports 16 PDGs. A list of PDGs can be found on the following pages, and on our Web site. If you wish to start a new PDG, please contact the IAFP office.

The Committees and PDGs meet during the Annual Meeting and also share information throughout the year via conference calls or E-mail. Therefore, even if you are unable to attend IAFP 2010 in Anaheim, California, your involvement is still possible and your insight important. Please review the list of Committees and PDGs and their respective mission statements found on the following pages. If you find one that sounds interesting or relevant to you, simply contact the IAFP office to let us know which group you want to join. Getting started is really that simple.

Participation in IAFP's Committees and PDGs has been a truly rewarding experience for me. Committee and PDG involvement allowed me to serve the Association in many ways, as well as providing me with opportunities for professional development, and making friends. The PDGs provide a forum for exchange of ideas with other professionals having similar food safety interests and expertise. Participation in PDGs allows you to serve our Association and your peers by providing your own unique talents and time in the promotion of food safety. And, while you are helping the Association and others, you'll also be networking with leading experts in the field, learning from their experiences, and developing valued relationships. So, it's a professional win-win. And that's not even to mention the many friends that you'll find in your IAFP colleagues!

For those of you who have participated in our Committees or PDGs in the past, I want to thank you for your service. We could not be the Association we are today without your valued participation. I encourage you to stay involved; your continued participation remains critical to the success and growth of IAFP.

As usual, your comments, questions, and suggestions are welcomed, and do not hesitate to contact the IAFP office or myself if we can be of help. And please join me in making 2009–2010 an active and vital year for the IAFP Committees and PDGs. We need the efforts of everyone as we seek to Advance Food Safety Worldwide[®].

Best Regards,

Jobel Dalle

Isabel Walls Vice President, IAFP

"Our mission is to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply." Publisher of the *Journal of Food Protection*, and *Food Protection Trends*

Phone: +1 515.276.3344 = Fax: +1 515.276.8655 • E-mail: info@foodprotection.org • Web site: www.foodprotection.org

IAFP Committee, Professional Development Group, Task Force and Affiliate Council Mission Statements

STANDING COMMITTEES

FPT Management Committee

The mission of the *FPT* Management Committee is to provide guidance to the Executive Board on matters concerning *Food Protection Trends*.

JFP. Management Committee

The mission of the JFP_{\oplus} Management Committee is to provide guidance to the Executive Board on matters concerning the *Journal of Food Protection*_{ϕ}.

Program Committee

The mission of the Program Committee is to develop the Annual Meeting program, evaluate abstracts, identify symposia and speakers, identify all sessions' convenors, and oversee Developing Scientist Awards Committee.

SPECIAL COMMITTEES

3-A Committee on Sanitary Procedures

The mission of the 3-A Committee on Sanitary Procedures is to serve as IAFP representatives to the 3-A Sanitary Standards Committee; to review and provide comments on proposed changes and revisions to the 3-A Sanitary Standards.

Audiovisual Library Committee

The mission of the Audiovisual Library Committee is to review and evaluate audiovisual materials for accuracy and appropriateness of content, make recommendations regarding the purchase of audiovisual materials, and provide guidance on matters concerning the AV Library.

Awards Committee

The mission of the Awards Committee is to select recipients for the IAFP awards.

Black Pearl Selection Committee

The mission of the Black Pearl Selection Committee is to select the recipient of the Black Pearl Award.

Committee on Control of Foodborne Illness

The mission of the Committee on Control of Foodborne Illness is to review information on epidemiology and control of communicable diseases of primary concern to food safety and related areas, and prepare manuals and articles addressing investigation and control of food safety-related problems.

Constitution and Bylaws Committee

The mission of the Constitution and Bylaws Committee is to review and study the Constitution and Bylaws of IAFP and make recommendations to the Executive Board for changes to be considered for submission to the Membership for ratification.

Developing Scientist Awards Committee

The mission of the Developing Scientist Awards Committee is to select finalists and judge the Developing Scientist Awards Competition at the IAFP Annual Meeting.

Fellows Selection Committee

The mission of the Fellows Selection Committee is to solicit nominations and make recommendations to the Executive Board for eligible Members to be confirmed as Fellows by the Executive Board.

Foundation Committee

The mission of the Foundation Committee is to oversee IAFP Foundation monies, solicit gifts to the Foundation, and identify and fund programs which further the goals and objectives of the Association.

Membership Committee

The mission of the Membership Committee is to develop strategies to retain current members and attract new members.

Nominating Committee

The mission of the Nominating Committee is to select and submit names of nominees for the office of Executive Board Secretary for election by the IAFP Membership.

Past Presidents' Committee

The mission of the Past Presidents' Committee is to serve as an advisory committee to the Executive Board.

Tellers Committee

The mission of the Tellers Committee is to count and certify the results of each election and other membership votes.

PROFESSIONAL DEVELOPMENT GROUPS

Applied Laboratory Methods PDG

The mission of the Applied Laboratory Methods PDG is to provide a forum for the exchange and sharing of information related to the development and use of laboratory methods for the analysis of food and related commodities.

Beverage PDG

The mission of the Beverage PDG is to provide a forum to discuss and develop symposia on issues facing the beverage industry.

Dairy Quality and Safety PDG

The mission of the Dairy Quality and Safety PDG is to promote the production and processing of safe, high quality dairy products and to develop program topics and symposia for presentation at the IAFP Annual Meetings.

Food Chemical Hazards and Food Allergy PDG

The mission of the Food Chemical Hazards and Food Allergy PDG is to facilitate communication on topics in food toxicology including food allergens.

Food Hygiene and Sanitation PDG

The mission of the Food Hygiene and Sanitation PDG is to provide information on the developments in hygiene and sanitation in the food industry.

Food Law PDG

The mission of the Food Law PDG is to provide an international forum for the exchange of information on the scientific issues associated with food laws, regulations and policy.

Food Safety Education PDG

The mission of the Food Safety Education PDG is to provide IAFP members and their clientele information on food safety education.

Fruit and Vegetable Safety and Quality PDG

The mission of the Fruit and Vegetable Safety and Quality PDG is to provide a forum to discuss items of interest to the safe production of fruit and vegetable products and to develop program topics and symposia for presentation at the IAFP Annual Meetings.

International Food Protection Issues PDG

The mission of the International Food Protection Issues PDG is to provide a forum to discuss scientific issues of interest to the international food protection community.

Meat and Poultry Safety and Quality PDG

The mission of the Meat and Poultry Safety and Quality PDG is to provide a forum to discuss items of interest to the safe production of meat and poultry products and to develop program topics and symposia for presentation at the IAFP Annual Meetings.

Microbial Modelling and Risk Analysis PDG

The mission of the Microbial Modelling and Risk Analysis PDG is to facilitate communication on the topic of microbial risk analysis (MRA), promote application and use of MRA and encourage research and data reporting methods that support MRA.

Retail Food Safety and Quality PDG

The mission of the Retail Food Safety and Quality PDG is to provide the retail food safety industry worldwide with information to prepare and serve safe food.

Seafood Safety and Quality PDG

The mission of the Seafood Safety and Quality PDG is to provide a forum to discuss items of interest to the safe production of seafood products and to develop program topics and symposia for presentation at the IAFP Annual Meetings.

Student PDG

The mission of the Student PDG is to provide students of food safety with a platform to enrich their experience as members of IAFP.

Viral and Parasitic Foodborne Disease PDG

The mission of the Viral and Parasitic Foodborne Disease PDG is to promote awareness of non-bacterial causes of foodborne disease by encouraging food safety professionals and others to seek education and training that will enable them to contribute to preventing non-bacterial foodborne infections and outbreaks.

Water Safety and Quality PDG

The mission of the Water Safety and Quality PDG is to provide a forum to discuss items as to the role the safety and quality of water plays globally in the farm-to-table chain and to develop program topics and symposia for presentation at the IAFP Annual Meetings.

TASK FORCE

Annual Meeting Future Planning Task Force

The mission of the Annual Meeting Future Planning Task Force is to look at future trends in meeting structure and make suggestions to keep IAFP's Annual Meeting an exceptional learning opportunity for all attendees.

Rapid Response Series Task Force

The mission of the Rapid Response Series Task Force is to identify developing conditions affecting food safety and organize meetings on these issues to educate IAFP members.

AFFILIATE COUNCIL

The Affiliate Council is an advisory body to the IAFP Board, represents Affiliate Associations' interests, responsible for IAFP Awards Committee, interchanges ideas and recommendations on programs, awards and procedures between Affiliates and the Board.



NEW MEMBERS

BRAZIL

Christina Zanette Universidade Federal do Paraná Palotina, PR

CANADA

Kingsley K. Amoako Canadian Food Inspection Agency Lethbridge, Alberta

Michael Sidra Alberta Health Services Sherwood Park, Alberta

Joyce Van Donkersgoed Dr. Joyce Van Donkersgoed Veterinary Services, Inc. Coaldale, Alberta

HUNGARY

Csaba Németh Corvinus University of Budapest Budapest

PAKISTAN

Rashida Ali H.E.J. Research Institute of Chemistry – Int'l. Cntr. Karachi, Sindh

SWITZERLAND

Laurence Blayo Nestle Lausanne

Kazuko Fukushima World Health Organization Geneva

UNITED KINGDOM

Mark Dunnett Independent Equine Nutrition Suffolk

Niamh M. Murphy Health Protection Agency London

UNITED STATES

ARIZONA

Dave L. Podesta Sysco Corporation Chandler

CALIFORNIA

Xunde Li University of California–Davis Davis

FLORIDA

Daniel-Heng T. Tan Dean Foods Miami

GEORGIA

Margaret Phillips Roger Wood Foods, Inc. Savannah

Wendy N. White Golden State Foods Conyers

ILLINOIS

Roberto S. Giuliano Great Kitchens Inc. Romeoville

MARYLAND

Ronald Diem Sysco Corporation Ridgely

MISSOURI

Michael Clark Chestnut Labs Springfield

Coesha A. Fairley Mars Petcare Raymore

Ashutosh Singh Mars Petcare NA Kansas City

NEBRASKA

John W. Schmidt USDA, US Meat Animal Research Center Clay Center

NORTH CAROLINA

Douglas R. Ware NPC Chapel Hill

PENNSYLVANIA

Amanda Douglas ARAMARK Philadelphia

TENNESSEE

Henry Perry HME, Inc. Oak Ridge

Emily Rotich Tennessee State University Nashville

TEXAS

Richard S. Cottrell Sysco Corporation Houston

Mitchell W. Gilgour Sysco Corporation Houston

Rob J. Glasscock Sysco Corporation Houston

Susan Linn Sysco Corporation Houston

Mark Mignogna Sysco Corporation Houston

Georgiann Miller Sysco Corporation Houston

Steven Streety Sysco Corporation Houston

WISCONSIN

Mitzi Schwertfeger Masterson Company Plymouth

WHAT'S HAPPENING

3-A SSI Announces 2010 Education Program and Annual Meeting

3 -A Sanitary Standards, Inc. (3-A SSI) announced plans to hold its 2010 Education Program and Annual Meeting May 17–21, 2010 at the Wyndham Milwaukee Airport Hotel & Convention Center in Milwaukee, Wisconsin. The program theme and schedule will be announced later this year.

Participation and interest in the yearly education session have increased steadily since the expanded program was introduced in 2003. The yearly program has become widely recognized in the sanitary equipment design marketplace worldwide as a primary opportunity to enhance the knowledge and awareness of leading issues in sanitary design and the application of 3-A Sanitary Standards and 3-A Accepted Practices. In addition to industry education, the event is a key networking opportunity for regulatory sanitarians, equipment fabricators, processors, and other equipment specialists from around the world.

3-A SSI welcomes submissions on topic/speaker suggestions for the 2010 program. Program suggestions for the 2010 event are requested no later than November 6, 2009.

Please add the 3-A SSI Education Program and Annual Meeting to your industry events schedule.

USDA Confirms 2009 Pandemic HINI Influenza Virus Present in Minnesota Fair Pig Sample

griculture Secretary Tom Vilsack has announced that USDA's National Veterinary Services Laboratories (NVSL) has confirmed the presence of 2009 pandemic H1N1 influenza virus in a pig sample collected at the Minnesota State Fair submitted by the University of Minnesota. Additional samples are being tested. "We have fully engaged our trading partners to remind them that several international organizations, including the World Organization for Animal Health, have advised that there is no scientific basis to restrict trade in pork and pork products. People cannot get this flu from eating pork or pork products. Pork is safe to eat," said Mr. Vilsack.

Sequence results on the hemagglutinin, neuraminidase and matrix genes from the virus isolate are compatible with reported 2009 pandemic HINI sequences. The samples collected at the 2009 Minnesota State Fair were part of a University of Iowa and University of Minnesota cooperative agreement research project funded by the US Centers for Disease Control and Prevention which documents influenza viruses where humans and pigs interact at such as fairs.

The infection of the fair pig does not suggest infection of commercial herds because show pigs and commercially raised pigs are in separate segments of the swine industry that do not typically interchange personnel or animal stock. USDA continues to remind US swine producers about the need for good hygiene, biosecurity and other practices that will prevent the introduction and spread of influenza viruses in their herd and encourage them to participate in USDA's swine influenza virus surveillance program.

More information about USDA's 2009 pandemic HINI efforts is available at www.usda.gov/HINIflu.

3-A SSI Issues Revamped Standard for Metal Tubing

3-A SSI announces the release of a comprehensive revision of 3-A® Sanitary Standard #33-02, Metal Tubing. This newly published revision is the major (5-year) update of this Standard.

The Metal Tubing standard is widely referenced in the dairy processing industry and covers the sanitary aspects of metal tubing used to conduct milk and milk products. This standard does not apply to the assembly of metal tubing into further fabricated forms or systems. This standard includes the requirements for the materials of construction and fabrication techniques, including surface finish. The polishing requirement, which appeared in previous versions of the standard, was removed due to improvements in stainless steel manufacturing techniques.

Copies of these announcements and a form to submit suggestions for the 2010 program are available at www.3-a.org under News & Events, or contact 3-A SSI.

GSI US Announces Launch of Groundbreaking Foodservice Initiative with Leading Foodservice Manufacturers, Distributors and Operators

SI US[™] has announced that 55 foodservice manufacturers, distributors and operators have launched the Foodservice GSI US Standards Initiative, and have funded the GSI US Team for Foodservice to guide execution. The Initiative recommends the adoption of a common timeline for voluntary individual company implementation

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of GS1 Global standards for company identification, item identification and product description; 45 of the Initiative's founding member companies have already voluntarily committed to this common timeline. Founding member companies can be found at www.gs/us.org/foodservice.

The Initiative is striving for 75 percent adoption of GSI standards throughout the foodservice industry, measured in terms of revenue, by 2015, and is endorsed by the International Foodservice Manufacturers Association (IFMA), the International Foodservice Distributors Association (IFDA), the National Restaurant Association. and GSI Canada Foodservice. Industry organizations and founding members of the Foodservice GSI US Standards Initiative cite three main objectives and industry-wide benefits as a result of companies choosing to adopt and implement GSI standards:

- Drive waste out of the foodservice supply chain;
- Improve product information for customers, and
- Establish a foundation for improving food safety and traceability.

Dawn Sweeney, president and CEO of the National Restaurant Association, said "The Foodservice GSI US Standards Initiative will have tremendous benefits for restaurants, their guests and their supply chain, and is an important step forward in our continuing efforts to ensure the highest standards for our industry."

The Foodservice GSI US Standards Initiative was formed as a result of a strategic planning process facilitated by Future Perfect Consulting Services. During the 6-month process, presidents of foodservice manufacturers, distributors and operators and their supply chain leaders worked with GS1 US, GS1 Canada and Future Perfect to draft a timeline that individual companies could choose to employ in their voluntary adoption and implementation of GS1 standards.

"Unified Foodservice Purchasing Co-op, LLC, in managing the supply chain exclusively for Yum! Brands, Inc., fully supports the Foodservice GSI US Standards Initiative and Roadmap," said Daniel E. Woodside, president and CEO of Unified Foodservice Purchasing Co-op, LLC. "We began our project in 2005 utilizing standardized bar codes on our product cases anticipating benefits for all our business partners. As we now begin to realize some of those benefits, we are excited to share our learnings with the industry and commit our full support."

Brenda Lloyd, director, Unified Foodservice Purchasing Co-op, LLC added, "It is critical we stay on the forefront of addressing data quality and food safety issues as an industry. We know our business best. Now is the time, together we can build a strong foundation that works for everyone."

Founding member manufacturers and distributors agree:"IFMA is fully supportive of voluntary adoption of GSI standards," said Tom Sampson, president, Kraft North America Foodservice and 2009 IFMA chairman of the board."Based on Kraft's experience implementing these standards in Canada, we know data synchronization not only drives out waste and inefficiencies, it also frees up time for manufacturers to collaborate with customers to drive growth. Voluntary adoption of these standards will also create a common foundation for improved product traceability and communication of nutritional information throughout the supply chain," said Mr. Sampson.

Near-term steps in the Foodservice GSI US Standards Initiative timeline include:

- By Q4 2009: Companies assign GS1 Global Location Numbers to their headquarters.
- By Q3 2010: Manufacturers assign GS1 Global Trade Item Numbers to products and include them on order guides and other trading partner documentation.
- By Q2 2011: Manufacturers and brand owners will publish product and company identification and related logistics information to trading partners. Distributors retrieve product information; populate back end systems and customer product catalogs.

Trading partners choosing to adopt and implement GSI standards will access standard product information through the GSI Global Data Synchronization Network® (GDSN®), an open platform that ensures continuous real-time exchange of consistent, accurate product information among supply chain partners. Many technology providers are certified to help companies with implementation; certification is required to ensure adherence to GSI global standards. Committed providers include widely known players in foodservice, including AFS, which announced that it will become certified for GSI data publishing and retrieval; Aligntrac, which already is certified for GSI data publishing and retrieval; FSE, which already is certified for data publishing and retrieval and is getting certified to become a GSI GDSN data pool; ISYNC, the world's largest GDSN data pool, which also is certified for GSI data publishing

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and retrieval; and iTradeNetwork, which will become certified to publish, retrieve and become a GSI GDSN data pool. GDSN data pools are interoperable – i.e., publishing to one or retrieving data from one means that companies can retrieve data from all GDSN-certified data pools without additional fees.

"The scores of foodservice companies voluntarily adopting GSI standards along a common timeline is a powerful testament to their commitment," said Bob Carpenter, CEO of GSI US. "We pledge to support foodservice with world class implementation guidance, as we've done for 25 other industries, including the retail food industry."

USDA Joins FDA Efforts on New Food Safety Regulations–Agencies Unite on Outreach to Produce Industry

SDA's fresh produce chief will join FDA to help develop new food safety rules as part of a cooperative initiative between FDA and the US Dept. of Agriculture (USDA). The announcement comes amid beefed-up outreach efforts with key agriculture and safe food stakeholders to better share and exchange produce safety "best practices" and ideas.

Leanne Skelton, chief of the Fresh Products Branch of the USDA's Agriculture Marketing Service (AMS), has extensive experience working with the fruit and vegetable industry. Ms. Skelton has been with the Fresh Products Branch at AMS for more than 22 years, working in inspections, grading and certification, standardization, training, and managing the Branch's financial and information technology activities. Ms. Skelton will be on detail with the FDA for six months as she helps the FDA develop new safety regulations for produce.

"USDA is committed to working with our partners to ensure that Americans have access to safe, healthy, and nutritious food," said Agriculture Secretary Tom Vilsack.

Through the initiative, FDA is gathering information and seeking feedback from the fresh produce industry, including small and organic farmers, on the impact such rules may have on their businesses and lives. In addition, USDA and FDA officials have been traveling together to meet with farmers and local food safety officials.

"The USDA and the FDA have joined together on listening sessions and farm tours, and are eager to develop a system of regulation that will work for American families and the growers," said AMS Administrator Rayne Pegg.

FDA Commissioner Margaret Hamburg iterated the agency's commitment to listen and learn from all those with a role in protecting the safety of the food system.

"It is vitally important for us to hear ideas, concerns, and experiences directly from local growers around the country as we develop rules to help protect the safety of fresh produce from the farm to the table. We will be that much more effective by working closely with farmers, our USDA partners and with state and local food safety agencies," she said.

Sweet Potato Protection is More Than Skin Deep

Sweet potatoes are a seasonal staple that earn US producers some \$370 million every year. Now Agricultural Research Service (ARS) scientists have found traits in sweet potatoes that someday may make the vegetable as appreciated in the lab as it is in the kitchen. All plants contain protective compounds called caffeoylquinic acids, which are known for their antioxidant activities. Caffeoylquinic acid levels vary widely between different plant species.

ARS agronomist Howard Harrison teamed up with plant pathologist Pat Wechter and plant physiologist Joseph Peterson (now retired) to measure the levels of caffeoylquinic acids in sweet potatoes. All three scientists work at the US Vegetable Laboratory in Charleston, SC. Other ARS collaborators included ARS chemists Maurice Snook and Trevor Mitchell, who work in the Toxicology and Mycotoxin Research Unit of ARS' Richard B. Russell Research Center in Athens, GA.

The research team found measurable amounts of all four types of caffeoylquinic acids in the sweet potatoes they tested. On average, the highest levels of the compounds were found in the layer of tissue just under the skin. Intermediate levels were found in the stele--the interior of the sweet potato and the lowest levels were found in the skin.

The scientists found that three of the compounds they tested provided some protection against *Rhizopus* soft rot, a fungus which infects sweet potatoes after harvest by invading through breaks in the skin. One of the compounds inhibited the growth of another infectious plant fungus, *Fusarium solani*.

This research was published in the Journal of the American Society for Horticultural Science.

John C. Bruhn Receives "Award of Distinction" from UC-Davis

ohn C. Bruhn, Ph.D., a dairy food processing specialist emeritus in the department of food science and technology, is an accomplished

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researcher and educator whose work has helped improve the quality and taste of milk, cheese, and other dairy products. For his contributions, he has been honored among "Outstanding Faculty" with a 2009 Award of Distinction from the College of Agricultural and Environmental Sciences (CA&ES) at the University of California–Davis.

Dr. Bruhn received his award, one of nine honoring faculty, staff, alumni and supporters, on Oct. 9, 2009, during the CA&ES 21st annual College Celebration at UC–Davis. The award is presented annually to those whose contributions and achievements enrich the image and reputation of UC–Davis and enhance its ability to provide public service.

"This year's recipients have all made important contributions to keeping our college at the forefront of meeting society's most pressing challenges," said CA&ES Dean Neal Van Alfen. "We are pleased to be able to give these individuals the recognition they deserve."

Dr. Bruhn came to UC–Davis in 1962 in pursuit of a master's degree in food science and technology, but coursework in biochemistry and microbiology convinced him that a career as a bacteriologist was more inviting. He earned his doctoral degree in 1968 and the following year became a UC cooperative extension specialist.

Throughout his career, Dr. Bruhn's research and education emphasized the quality and safety of raw and processed milk and dairy foods. Early efforts with California dairy farm advisors helped eliminate variable milk flavors through a statewide program to teach dairy producers how to produce raw milk with uniform quality. He received an extension award from the American Dairy Science Association for this work, one of many career awards. Dr. Bruhn would also later become the organization's president. In the 1970s. He led a national effort to identify the source of iodine contamination on dairy farms and at food processors.

Dr. Bruhn helped establish the Dairy Research and Information Center in 1995 and served as its founding director until 2002. Before retirement, he worked with the artisan and farmstead cheese producers to improve the quality and safety of cheeses from goat, sheep, and cow milk.

"The career achievements of John Bruhn illustrate a lifetime of selfless service driven by passion for dairy food science and for meeting the needs of the dairy industry," said Kathryn Boor, professor and chair, Department of Food Science, Cornell University. Dr. Boor is a former UC-Davis staff research associate mentored by Dr. Bruhn.

Tom Ambrosia Appointed Food Safety Program Manager

ÜV SÜD America Inc. announced the appointment of Mr. Thomas C.Ambrosia to the position of food safety program manager in its management services division. In this role, Mr. Ambrosia will be responsible for supporting SQF program and Food Safety initiatives in the North American region. Additionally, Mr. Ambrosia will manage key accounts and act as lead auditor.

"We are very fortunate to have an experienced professional like Tom with over 30 years of food safety and quality work experience," stated Craig Casillas, director of management services. "We are confident that our food safety program will continue to grow and improve under Tom's guidance and leadership," concluded Mr. Casillas.

Mr. Ambrosia previously held various corporate positions from director of food safety and quality at both Hain Pure Protein Corporation and The Kmart Corporation, to vice president of food safety, SQF & training at HACCP, US, and director of quality and R&D at both ToJo Mushrooms and ConAgra. He has also served as the corporate executive chef and QA manager for Marriott and Cargill. He is a certified executive chef and also is a certified food safety manager and a certified professional of food safety.

INDUSTRY PRODUCTS



KD Scientific

New Portable Syringe Pump from KD Scientific Ideal for Drug and Nutrient Delivery

K D Scientific's new EZFlow 2030 is a small, light and completely portable syringe pump. It is designed to deliver small volumes with a linear flow rate of I - 99 mm per/h with $\pm 2\%$ accuracy and can be used in a wide variety of applications. It is cost effective and the most compact and lightest pump in its class.

Flow Rate Ranges from 0.1 ml/h up to 65 ml/h depending on the syringe size and pump linear rate.

This portable, user-friendly Syringe Pump offers a new alternative for micro-reliable infusions. It can accommodate a wide variety of plastic syringes from 1 ml to 60 ml. Ergonomic, easy-to-use, horizontal design protects the syringe barrel and allows single-handed loading.

This Syringe Pump has a bolus function which allows the user to add 1/4 of preset fluid by bolus cable, without interruption of current infusion at a minimum of 30 minute intervals. There are two audible and visual alarms, complete occlusion and low battery.

The KDS EZFlow 2030 uses 3 AA batteries. The battery life is 30 days or more than 30 syringes at intermediate flow. It can also operate on a DC 4.5V power supply. It comes complete with bolus cable, syringe cover protector, leather case and batteries.

KD Scientific designs, manufactures and sells a range of quality fluidics equipment used by research laboratory markets worldwide.

KD Scientific syringe pumps are an economical solution to delivering precise and smooth flow in research, pilot plants and production applications. They are recognized worldwide for quality, accuracy and reliability. A broad line of syringe pumps are offered from a simple one syringe infuse only, to a programmable, multi-syringe infuse/withdrawal pump.

> KD Scientific 508.429.6809 Holliston, MA www.kdscientific.com

SDI's RapidChek E. coli O157 Test System First to be Validated by an Independent Lab for Composite Testing of Common Types of Raw Beef Products

SDI, a provider of biotechnologybased products and services for a broad range of life science, food safety, and industrial applications, announced the completion of an extensive third-party validation of the RapidChek[®] *E. coli* O157 (including H7) test system for 375 g composited raw beef samples.

The third-party validation study was performed with RapidChek *E. coli* O157 test strips for detection of *E. coli* O157 (including H7) in composited 375 g beef trim, ground beef, and ammoniated beef samples. The results were compared to the United States Dept. of Agriculture (USDA) FSIS (Food Safety Inspection Service) reference method. All samples were confirmed using biochemical/serological procedures as listed in the USDA MLG (Microbiology Laboratory Guidebook). RapidChek E. coli O157 was shown to reliably detect E. coli O157 (including H7) in 375 g beef trim samples in as few as 10 h when incubated at 42°C and using a 1:5 sample to media dilution factor, in 375 g ground beef samples in as little as 12 hours when incubated at 42°C and in 375 g ammoniated beef samples in as few as 18 h when incubated at 42°C. The study also demonstrated the ability to verify RapidChek E. coli O157 potential positive results directly from the RapidChek media system with commercially available DNAbased methods followed by further confirmation with biochemical/ serological procedures as listed in the USDA MLG. The validation study was conducted by Food Safety Net Services of San Antonio, TX.

> Strategic Diagnostics, Inc. 800.544.8881 Newark, DE www.sdix.com

Charm Sciences Helps Industry Meet Sustainability Goals with Recyclable ATP Swab Tests

Charm Sciences, Inc. makes it easier for its customers to meet the growing demand for sustainable solutions by manufacturing its popular PocketSwab® Plus ATP swabs, commonly used for food safety and infection

Be sure to mention, "I read about it in Food Protection Trends"!

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INDUSTRY PRODUCTS

control programs, using recyclable components. By allowing customers to conveniently recycle swab components within their own waste management programs, Charm helps companies meet their sustainability goals.

Specific recycling codes for each component are featured on new packaging.

Charm's environmentallyfriendly swabs leave only residue that is Generally Recognized as Safe (GRAS) on food contact surfaces. Unlike some competitor products which employ a known carcinogen, sodium azide, Charm swabs do not contain any hazardous chemicals

Additional "green" benefits of Charm ATP swabs are the facts that Charm PocketSwab Plus and FieldSwab have a shelf life of oneyear at room temperature. Unique among ATP swabs, this feature saves energy and shipping costs compared to other swabs that require refrigerated storage and shipping.

"ATP swab tests are used by food, beverage, medical and many other businesses to measure surface cleanliness and evaluate effectiveness of sanitation programs in real-time. Companies can use hundreds of swabs a month as a part of their HACCP and quality control plans," said David Legg, vice president quality assurance at Charm Sciences. "Because Charm PocketSwab Plus, WaterGiene, FieldSwab, AllerGiene®. and WineGiene swabs are made of recyclable components, companies can increase usage to meet growing safety demands while reducing their solid waste footprint." he added.

> Charm Sciences, Inc. 978.687.9200 Lawrence, MA www.charm.com



Hoefer, Inc.

New Workstation Designed for Polymerase Chain Reactions (PCR) from Hoefer, Inc.

Hoefer, Inc. has announced the introduction of the new PCR Workstation.

The PCR Workstation provides effective decontamination of solutions, reagents and equipment before carrying out sensitive PCR reactions, particularly when amplifying DNA fragments which are either in limited supply or low copy number.

Four timer-controlled 15-watt UV bulbs enable the user to control the exposure time and dose of high energy UV irradiation required to denature nucleic acids preventing background contamination.

The UV bulbs generate pyrimidine dimers and other photo defects in contaminating target sequences, thus eliminating falsely primed products that result in lost time and expense.

Two safety interlocks switch-off the UV bulbs automatically when the cabinet side doors are opened preventing accidental exposure to the UV source. A single white light bulb illuminates the work area when the cabinet is in use.

The cabinet's construction from UV impermeable 10 mm acrylic also serves as an effective barrier against some radioactive isotopes, allowing the user to work in increased safety with B-emitters such as 32P and 35S.

The PCR Workstation meets Safety Certifications EN61010-1, CE. The internal dimensions are 54 cm wide by 75 cm high by 40 cm deep and there is a 0–120 minute timer.

> Hoefer, Inc. 800.227.4750 Holliston, MA www.hoeferinc.com

Bio-Rad Offers Large Solutions of Rapid Methods to Meet Dairy Laboratories Needs

n dairy products pathogen testing, Bio-Rad's unrelenting quest for innovation aimed at customer satisfaction has resulted in new methods: RAPID' chromogenic media and ready-to-use iQ-Check PCR kits, which ensure reliable results validated by AFNOR validation, AOAC-RI.

These methods minimize the time required to obtain results and offer a wide range of choices: *Listeria monocytogenes* and spp. *Campylobacter* spp., *E. coli* O157:H7, *Salmonella*, and *Cronobacter* spp.

Due to the high sensitivity and specificity of real-time PCR, a single overnight enrichment is sufficient to obtain very good results.

> Bio-Rad Laboratories 800.224.6723 Hercules, CA www.bio-rad.com

ie sure to mention,"I read about it in Food Protection Trendt"

INDUSTRY PRODUCTS

Spiroflow Systems Introduces Bulk Bag Filler with New Advanced Control Package

Spiroflow Systems, Inc. introduces the redesigned C1-2 Bulk Bag Filler complete with a new programmable controller designed to increase filling accuracy and cycle speed.

The CI-2 Bulk Bag Filler uses an automatic gain in weight adjustment to monitor and compensate for any weight variation. Using programmable one-touch controls, the CI-2 Bulk Bag Filler operator can control Bulk Bag Filler operations as well as upstream infeed devices. With accuracy within 1%, the CI-2 Bulk Bag Filler is ideal for companies who seek NTEP resale approval.

A filling rate of up to 20 bags an hour is attainable, depending on the 'flowability' of the product and the storage hopper or conveyor used to deliver the product to the C1-2 Bulk Bag Filler. The system offers broad applications in numerous industries including chemical, food, dairy, pharmaceutical, animal feed, plastics, minerals and aggregates.

An additional benefit of the newly redesigned C1-2 Bulk Bag Filler is the greater ease to add custom features. The C1-2 Bulk Bag Filler can be customized to meet individual user requirements.

Below are some examples of custom features:

Power height adjustment: This option lets the operator quickly adjust the height between filling cycles to accommodate various sized Bulk Bags. Retracting bag hooks: System that simultaneously opens/closes all bag hooks to allow for faster attachment/detachment of the Bulk Bag loops to the Bulk Bag Filler.

Filling nozzle and inflatable mechanical seal: A dust tight seal between the Bulk Bag Filler and the Bulk Bag for sanitary dust-free operation.

Liner inflation device: Inflates the Bulk Bag's liner with ambient air and creates slight positive pressure to remove wrinkles and properly form the bag to assure maximum material capacity.

Roller Bed: The roller bed system ensures faster off-loading of filled bags for increased productivity.

Electric or pneumatic vibrators: During the filling process vibrators improve material densification and compaction of the material in the Bulk Bag for better storage and transport. This increases productivity and maximizes the use of space.

> Spiroflow Systems, Inc. 704.291.9595 Charlotte, NC www.spiroflowsystems.com

Idaho Technology Receives AOAC-RI Validation for E. coli O157:H7 Test

daho Technology Inc. (ITI) has been granted Performance Tested Methods Status by the AOAC Research Institute (Certificate No. 100901) for its *E. coli* O157:H7 test used with the R.A.P.I.D.® LT Food Security System (FSS). The assay uses real-time PCR technology to identify the presence of *E. coli* O157:H7 in raw ground beef and uncooked spinach food samples.

The system marks a milestone in real-time PCR testing of foodborne pathogens as this platform enables detection of E. coli O157:H7 in less than one hour after only 8 hours of enrichment. The validation studies on ground beef and spinach prove that the R.A.P.I.D. LT FSS performed as well or better than traditional culture methods with faster time to result. The complete system provides the easiest end-to-end protocol for PCR-based detection methods, and the E. coli O157:H7 test joins the Idaho Technology Listeria spp. and Salmonella spp. assays as AOAC-RI approved.

"Our objective is to help food processors effectively test for *E. coli* O157:H7 in order to prevent illness in consumers," said David Nielsen, ITI vice president of product development. "This new test from Idaho Technology provides easy, accurate and timely pathogen identification to enhance food companies' productivity."

The validation of this rapid screening tool for *E. coli* is an important development for all food manufacturers since *E. coli* O157:H7 is a major health problem and is estimated to cause infection in more than 70,000 patients a year in the United States alone. The use of an *E. coli* O157:H7 screening tool that is both rapid and accurate will permit earlier release of products without fear of potential outbreaks or possible food recalls. The assay is intended for use by trained laboratory personnel.

> Idaho Technology Inc. 801.736.6354 Salt Lake City, UT www.idahotec.com

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COMING EVENTS

JANUARY

- 13, Ohio Association for Food Protection Winter Meeting, Ohio Dept. of Agriculture, Reynoldsburg, OH. Featuring speaker Lee-Ann Jaykus. For more information, contact Kelli Dodd at 614.645.6741; E-mail: krdodd@ columbus.gov.
- 27–29, International Poultry Expo, Atlanta, GA. For more information, call 770.493.9401 or go to www.ipe10.org.
- 31–Feb. 3, NMC 49th Annual Meeting, Albuquerque, NM. For more information, go to www. nmconline.org.

FEBRUARY

- 3-5, Global Food Safety Conference 2010, Hotel JW Marriott, Washington, D.C. For more information, go to www.ciesfoodsafety. com.
- 16–19, 2010 Public Health Preparedness Summit, Atlanta, GA.
 For more information, go to www. phprep.org.
- 21–24, 5th Dubai International Food Safety Conference, Dubai Convention and Exhibition Center, Dubai, United Arab Emirates. For more information, go to www. www.foodsafetydubai.com.
- 23–25, Food Claims and Litigation Conference, Barton Creek Resort and Spa, Austin, TX. For more information, go to www. gmalitigationconference.com.
- 27–March 3, AFFI Frozen Food Convention, Manchester Grand Hyatt, San Diego, CA. For more information, go to www.affi.com.

MARCH

 I4–I7, FMI Asset Protection Conference, Ritz-Carlton Hotel, Dallas, TX. For more information, call Aileen Dullaghan Munster at 202.220.0704 or go to www.fmi. org. 23-26, 2010 Food Safety Education Conference, Advancements in Food Safety Education: Trends, Tools and Technologies, Hyatt Regency Atlanta, Atlanta, GA. For more information, go to www.fsis.usda.gov/ Atlanta2010.

APRIL

- 9–14, Conference for Food Protection 2010 Biennial Meeting, Providence, RI. For more information, call 916.645.2439 or go to www. foodprotect.org.
- 12-14, 2010 Food Safety Summit, Washington, D.C. For more information, go to www. foodsafetysummit.com.
- 18–21, TAPPI 2010 PLACE Conference, Albuquerque, New Mexico. For more information, call 800.332.8686 or go to www.tappi. org.
- 25–27, ADPI/ABI Annual Conference, Hyatt Regency, Chicago, IL. For more information, go to www. adpi.org.

MAY

- 5, Carolinas Association for Food Protection Annual Meeting, North Carolina Research Campus, Kannapolis, NC. For more information, contact Steve Tracey at smtracey@foodlion.com.
- 5, Florida Association for Food Protection Annual Educational Conference, International Plaza Resort and Spa, Orlando, FL. For more information, contact Zeb Blanton at 407.618.4893 or go to www.fafp.net.
- 5–8, ISOPOL XVII International Symposum on Problems of Listeriosis, Alfandega Congress Centre, Porto, Portugal. For more information, go to www.esb.ucp.pt/ isopol2010.
- 6, Metropolitan Association for Food Protection Spring Seminar, Rutgers University, Cook College Campus, New Brunswick, NJ.

For more information, contact Carol Schwar at 908.475.7960; E-mail: cschwar@co.warren.nj.us.

- 6–7, Associated Illinois Milk, Food and Environmental Sanitarians Spring Conference, Eastland Suites, Bloomington, II. For more information, contact Steve DiVencenzo at Steve.DiVencenzo@ illinois.gov.
- 6–8, High-Throughput Methods for Detecting Foodborne Pathogens Workshop, York College, Jamaica, NY. For more information, go to www.york.cuny.edu/conted/ fdaworkshops/2008-fda-workshop/ preliminary-program.
- II–I3, FMI 2010, Mandalay Bay Convention Center, Las Vegas, NV. For more information, go to www. fmi.org/events.
- 17–21, 3-A 2010 Education Program and Annual Meeting, Wyndham Milwaukee Airport Hotel and Convention Center, Milwaukee, WI. For more information, go to www.3-a.org.

JUNE

 19–23, AFDO 114th Annual Educational Conference, Sheraton Waterside Hotel, Norfolk, VA. For more information, contact Leigh Ann Stambaugh at 717.757.2888 or go to www.afdo.org.



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Q: What's the safe minimum cooking temperature for a turkey?

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Q: How long should you keep leftovers?



A: HolidayFoodSafety.org

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