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Food Protection Trends

Science and News from the International Association for Food Protection

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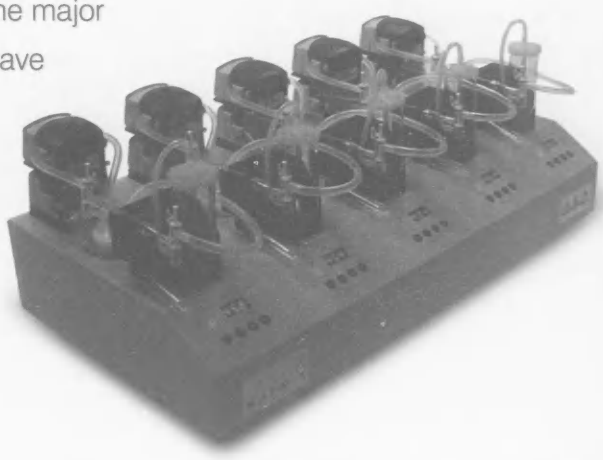

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FOOD PROTECTION TRENDS

VOLUME 29, NO. 4

ARTICLES

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EXTRAS

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FOOD PROTECTION TRENDS
SCIENCE AND NEWS
FROM THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

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Gaylord Texan Resort
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IAFP 2010

AUGUST 1–4

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"PERSPECTIVES" FROM YOUR PRESIDENT

By **STAN BAILEY**
PRESIDENT

"The Program Committee has put together another exceptional program with 28 symposia and roundtables and 438 technical presentations"

Wow! What a venue and what a program! As I write this column, I have just returned from the Program Committee and Executive Board meeting held at the Gaylord Hotel in Grapevine, Texas, the site of this year's Annual Meeting. In this month's column, I hope to convey to you how outstanding the hotel, meeting space, and scientific program are for this year's meeting. I will also describe some of the changes that the Program Committee and Executive Board have implemented that we think will enhance your 2009 IAFP experience.

The Gaylord Texan Resort and Convention Center is a beautiful hotel with 1,511 well-appointed sleeping rooms, exceptional service, and excellent restaurants all surrounding a 3.5 acre covered atrium with a year-round temperature of 72°F, which will be greatly appreciated in July. The atrium has a stream running through it that is surrounded by plants and trees, all of which are live except for the $250,000 oak tree near the Ama Lur Restaurant. This oak tree is patterned after one of the oldest trees in Texas, the famous "Treaty Oak," located in Austin. The Riverwalk area is designed to capture the look and feel of its namesake in San Antonio. The Riverwalk Buffet Restaurant, a 4,000-square-foot state-of-the-art workout room, and a 25,000-square-foot world class spa are located in this area.

For those of you who like to dance the night away or sit on the veranda overlooking the lake, the Glass Cactus located on the Gaylord property sits directly by Lake Grapevine and is only a two-minute shuttle bus ride or ten-minute walk away. The Glass Cactus, widely recognized as one of the best night-clubs in the Dallas area, has live music every evening and admission is free to anyone staying at the Gaylord Hotel.

I have been attending IAFP meetings for about 30 years, and I believe that the meeting space at the Gaylord Convention Center may be the best that I have seen. The convention center with registration, exhibit halls, and meeting rooms is only a short (one minute) enclosed walk from the hotel's Lone Star Tower. The size of the exhibit hall is large enough to comfortably accommodate all vendors, poster boards, and associated lunches and receptions. Meeting rooms are "Texas" sized and should be large enough to handle the large number of attendees that we anticipate. The Sunday Professional Development Group (PDG) meeting rooms are in the same area making movement between PDG meetings easier than in some other years.

The Program Committee has put together another exceptional program with 28 symposia and roundtables and 438 technical presentations. I do not have the space to mention all the symposia, but the update on recent foodborne outbreaks including the peanut butter outbreak is sure to be of high interest. Other cutting-edge symposia topics will be presented on prepared not ready-to-eat foods, viruses detection in foods, *E. coli* O157:H7 and other pathogenic *E. coli*. Special sessions on dairy, produce, poultry, risk assessment, and new detection methods will also be presented.

In addition to the strong technical program, IAFP is offering three workshops prior to the Annual Meeting. The first of these, "Your Toolkit for Cleaning by Design...What Can Go Right," will be held on Friday and Saturday prior to the meeting. The "Microbiological Sampling and Testing in Food Safety Management" and "Beyond Food Safety Management–How to Create a Food Safety Culture" will be conducted on Saturday only.

IAFP also provides numerous opportunities to network. The Committees and PDGs that meet on Sundays, in addition to planning, developing, and instituting many of the Association's projects, including workshops, publications, and educational sessions, also offer an excellent opportunity to network with colleagues in your area of expertise. Please come and share your expertise by volunteering to serve on committees or PDGs.

This is a great opportunity to keep abreast of the latest developments and meet colleagues working in your area of interest. Meetings are open and everyone is invited to attend.

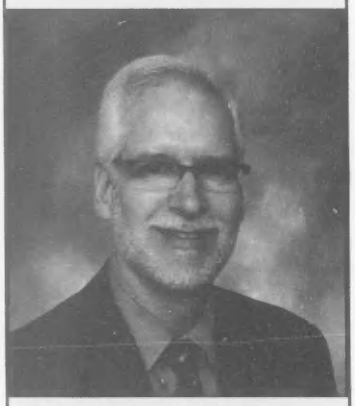
This year the Program Committee and Board have worked diligently to address a concern that has been voiced to them in past years, that there are too many presentations or posters going on at the same time. In an effort to address this issue, posters will be on display for an entire day; however, the authors will only be present for a two-hour period.

Perhaps the biggest change that will be implemented this year is the symposia development and submission process for IAFP 2010. In recent years, the process for symposia development called for PDGs and others to submit symposia for the next year's meeting during the current year's meeting. At least 95% of all the symposia at IAFP for the last several years followed this process. In order to allow time for timely, cutting-edge symposia to be more fully developed, the Program Committee has recommended and the Executive Board has agreed to extend the latest time that symposia may be submitted until the first of November each year. The online submission site will be open beginning at the Annual Meeting and will continue to be open until the November deadline.

In addition to a strong professional program, the IAFP staff and Local Arrangements Committee have put together an exciting social program as well. On Saturday morning, the annual IAFP Golf Tournament will be held at the "Tour 18" Golf Course. The Tour 18 course is world renowned for its layout where each of the 18 holes is a duplicate of a legendary hole from one of the world's most celebrated golf courses. Accompanying persons who want to visit area attractions will find organized events including the JFK and Dallas City tour, the Fort Worth Stockyards tour, and the Fort Worth Arts tour. More information about these exciting events can be found at the IAFP Web site www.foodprotection.org.

As you can see, I am very excited about this year's IAFP Annual Meeting, and I invite you to join me in Grapevine, Texas, July 12–15, 2009. Remember to register before June 9th in order to avoid late fees. Comments on this column or anything else you would like to share are welcomed and can be sent to me at stan.bailey@na.biomerieux.com.

"COMMENTARY" FROM THE EXECUTIVE DIRECTOR



By DAVID W. THARP, CAE
EXECUTIVE DIRECTOR

"We encourage you to participate in IAFP's conferences wherever they take place around the world"

This issue of *Food Protection Trends* is our pre-Annual Meeting issue where you can learn about all that will be offered this year at IAFP 2009. First off, let's make sure you know the location! IAFP 2009 will be held at the Gaylord Texan Resort and Conference Center located in Grapevine, Texas. This facility is only fifteen to twenty minutes away from the Dallas-Fort Worth Airport, so access is very easy.

Stan Bailey has already described the hotel and convention center in his President's column this month, so I will just affirm that everyone will enjoy this wonderful venue. It is beautifully decorated, large enough to hold all of our meeting needs and has many unique features when compared to other hotel facilities. We have received a few questions about other hotels offered for IAFP 2009. Because the Gaylord Texan contains more than enough rooms to fit our attendees' requests, there is not a need for us to contract with additional hotels in the area. When considering optional hotels, you need to take into account the taxi or rental car expense and the related parking fees at the Gaylord. For these reasons, we encourage you to book your room at the Gaylord and enjoy all the resort has to offer!

Our Annual Meeting coverage begins on page 236 and shows the program topics, workshop offerings, additional events including the golf tournament, Monday Night Social and the Tuesday Evening Fundraiser for the IAFP Foundation. You should review this information carefully to plan your experience at IAFP 2009. It is sure to be an historic event.

I want to change topics now to provide a short update on the Dubai International Food Safety Conference (DIFSC) held recently, in late February. In fact, I am preparing this column from Dubai as I participate in the conference. It is IAFP's second year of involvement and we can already see our efforts are paying dividends. The Dubai Municipality became a Silver Sustaining Member, an Affiliate was established titled the United Arab Emirates Association for Food Protection and we have seen Member growth in the Middle East and Gulf Region. IAFP is proud to be a supporter of this conference and looks forward to many years of continued participation.

During the opening plenary session, Stan Bailey and I presented Hussain Nasser Lootah, Director General of the Dubai Municipality with a commemorative plaque recognizing their efforts in food safety. In prepared comments, I explained the special relationship IAFP has with DIFSC and the Dubai Municipality. It has been exciting for IAFP to be involved with this growing food safety conference in the beautiful city of Dubai.

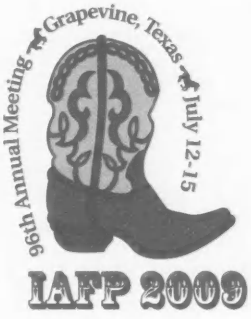
This year in Dubai, there were many people who stopped me to say they were IAFP Members. They are proud to be associated and known as a Member of the Association. Those Members communicate with each other around the conference and help to encourage new Memberships. Also, it is interesting to know that more than fifty percent of the speakers were IAFP Members. There were close to 850 attendees this year at the Dubai International Food Safety Conference.

DIFSC is organized and supported by the Dubai Municipality. They recognize the significance of having and enforcing strong food safety laws. They see the importance of sharing food safety information among food safety professionals in the region and that is the reason they have now organized this conference

for four years. Attendance has expanded to now include attendees from around the globe. I met people from around the Gulf Region, all across Europe, Asia, Australia, North and South America, and Africa.

Some attendees shared with me that they were not supported by their employer to attend this conference, but they had felt so strong about learning from food safety colleagues that they paid their own way to attend DIFSC. Can you believe it? This is true commitment from the attendee and should be embarrassing to the employer! Employers, if you have employees who want to learn, interact with other food safety professionals and establish their own network of food safety professionals, you should be fully supportive of this effort! All professionals, including food safety professionals, need to learn more about the area in which they work. Face-to-face conferences allow this to happen!

Watch the May issue of *Food Protection Trends* for pictures from DIFSC. To conclude for this month, we encourage you to participate in IAFP's conferences wherever they take place around the world. You can learn from others and establish your own network of food safety professionals. We hope to see you soon.



IAFP WORKSHOPS

Friday and Saturday
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Workshop 1

Your Toolkit for Cleaning by Design...What Can Go Right

Saturday
July 11
8:00 a.m. – 5:00 p.m.

Workshop 2

Microbiological Sampling and Testing in Food Safety Management

Saturday
July 11
8:00 a.m. – 5:00 p.m.

Workshop 3

Beyond Food Safety Management– How to Create a Food Safety Culture

ARTICLES

Food Protection Trends, Vol. 29, No. 4, Pages 204–210

6200 Aurora Ave., Suite 200W, Des Moines, IA 50322-2864

International Association for Food Protection

Mexican Food Safety Trends: Examining the CDC Data in the United States from 1990 to 2006

WENDY FRANCO and AMARAT H. SIMONNE*

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SUMMARY

Mexican food has become mainstream in the United States. We assessed food safety trends for the cuisine associated with Mexican foods, using the CDC foodborne illness data from 1990 to 2006. During this period, 560 foodborne illness outbreaks (18,581 cases), 3.5% of the total foodborne illness outbreaks reported to the CDC, were attributed to Mexican foods. The majority of the outbreaks (47%) occurred in restaurants. More than 50% of those outbreaks were of unknown etiology. When the pathogens could be identified, *Salmonella* (34%), *Clostridium* spp. (24%), *Shigella* spp. (6%), *Staphylococcus* (5%), and *Escherichia coli* (5%) were associated with outbreaks; the microbial profile associated with Mexican foods differs from the general data reported by the CDC. Outbreaks were most frequently associated with multiple food items (22%), followed by tacos (18%), chili and salsa (9% each), refried beans (8%), and guacamole (4%). In addition to the usual food safety and handling risks, some Mexican foods carry their own specific risks. Potential safety concerns include serving practices that combine cold fresh food items with warm cooked ingredients, which may increase the likelihood of microbial growth. The epidemiological information provides a starting point from which to address the increasing number of outbreaks associated with Mexican cuisine.

A peer-reviewed article

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FIGURE 1. Total numbers of foodborne illness outbreaks associated with Mexican food for each year in the US (1990 to 2006) are illustrated as bars, with numbers of cases shown in the middle. The diamonds connected by the line represent the percentage of outbreaks associated with Mexican foods, as compared to the total number of foodborne illness outbreaks reported to the CDC during the same time period

INTRODUCTION

In recent years, Mexican foods, along with Italian and Asian foods, have become mainstream ethnic foods in the United States (US) *(10, 12, 14, 15)*. Tortillas, salsa, refried beans, quesadillas and guacamole are available in general grocery stores, restaurants and specialty stores. This widespread ethnic food availability in the US is perhaps a reflection of the exponential growth of the ethnic population. According to the US Census Bureau, 15% of the US population is of Hispanic origin, with a majority being Mexican-American and people of Hispanic origin are expected to make up 24% of the total population by 2050 *(1, 20)*. This demographic change has caused growth in the ethnic food sector, including ethnic food restaurants, leading Americans to experience new flavors and become familiar with foods from foreign countries. Furthermore, as per capita income increases, especially among ethnic populations, spending on foods eaten away from home increases *(5, 19)*. Mexican foods are the second largest segment in the top 100 menu categories, with 12.5% of retail sales *(11, 18)*. One market research survey found that 46% of US households surveyed ate Mexican food four or more times per month *(4)*.

It is difficult to obtain an accurate estimate of the frequency of foodborne diseases. In the US, the Centers for Disease Control (CDC) estimates that 76 million cases of foodborne diseases occur each year, resulting in 325,000 hospitalizations and 5,000 deaths *(9)*. The Center for Science in the Public Interest (CSPI) collects its own foodborne illness data, and from 1990 to 2005 its data reveal a total of 5,316 foodborne outbreaks, with 157,830 individual cases. Seafood, produce, poultry, beef, and eggs were responsible for 60% of all outbreaks and 55% of disease cases. Produce items were implicated in the largest number of outbreaks and cases (713 outbreaks, 34,049 cases) and accounted for 22% of the total outbreaks *(2)*. However, specific information on the preparation and serving of food products associated with outbreaks in different types of cuisines is rarely available. Simonne et al. *(17)* first reported on the relationship between foodborne illness and type of ethnic cuisine, on the basis of data reported to the CDC from 1990 to 2000. Their research showed that, of the three ethnic cuisines most commonly consumed in the US, Mexican foods are the most frequent source of foodborne disease outbreaks *(17)*. This study also revealed that the profiles of microorganisms implicated in outbreaks were different for various ethnic cuisines *(17)*.

Asian and Mexican/Latin American cuisines are the most commonly available ethnic cuisines in the US. Mauer et al. surveyed food safety inspectors in different jurisdictions across the US in 2006. More than 90% of the participants reported that Mexican/Latin American food items are prepared, stored and served in food establishments in their jurisdictions, but participants considered few of these food items to be problematic from a food safety point of view. Food safety professionals may be particularly concerned with food safety issues associated with foods with which they are not familiar, even without specific knowledge of hazards associated with these foods *(8)*. However, findings of Simonne et al. *(17)* show that Mexican cuisine is the ethnic cuisine most frequently associated with foodborne disease outbreaks. Mexican cuisine often features a combination of cooked and raw ingredients, and this serving practice, along with problematic handler hygiene practices, may contribute to food contamination and microbial growth.

FIGURE 2. Foodborne illness outbreaks associated with Mexican foods from 1990 to 2006, separated by year and categorized as either known etiology or unknown etiology

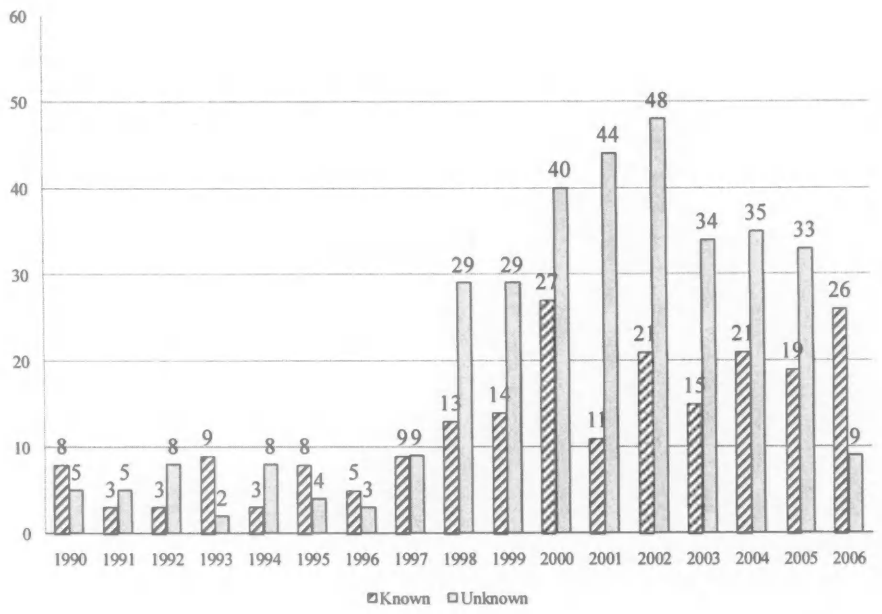
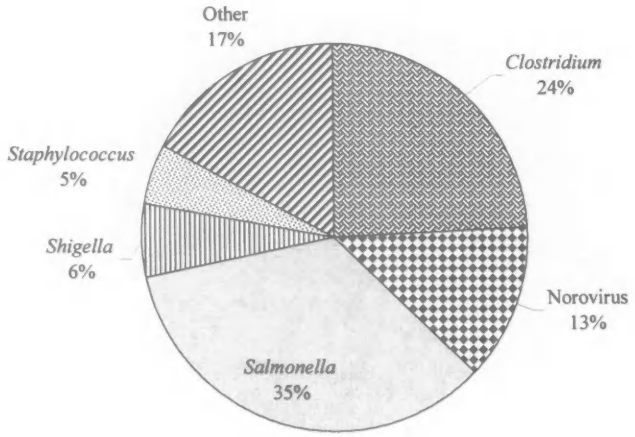


FIGURE 3. Most prevalent known etiologies associated with Mexican food outbreaks (1990–2006)



The objective of this study was to examine the CDC foodborne illness data for Mexican foods for the period from 1990–2006 in order to better understand food safety trends for the most popular ethnic cuisine in the US.

MATERIALS AND METHODS

Foodborne illness data (1990–2006) from the CDC were obtained and used as the primary compilation source for outbreaks related to Mexican foods (http://www.cdc.gov/foodborneoutbreaks/outbreak_data.htm) *(3)*. The outbreak data were current as of April 2008. As previously described, ethnic cuisines were grouped into three major categories: Italian, Asian and Mexican *(6, 17)*. Additional data related to Mexican cuisine was also extracted from a previous publication *(17)* and analyzed separately. The researchers used the book *Food Culture in Mexico (7)* to confirm that food items in question were in fact Mexican-style. The combined data for Mexican cuisine (1990–2006) were processed and ranked on the basis of number of outbreaks, etiology, outbreak location, and outbreak vehicle.

RESULTS AND DISCUSSION

The CDC received a total of 15,997 reports of foodborne illness outbreaks, with 349,083 illness cases, in the US from 1990 to 2006. Mexican foods were associated with 560 of these foodborne illness outbreaks (18,581 illness cases), representing about 3.5% of total foodborne illness outbreaks reported during this 16-year period; these outbreaks occurred in 43 states. The median size of Mexican

TABLE 1. Pathogen distribution in foodborne illness outbreaks associated with Mexican food, as reported by the CDC (1990–2006)

Etiology	Number of outbreaks	Relative %
***Salmonella* serovars**	**74**	34
S. Enteritidis	29	13
S. Heidelberg	10	5
S. Typhimurium	10	5
Other *Salmonella*	25	12
***Clostridium* spp.**	**52**	24
C. botulinum	1	0
C. perfringens	51	24
Norovirus	**28**	13
***Shigella* spp.**	**13**	6
S. sonnei	8	4
Other *Shigella*	5	2
Staphylococcus	**11**	5
S. aureus	9	4
S. aureus (enterotoxin type A)	2	1
Escherichia	**10**	5
E. coli O157:H7	8	4
Enterotoxigenic *E. coli*	2	1
Bacillus cereus	**4**	2
Campylobacter jejuni	**4**	2
Listeria monocytogenes	**4**	2
Norwalk virus*	**4**	2
Hepatitis A	**2**	1
Other and multiple	9	4
Total	**215**	100

*Norwalk virus is now known as Norovirus

food-associated outbreaks was 10 illness cases (range: 2 to 700). The percentage of outbreaks associated with Mexican foods rose slightly over the 16-year period (from 2.4% in 1990 to 2.8% in 2006) for both known and unknown etiology categories (Fig. 1). In some years (2000, 2002, 2003, and 2005) the percentage of outbreaks associated with Mexican cuisine was higher than usual (5% on average). While the total number of foodborne illness outbreaks associated with Mexican foods did not follow any specific trend, there is an increasing incidence of outbreaks associated with this type of food. This may be due to several factors. First, the increasing availability and consumption of Mexican-style food items would logically be expected to lead to greater numbers of illnesses over time. Also, in 1998, the CDC enhanced its outbreak surveillance network, resulting in an increase in the total number of foodborne illness outbreaks reported to the network. It is likely that this action by the CDC resulted in the increase in the number of reports of foodborne illness outbreaks associated with Mexican foods.

The majority of outbreaks associated with Mexican foods were placed in the "unknown etiology" category (Fig. 2). Overall, only 215 outbreaks (10,359 illness cases) of the 560 outbreaks in Mexican foods (18,581 illness cases) were positively associated with known causative agents. Among the known pathogens, 34% of the outbreaks were caused by *Salmonella*, 24% by *Clostridium* spp., 6% by *Shigella* spp., 5% by *Staphylococcus*, and 5% by pathogenic *Escherichia coli* (Fig. 3). According to the CDC, *Salmonella*, *E. coli* O157:H7, and *Listeria monocytogenes* are among the top five bacteria that cause severe illness *(13)*, and one of these top five bacteria, *Salmonella*, is often implicated in illnesses associated with Mexican foods. Norovirus (formerly known as Norwalk virus) (13%) was also an important viral agent associated with foodborne illness outbreaks in Mexican foods (Table 1). Foodborne illnesses associated with Mexican foods follow a pattern and are consistently associated with certain microorganisms, based on the 10-year data compiled by Simonne et al. *(17)* and the findings of this study. *Salmonella*, *Clostridium* spp., *Shigella* spp. and *Staphylococcus* were the most common pathogens in both studies. However, the prevalence (%) for each bacterium was higher in the first report *(17)* than in this study.

The majority of the Mexican food-associated outbreaks with known etiologies occurred in restaurants or delicatessens (47%), followed by private homes (16%), schools (6%), workplaces (8%), prisons (3%), unknown, churches or temples and multiple locations (2% each), and other locations (15%) (Fig. 4). The "other locations" category includes hotels, conferences, camps, festivals, fairs, and picnics. The outbreak locations reported in this study are similar to those reported by the CDC and in other studies. According to the CDC, from 1990 to 2006, 50%

FIGURE 4. Location of foodborne illness outbreaks with known etiologies associated with Mexican foods, 1990–2006

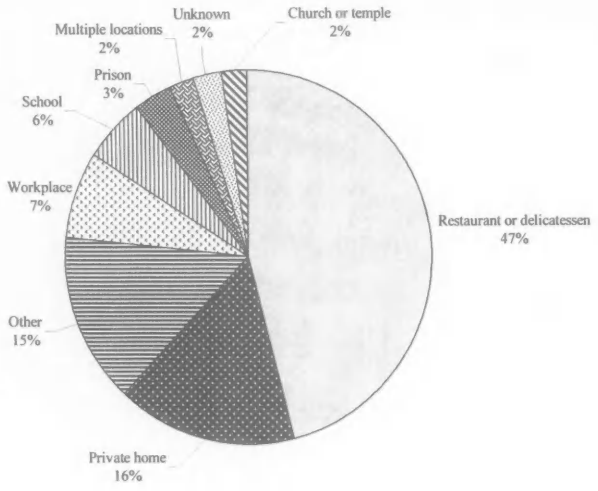
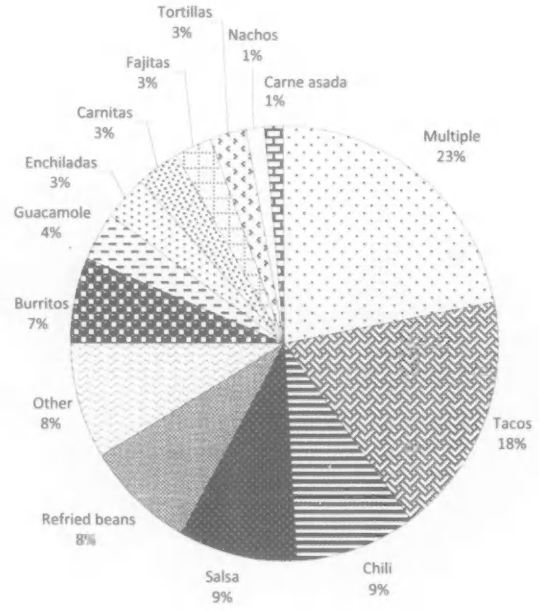


FIGURE 5. Mexican food vehicles reported in foodborne illness outbreaks (1990–2006)



of the annual foodborne illness outbreaks reported to them (941 outbreaks) could be traced to the food service sector *(13)*. CDC FoodNet case control studies also reveal that consumption of food outside the home is associated with an increased risk of gastrointestinal illness and with specific types of foodborne pathogens *(16)*.

The Mexican food items most commonly implicated in outbreaks with known etiology were tacos (18%), chili (9%), salsa (9%), refried beans (8%), burritos (7%) and guacamole (4%) (Fig. 5). Other food items, such as enchiladas, carnitas, tortillas and fajitas (3% each), were also implicated in outbreaks, but less frequently than the aforementioned foods. Multiple food items (22%) and "others" (8%) were also often associated with outbreaks in Mexican cuisine during the study period (1990–2006), but no specific details on these "multiple" or "other" food items were given in the CDC outbreak reports.

Mexican foods are typically made with multiple ingredients and multiple items. Furthermore, the foods in Mexican cuisine frequently include combinations of cold, raw items (fresh produce) and cooked, hot ingredients (meats, beans). Therefore, an increase in foodborne outbreaks associated with raw ingredients, such as produce, likely will also lead to increases in outbreaks associated with Mexican cuisine. These findings are also consistent with those reported in the 2007 Outbreak Alert by the CSPI *(2)*. In that report, a total of 952 outbreaks (26,891 illness cases) from 1990 to 2005 were attributed to multi-ingredient foods. The most common identified vehicles for foodborne illness were multi-ingredient dishes, including (in descending order) lasagna, tacos and lo mein (26%), multi-ingredient salads (24%), rice, stuffing and pasta dishes (21%), sandwiches (15%) and sauces (7%). The risk factors most commonly noted in these outbreaks were cross contamination, inadequate cooking, inadequate cooling and storage, and worker contamination *(3)*.

To gain insight into the data, we further examined individual Mexican food items such as chili (9%), salsa (9%), refried beans (8%) and guacamole (4%). These were considered homogeneous foods, not involving the mixing of cooked and raw ingredients, but were implicated in high percentage of the outbreaks (4–9%). Chili accounted for 9% of the total Mexican food outbreaks (n = 20), and out of these, 16 outbreaks were due to *Salmonella* (278 illness cases), three to *Clostridium perfringens* (68 illness cases), and one to Norovirus (171 illness cases). While outbreaks due to *Salmonella* and Norovirus were likely due to cross contamination from environmental sources, including contamination by food handlers

(after foods had been cooked or before they had been served and consumed), the *C. perfringens* outbreaks may have been caused by inadequate cooling or heating of the chili. On the other hand, in the outbreaks associated with refried beans (8% of total Mexican foodborne illness outbreaks), the major causative agent was *C. perfringens* (595 illness cases), while other causative agents were *Salmonella* (58 illness cases), *Bacillus cereus*, *Staphylococcus aureus*, and Norovirus (28 illness cases). Refried beans are highly viscous and very difficult to heat and cool. If a safe heating/reheating or cooling method can be developed and disseminated to operators, there is potential to eliminate outbreaks associated with microorganisms in this particular food. As for guacamole and salsa, the major microorganisms of concern are *Salmonella*, *Campylobacter jejuni*, *Shigella*, *S. aureus* and Norovirus. Contamination with these microorganisms typically results from cross contamination from raw materials, workers, or other aspects of the environment. Guacamole and salsa are typically served raw and require a great deal of handling during preparation. Therefore, the precautions for preparation of these foods would be slightly different from those for refried beans. Salsa, refried beans, and guacamole are primary ingredients or side dishes for many Mexican dishes, such as tacos, burritos, fajitas, and enchiladas. Addressing specific food safety issues for these primary ingredients would help reduce the risk for "multiple-ingredient" foods, which are frequently implicated in outbreaks.

In summary, in the past 16 years the number of Mexican food-associated outbreaks reported to the CDC has increased. These data suggest that Mexican cuisine is often susceptible to foodborne pathogen contamination. The majority of Mexican food-associated outbreaks occurred in restaurants or delicatessens. The majority (> 50%) of foodborne illnesses associated with Mexican foods were attributed to unknown pathogens, but when causes were known, *Salmonella*, *Clostridium* spp., *Shigella* spp., *Staphylococcus* and *E. coli* were the pathogens most commonly associated with the outbreaks. While the findings about *Salmonella* and *E. coli* reflect general trends reported by the CDC *(3, 13)*, illness caused by *Clostridium* spp. was more common among outbreaks associated with Mexican foods.

Many dishes in Mexican cuisine are prepared by combining multiple food items, including meat and meat products, fresh produce, and dairy products; these food products are all susceptible to contamination during the chain of production. Another concern is that most Mexican dishes combine cold raw items and cooked warm items, increasing the likelihood of bacterial growth. Based on this study, two main factors affect foodborne illnesses associated with Mexican foods: handling practices and risks associated with specific foods. These factors may vary by region depending on such factors as differences in cultures, diets and local conditions.

Evaluating the epidemiology information for Mexican foods in the US provides a starting point from which to address the increasing number of outbreaks associated with this type of cuisine. This type of information may be useful for operators of Mexican restaurants. Further observational research is needed to identify actual food handling practices among Mexican food vendors and restaurant operators in order to develop science-based guidelines and culturally appropriate materials for food handlers and vendors.

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Outbreaks Associated with Unpasteurized Milk and Soft Cheese: An Overview of Consumer Safety

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SUMMARY

Unpasteurized (also called raw or farm-fresh) milk is currently banned in more than half of all states in the U.S. There is substantial controversy over whether unpasteurized milk is safe for human consumption. Although less than 1% of the total U.S. population is known to consume these products, proponents of raw milk claim that unpasteurized milk and soft cheeses are more nutritious than pasteurized milk and soft cheeses. However, numerous disease outbreaks, involving pathogens including *Escherichia coli*, *Salmonella*, and *Listeria monocytogenes*, have been linked to raw milk and soft cheese consumption. While some believe that an outright ban would help abate the incidence of outbreaks associated with unpasteurized milk and cheese, many others believe that imposing a ban on such products is an infringement on people's freedom of choice. If a ban were imposed, it would pose a variety of problems for key stake-holders, such as state agriculture departments and dairy farmers, as well as consumers of raw milk and cheese. Given these considerations, providing education to dairy producers and consumers and implementing the use of warning labels on unpasteurized milk and soft cheeses may be the most effective ways for state agriculture departments to decrease the consumption of these products and thus prevent illness.

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INTRODUCTION

In the U.S., raw milk is typically consumed and/or distributed directly on the premises of farms, through milk clubs, cow-sharing (or cow-leasing) programs, or boarding agreements, or as pet food. Currently, the sale of raw milk for human consumption is legal in less than half of all U.S. states (Fig. 1) *(13)*. Four states (Arkansas, Kentucky, Mississippi, Rhode Island) prohibit consumption of raw cows' milk but permit consumption of raw goats' milk. Substantial evidence indicates that raw milk serves as a source of pathogens that cause disease in humans.

UNPASTEURIZED (RAW, FARM-FRESH) MILK AND SOFT CHEESES: AN OVERVIEW

As dairy farms became increasingly industrialized in the late nineteenth century, milkborne diseases became more common as a result of poor sanitation measures, improper handling procedures, and diseased dairy cows. In 1886, Franz Ritter von Soxhlet suggested pasteurizing milk, which involved heating it to 161°F for fifteen seconds to destroy viruses

TABLE 1. Organizations with formal statements regarding the hazards of consumption of unpasteurized milk

American Academy of Pediatrics
American Medical Association
American Public Health Association
International Association for Food Protection
National Environmental Health Association
The Centers for Disease Control and Prevention
U.S. Animal Health Association
U.S. Department of Agriculture
U.S. Food and Drug Administration
World Health Organization

FIGURE 1. U.S. states that have legalized the sale of raw milk for human consumption (shaded)

and harmful organisms such as bacteria, protozoa, molds, and yeasts *(86)*. In the early twentieth century, the Illinois and Wisconsin Supreme Courts were among the first courts to hear legal cases that highlighted the potential harmful effects of unpasteurized milk (milk from cows, sheep, and goats that has not been pasteurized or homogenized—pumped under pressure to render it uniform in consistency by emulsifying the fat content) *(57, 58)*. Production of milk in cities where cows were kept in tight unhygienic quarters, led to contamination of milk and milk products. As a result of this poor hygiene, along with lack of pasteurization, numerous city dwellers, including children, fell ill, and some died after consuming contaminated, unpasteurized milk *(104)*.

During this time, unpasteurized milk became increasingly significant to public health. By 1938, approximately 25% of all disease outbreaks from contaminated food and water were attributed to milk *(71)*. Unpasteurized cow's milk was noted to contain many pathogens capable of causing disease in humans, including bovine tuberculosis, diphtheria, severe streptococcal infections, and typhoid fever. However, because many feared that the nutritional value of milk would be diminished by pasteurization the practice was not widely adopted *(77)*.

To prevent infections resulting from drinking unpasteurized milk, some have suggested improving the sanitary conditions and health of the animals associated with the milk production process. Nevertheless, outbreaks of illness continued and, as a result, the Public Health Service Standard Milk Ordinance of 1927 was enacted. This new regulation sought to grade milk on the basis of a range of sanitation measures and to pasteurize only Grade A milk *(4)*. Since the promotion of pasteurization techniques in milk during the late 1940s, the incidence rate of milk-borne outbreaks has diminished to less than 1% *(91)*.

The Food and Drug Administration (FDA) states that microorganisms in soft raw-milk cheeses are capable of causing serious infectious diseases, including listeriosis, brucellosis, salmonellosis and tuberculosis. Because of this, a law was enacted in 1944 mandating that all raw-milk cheeses (including, since 1952, all imported cheeses) must be aged for at least 60 days. The aging process allows for a combination of factors, which include pH levels, salt content, and water activity, to render cheeses microbiologically safe for consumption *(43)*.

At present, there is no law requiring all milk to be pasteurized, though numerous educational, regulatory, and public health organizations have issued statements regarding the hazards of unpasteurized milk consumption (Table 1) *(12)*. In *Public Citizen v. Heckler*, the U.S. District Court stated that the FDA had garnered enough evidence to show that raw milk is not safe for human consumption *(98)*. Despite this decision, the FDA did not impose a federal ban of unpasteurized milk and milk products, believing that this would not be an effective measure, for various reasons, including the fact that most unpasteurized milk and milk products are marketed in intrastate commerce and the belief that problems created by unpasteurized milk and milk products are best managed at the state and local level *(98)*.

In 1987, as part of the Public Health Service Act, the FDA banned the shipment of raw milk in interstate commerce *(24)*. Currently, the majority of milk consumed in the United States is Grade A and pasteurized *(54)*. The National Conference on Interstate Milk Shipments "Grade A" milk program oversees proper pasteurization. The standards in the program are based on those set by the FDA's Pasteurized Milk Ordinance (PMO), which gives states the option of

FIGURE 2. Average milk composition as percent of total volume

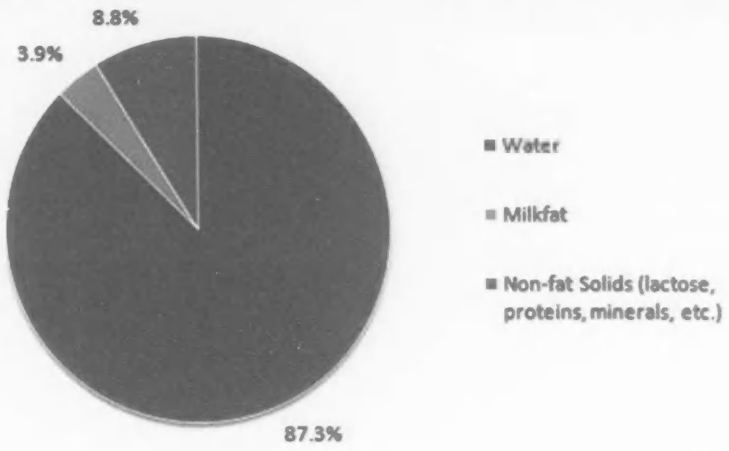
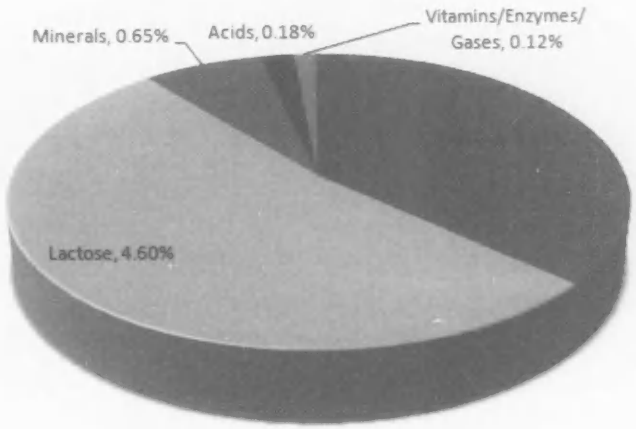


FIGURE 3. Composition of non-fat solids in milk



adopting these regulations. Raw milk and raw milk cheeses are not labeled "Grade A" because they are not pasteurized and do not meet the requirements specified in the PMO.

OPPOSING VIEWS

According to the Centers for Disease Control and Prevention, since 1998, more than 800 people in the United States have become ill from consuming raw milk or cheese products made from unpasteurized milk *(10)*. Raw milk proponents believe that pasteurization of milk diminishes the nutritive value of milk, causes pathogens to multiply, destroys immunoglobulin G antibodies, and causes lactose intolerance *(85)*. They also maintain that pasteurization destroys proteins and polypeptides, including enzymes, such as lactoferrin, xanthine oxidase, lactoperoxidase, and lysozyme, as well as nisin; some of these are claimed to be necessary for calcium absorption *(15, 44)*. It is also claimed that the pasteurization process causes allergic reactions, kills beneficial bacteria, and is associated with the development of arthritis *(15, 44)*. Moreover, they praise unpasteurized milk's richer flavor and claim that it is more nutritious and leads to stronger immune and digestive systems than pasteurized milk *(15, 44)*.

Review of the scientific literature has shown that there are no significant nutritional differences between pasteurized and raw milk *(59)*. Milk is a nutritive source of lactose, proteins (casein and whey), vitamins (thiamin, folate, vitamin B_{12}, riboflavin), minerals (especially calcium) and enzymes (Figures 2 and 3) *(99, 101)*. The bovine enzymes naturally present in milk are reduced by pasteurization, but these enzymes are not used by humans to aid metabolism of calcium and other nutrients; enzymes naturally present in humans are used to digest and metabolize the components of milk. At present, there is no scientific evidence to substantiate the claim that there is an anti-arthritis factor present in raw milk or that any factor in raw milk enhances resistance against diseases. Vitamin D, which aids in the body's absorption of calcium, is added to pasteurized milk, but is found in only minute amounts in raw milk *(85)*. The creamier flavor of raw milk can be attributed to a perception of a higher butterfat content, as the fat particles have not been homogenized (treated so that the fat droplets are dispersed).

Raw milk advocates have also claimed that two types of spore-forming bacteria (termed "heat-resistant pathogens" by raw milk advocates), *Bacillus cereus* and *Clostridium botulinum*, survive the pasteurization process. *B. cereus* can be eliminated through pasteurization at temperatures above 100°C, and the growth of *C. botulinum* in milk, though possible, is rare because milk is too aerobic to allow this organism to grow *(100)*.

Lactoperoxidase and bovine milk lysozyme, enzymes key to limiting microbial growth and spoilage, are described as being inactivated by pasteurization. Lactoperoxidase is not destroyed by minimum pasteurization standards *(85)* and Griffiths has reported that bovine milk lysozyme also survives pasteurization *(50)*.

Some raw milk advocates have stated that drinking unpasteurized milk on the farm during childhood can help abate allergic symptoms, such as allergic rhinitis and asthma. In a study by Perkin, farmers' children who drank unpasteurized milk showed decreased asthma symptoms (OR = 0.67, 95% CI 0.49 – 0.91), seasonal allergic rhinitis (OR = 0.50, 95% CI 0.33 – 0.77), eczema (OR = 0.59, 95% CI 0.40 – 0.87), and atopic

TABLE 2. Tests commonly performed on raw milk samples

Specific pathogens	Tests for certain pathogens considered to be the most dangerous, which include: *Salmonella*, *E. coli* O157:H7, *S. aureus*, and *L. monocytogenes*
	Cattle are also vaccinated against brucellosis and tested for tuberculosis and Johne's disease (paratuberculosis)
Somatic cell count	Presence of leukocytes (white blood cells) in milk, which is an indication of whether the dairy herd is infected
	Should be equal to or less than 200,000 cells/ml
Coliforms	Indication of unsanitary production practices and/or mastitis
	A count of less than 100 CFU/ml is considered acceptable
Standard plate count	An indication of overall cleanliness of milking equipment
	Determines the numbers of visible individual or tightly associated clumps of bacteria in 1 ml of milk incubated at 90°F for 48 hours
	Standard plate count should be equal to or less than 5,000 CFU/ml
Drug or antibiotic residues	Used for treatment of mastitis and for disease therapy, but can be shed in milk
	Commonly used drugs/antibiotics include penicillin, oxytetracycline, cephapirin, amoxicillin, cloxacillin, and gentamicin
	Cattle should be 100% drug/antibiotic residue-free
Preliminary incubation	Best measure of raw milk keeping quality and sanitation practices on farms
	Preliminary incubation count should be equal to or less than 10,000 CFU/ml
Lab pasteurized count	Levels in raw milk should be less than 250–300 CFU/ml
Sanitation inspection of milking system	Commonly performed every 6 months
Monthly bulk tank cultures	Identification of equipment bacteria, mastitis, and potential environmental contamination
Sediment count	Acceptable levels are less than 1.5 mg/gal milk
Freezing point (Cryoscope)	Reading should be equal to or less than -.530° Horvet
Rancidity	Acid degree value should not exceed 1.0

*Mastitis, an inflammation of the mammary glands, is caused by bacterial infection, trauma, or injury to the udder. Globally, it remains the most common and most expensive disease affecting dairy cattle.

symptoms (OR = 0.24, 95% CI 0.10 – 0.53) compared to non-farmers' children *(75)*. However, the generalizability of this study is questionable; unidentified confounding factors in the farm environment may have been responsible for the reduction of these symptoms. Furthermore, Perkin's study was cross-sectional, which makes it difficult to determine a causal relationship because of the lack of a time component.

Assertions regarding the destruction by pasteurization of immunoglobulin G (IgG), a protein found in blood and other bodily fluids of vertebrates that is used by the immune system to identify and neutralize foreign bacteria and viruses, are refuted by Kulczycki, who states that the receptor-binding ability of IgG is not destroyed, but rather enhanced, by pasteurization of milk *(66)*. Another source of contention is whether unpasteurized milk causes lactose intolerance. Bifidobacteria are claimed to aid in alleviating the symptoms of this disease. Raw milk consumers are not protected against developing lactose intolerance, as this condition is caused by innate lactase deficiency, low dietary intake of lactase after childhood, or a variety of illnesses, including Crohn's disease, celiac sprue, or Whipple's syndrome *(16, 79)*. Raw milk proponents claim that it is also probiotic, or contains beneficial bacteria, however, raw milk is not considered a probiotic food according to the Joint FAO/WHO Working Group Report on Drafting Guidelines for the Evaluation of Probiotics in Food *(9)*. In order for the term "probiotic" to be applied to a particular food, it must meet certain criteria, such as passing a safety assessment, and no such assement has been conducted for raw milk.

Research regarding reduction of proteins, vitamins, and minerals by pasteurization have revealed that only very slight reductions of these components are caused by pasteurization of milk. The major milk proteins, caseins, are essentially unaffected by pasteurization

(6). Pasteurization reduces B-complex vitamins (thiamin, folate, and riboflavin) and vitamin C by no more than 10% *(20)*. Most of the vitamin C losses occur during milk storage, irrespective of whether the milk is pasteurized. Moreover, pasteurization is not known to cause considerable reductions of fat-soluble vitamins (A, D, E and K). Lastly, as would be expected, minerals such as manganese, potassium, and sodium are not significantly reduced by pasteurization *(107)*, and in a study of both pasteurized and unpasteurized bovine and caprine milk, no differences in calcium levels were found *(68)*.

PREVALENCE OF RAW MILK CONSUMPTION

In 1997, Headrick et al. *(55)* showed that 3.2% of the population surveyed in California had consumed raw milk. This study also showed an association between education and a person's choice to consume raw milk; those with less than a high school education were more likely to consume raw milk than those who had completed high school. According to Mark McAfee, owner of Organic Pastures Dairy Company, California's largest producer of raw milk, approximately 100,000 California residents drink raw milk each week *(51)*. In a survey conducted by Jayarao and colleagues in Pennsylvania, dairy producers residing on dairy farms were approximately three times more likely to consume raw milk than to those living elsewhere *(59)*. Furthermore, they noted that a mere 42.3% of dairy producers in Pennsylvania were aware of pathogens in raw milk.

THE RISKS

Those who oppose the consumption of raw milk believe that unpasteurized milk is inherently unsafe and may expose the public to potentially infectious pathogens that include enterotoxigenic *Staphylococcus aureus, Campylobacter jejuni, Salmonella*, enterohemorrhagic *Escherichia coli (E. coli* O157:H7*)*, enterotoxigenic *E. coli* – ETEC, *Listeria monocytogenes, Mycobacterium tuberculosis, Mycobacterium bovis*, *Brucella* species (*B. abortus* is mainly associated with cattle and *B. melitensis* mainly with goats), *Yersinia enterocolitica*, *Coxiella burnetii* and the rabies virus *(84)*. As a result, a range of tests have been developed to ensure the safety of unpasteurized milk (Table 2) *(61)*. Five pathogens, *Salmonella*, *E. coli* O157:H7 and other forms of Shiga toxin-producing *E. coli*, *Campylobacter*, *Listeria*, and *Toxoplasma*, account for most of the severe illnesses that can be contracted through raw milk consumption *(91)*. These disease-causing organisms cause an estimated 3.5 million infections, 33,000 hospitalizations, and 1,600 deaths each year *(91)*. Outbreaks have affected European countries as well; between 1992 and 2000, 52% of all foodborne outbreaks in England and Wales were attributable to consumption of raw milk *(48)*. Lastly, the economic burden of foodborne infections is substantial, costing the U.S. approximately $6.7 billion annually *(91)*.

THE EVIDENCE: RAW MILK-ASSOCIATED OUTBREAKS

Salmonellosis

An estimated 1.4 million of the 76 million annual foodborne illnesses in the U.S. are caused by *Salmonella* and result in roughly 16,000 hospitalizations and 580 deaths *(54)*. From 1972 to 2000, 17 (29%) of the 58 raw milk-associated outbreaks were directly attributable to *Salmonella (54)*. Between 2000 and 2005, 191 illnesses were traced to *Salmonella*-infected raw milk. In an outbreak that occurred in Illinois, Indiana, Ohio, and Tennessee, *Salmonella* Typhimurium infected 62 people *(54)*. 87.1% of patients reported signs and symptoms of illness that included diarrhea (96.3%), abdominal cramps (75.9%), and emesis (44.4%) *(54)*. Approximately 81% of the cases reported more than one symptom *(54)*. In a case-control study, illness occurred in 37 (94.9%) of the 39 people who drank the unpasteurized milk (cases) and 16 (29.1%) of the 55 people who did not (controls) (OR = 45.1, 95% CI = 8.8 – 311.9) *(32)*.

In 2007, 29 cases of diarrhea caused by *S.* Typhimurium were directly linked to consumption of raw milk and raw milk products in Pennsylvania *(36)*. During this time, the Pennsylvania Department of Agriculture estimated that the dairy implicated in this outbreak was selling approximately 200–300 gallons of raw milk weekly to 275 regular customers *(36)*. No deaths were reported, but two of the 29 patients were hospitalized *(36)*. In Montana, 105 people were infected with *S.* Typhimurium, apparently from drinking raw milk from a particular farm *(27)*. In Vermont, *Salmonella* Derby infection occurred in eight persons, resulting in symptoms of diarrhea, abdominal cramps, and fever *(96)*. The unpasteurized milk to which the illness was linked was traced back to a single dairy.

Werner and colleagues reported that the mean annual incidence of *Salmonella* Dublin infections increased more than five-fold in the period between 1971 and 1975 in California *(102)*. Forty-four cases out of 113 had consumed unpasteurized milk; 35 of the 44 had consumed raw milk from a single dairy *(102)*. There were 89 hospitalizations (79%) and 22 (20%) fatalities were reported *(102)*. Most of the cases that were infected were immunocompromised because of diseases such as leukemia and lymphoma. The authors concluded that the public, particularly infants, the elderly, and the immunocompromised, should be better informed of the potential danger of drinking unpasteurized milk *(102)*.

Campylobacteriosis

C. jejuni infection, commonly characterized by gastritis (inflammation of the stomach) and enterocolitis (inflammation of both the small and large intestine), can also lead to more serious diseases, which include Guillain-Barré syndrome and reactive arthritis *(73, 82)*. In the U.S., campylobacteriosis is one of the most frequently reported bacterial causes of foodborne illness *(45)*. *C. jejuni* is commonly found in approximately 1% to 12% of raw milk samples *(78)*. In 1981, an outbreak in Arizona left approximately 200 persons with *C. jejuni* enteritis after the consumption of one brand of unpasteurized milk *(92)*. A cohort study showed that those who drank unpasteurized milk had diarrheal illness (RR = 4.7, 95% CI 1.79 – 12.33, $P = 0.003$) at a significantly higher frequency than those who did not consume unpasteurized milk (RR = 3.85, 95% CI 1.68 – 8.81, $P = 0.001$) *(92)*. Fecal samples containing the bacterium were found in higher quantities in the cattle that had produced the unpasteurized milk than in the control cattle. In Chittenden County (Vermont), Vogt and colleagues also traced fifteen cases of *C. jejuni*-associated gastroenteritis to a commercial dairy *(97)*.

In Oregon, a college retreat to a farm left nineteen of 31 students with acute gastrointestinal illness secondary to

unpasteurized milk consumption *(19)*. These students showed high levels of *C. jejuni*-specific antibodies compared to the unexposed population *(19)*. Of the 25 students who consumed the raw milk for the first time, 22 were infected, whereas neither of the two students who did not consume the raw milk were infected *(19)*. Although *C. jejuni* is more commonly found in unpasteurized cows' milk, goats' milk has also been documented as a source of infection; in Washington State, it was identified as the source of *C. jejuni* enteritis among six patients *(52)*. Although the organism was not recovered from the milk, it was isolated from the intestinal tract of three goats from one dairy, and other *C. jejuni* isolates were obtained from goats at another dairy *(52)*.

An outbreak of *C. jejuni* enteritis in Utah occurred at a high school athletic-team dinner at which unpasteurized milk was served. In this case-control study, all cases (those experiencing illness) reported diarrhea, abdominal pains, nausea, vomiting, body aches, chills, and headaches four days after the team dinner; in contrast, none of the controls (those not suffering from any illness) had consumed the milk served at the team dinner. The consumption of unpasteurized milk was significantly associated with *C. jejuni* enteritis (OR = 30.0, 95% CI 1.58 – 153, $P = .0072$) *(76)*.

Escherichia coli

E. coli and Shiga toxin-producing *E. coli* have been found in 0.87% to 10% of bulk tank samples of unpasteurized milk in Minnesota, Ontario, Pennsylvania, South Dakota and Wisconsin *(59, 74, 88)*. Sixteen cases of *E. coli* infection caused by raw milk consumption were reported in Oregon, where four of the 132 animals of the herd tested positive for the organism *(63)*. The infection led to gastrointestinal symptoms in those affected. Interestingly, despite new labeling requirements, increased monitoring of dairy sales from the implicated dairy farm, and public health efforts to warn the public of hazards associated with raw milk consumption, retail sales continued and illnesses ensued *(63)*. In the state of Washington in 2005, an outbreak of *E. coli* resulted in illness among eighteen people, most of whom were children. The relative risk for illness increased steadily with the average number of cups of raw milk consumed daily. The average daily consumption dose-response trend was highly statistically significant ($P = 0.008$), with disease rates of 3.6% for 0–0.9 cups of milk, 6.7% for 1–1.9 cups, 14.3% for 2–2.9 cups, and 37.5% for ≥ 3 cups *(35)*.

Shiga toxin-producing strains of *E. coli* are also known to cause hemolytic uremic syndrome (HUS), a potentially fatal disease occurring mostly in children and infants *(94)*. A majority of cases experience acute renal failure (97%) and gastroenteritis (83%). In 1997, four cases of HUS were reported in the Czech Republic in children who had consumed raw goat's milk. The levels of anti-O157 LPS antibodies (which can be associated with *E. coli* infection) were found to be significantly higher among those who regularly consumed a particular farm's goat milk (33%; 5 of 15 regular drinkers) compared to a control population (0%; 0 of 45) ($P = 0.0005$) *(18)*. In Austria, enterohemorrhagic *E. coli* O26:H infection was also linked to the consumption of raw cows' and goats' milk in two children, both less than three years of age *(3)*. Both children had severe bloody diarrhea and one child developed HUS.

Other diseases

In 1996 and 1998, two separate incidents in Massachusetts involving the consumption of unpasteurized milk from rabid cows led to mass rabies post-exposure prophylaxis (PEP) of 80 people *(29)*. The median cost of this treatment in Massachusetts was reported as $2,376 per person during the period 1991–1995 *(65)*. In 2005, the milk of a rabid cow in Oklahoma was mixed with that of approximately 70 other cows, and as a result, hundreds of consumers were potentially exposed *(34)*. Sixty-two consumers received PEP at an estimated cost of $186,000 No humans were reported to have contracted rabies through ingestion of unpasteurized milk from any of the rabid cows. Although rabies infection through ingestion of unpasteurized milk has not been described in the literature, it is theoretically possible; rabies transmission through ingestion of milk from rabid animals has been reported *(2)*. Pasteurization, however, inactivates the rabies virus *(89)*.

Other organisms present in raw milk have also been implicated in human disease. Globally, milk and milk products are the primary means by which human brucellosis infection occurs. Approximately 10% of all cases in the U.S. are attributed to consumption of unpasteurized milk and milk products *(105)*. Several studies have suggested that unpasteurized milk has been a source of *C. burnetii*, the causative agent of Q fever *(38, 41, 93)*. Hatchette and colleagues noted that 37% of those affected by a goat-associated Q fever outbreak in Newfoundland had antibody titers to phase II *C. burnetii* antigen > 1:64, suggesting that infection with this organism had occurred *(53)*. Consumption of unpasteurized milk contaminated with *L. monocytogenes* in pregnant women is also known to cause miscarriage, fetal death, or illness or death of a newborn *(28)*. Infections caused by *Toxoplasma gondii* and *Corynebacterium pseudotuberculosis* have also occurred in persons who have consumed unpasteurized milk *(77, 80)*.

THE EVIDENCE

Cow-shares

Cow-share programs involve a farm cooperative in which members lease cows from a dairy farm and then sell shares in the herd to the cooperative members. Typically, a member pays an annual fee and, in return, is given purchasing rights to the herd's milk. In turn, the dairy farmer uses the annual fees as boarding fees for the cows. Outbreaks of foodborne illness have been linked to raw milk purchased through such cow-sharing programs *(31)*. In 2005, eighteen cases of *E. coli* O157:H7 were associated with raw milk consumption among shareholders of a cow-share program in Oregon *(33)*. Five patients, all younger than fourteen years of age, required hospitalization, and four developed hemolytic uremic syndrome *(33)*.

Pasteurized milk outbreaks

The rare outbreaks attributed to pasteurized milk can generally be traced to post-pasteurization hygiene, namely inadequate pasteurization and/or contamination after pasteurization *(47)*. In 1983, an outbreak caused by *L. monocytogenes* in Massaschusetts affected 42 immunocompromised adults and seven fetuses or infants *(47)*. Fourteen of these patients died because of disease-related meningitis, septicemia, or spontaneous abortion *(47)*. In this outbreak, two case-control studies (one matched by neighborhood, one matched by under-

lying disease) showed that illness was strongly associated with consumption of pasteurized whole or 2% milk (OR = 9.0, $P < 0.01$ for neighborhood-matched study; OR = 11.5, $P < 0.001$ for illness-matched study) *(47)*. After inspection of the dairy plant with which the outbreak was associated, neither improper pasteurization nor a source of contamination after pasteurization was identified. As the result of further epidemiologic study, it was determined that this vulnerable population had in fact consumed raw milk that was contaminated after processing *(47)*.

Y. enterocolitica O:8 infections have the potential of being transmitted through pasteurized milk because the bacterium is capable of growing under refrigeration *(62)*. In 1976, 38 schoolchildren became ill with yersiniosis after becoming infected by way of contaminated chocolate milk. The bacterium had been introduced into the milk through improper handling of chocolate syrup, which was hand-mixed with pasteurized milk. A large multistate outbreak of this disease also occurred in Tennessee, Arkansas, and Mississippi, where three different case-control studies indicated that milk consumption from a specific plant was statistically associated with illness characterized by enteritis involving fever, diarrhea, and abdominal pain *(90)*. Inspection of the plant did not reveal a source or mechanism of contamination. However, an outbreak of yersiniosis in 10 residents of the Upper Valley of Vermont and New Hampshire was linked to consumption of bottled pasteurized milk *(1)*. The contamination likely occurred when milk bottles were rinsed with untreated well water after they had been handled by workers caring for pigs.

S. Typhimurium outbreaks have also been linked to poor pasteurization techniques *(12)*. The largest outbreak of salmonellosis in U.S. history was attributed to two brands of pasteurized 2% milk taken from a single dairy plant in Kentucky; at least sixteen cases of gastroenteritis occurred because of improperly pasteurized milk. People who consumed the milk were approximately six times more likely to develop illness ($P = 0.01$) than those who did not consume it *(26)*.

Unpasteurized soft cheese-associated outbreaks

Unpasteurized milk is preferred by cheese makers because pasteurization can decrease flavor and lengthen the ripening time of cheese *(23)*. However, United States Department of Agriculture regulations require that cheeses made from unpasteurized milk be aged for more than 60 days, as stated in the Standards of Identity in the U.S. Code of Federal Regulations CFR, section 7 CFR 58.439. The FDA permits the manufacture and interstate sale of unpasteurized milk cheeses if they are aged for a minimum of 60 days at a temperature greater than 35°F.

Soft cheeses tend to be high in moisture. Unpasteurized soft cheeses implicated in disease outbreaks include Brie, Camembert, Vacherin, and homemade, soft, and unripened cheeses *(106)*. A variety of pathogens have been implicated in outbreaks associated with raw soft cheeses *(106)*. During the cheese-making process, some pathogens are inactivated, depending on the temperature and pH during production and ripening, yet many others survive this aging process. Ripened soft cheeses present a greater risk for growth and survival of microorganisms than do aged hard cheeses *(43)*.

The raw milk soft cheeses of greatest concern to public health are "queso fresco" style cheeses, which are typically soft and white and which are often imported from Mexico and Central American countries *(5)*. They are typically made at home, sold door-to-door, illegally imported, or sold in local markets and restaurants. In the U.S., a variety of raw milk cheese-associataed outbreaks have occurred *(5)*.

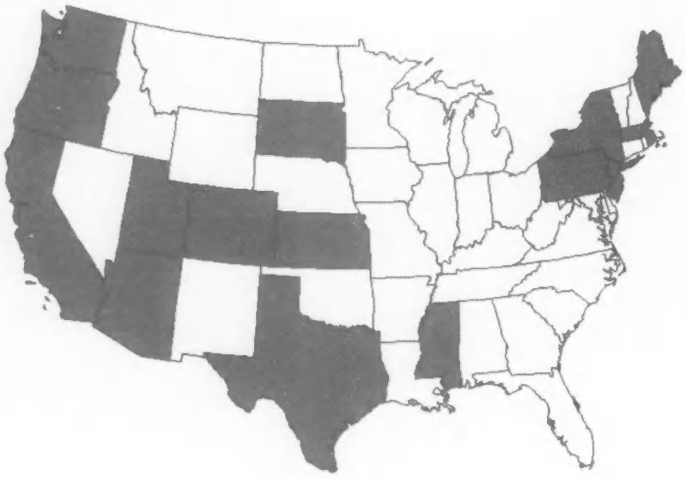
In 1983, sixteen cases of Group C Streptococcal infections in New Mexico were linked to "queso blanco," a homemade white cheese *(5)*. In North Carolina, in an outbreak of listeriosis associated with homemade Mexican-style cheese, infection of 10 pregnant women with *L. monocytogenes* resulted in five stillbirths, three premature deliveries, and two infected newborns *(87)*. A case-control study showed that cases had a seven times greater odds of having ingested queso fresco compared to controls (OR = 7.3, 95% CI 1.4 – 37.5) *(30)*. In another case-control study, *S.* Typhimurium DT104 was also shown to have caused queso fresco-associated illness due to raw milk cheese ingestion, when isolates were drawn from seventy-nine people *(37)*. Lastly, a comparison of patients with neighborhood controls linked *S.*Typhimurium with eating raw milk queso fresco in an outbreak in Washington state (matched OR = 32.3, 95% CI 3.0 – 874.6) *(95)*.

In France, where many of the world's raw milk soft cheeses are produced, several outbreaks have occurred. Desenclos and colleagues identified an outbreak in 273 people in France who consumed raw goats' milk cheese in which the organism implicated was *Salmonella enterica* serovar *paratyphi* B *(42)*. Brie de Meaux cheese made from raw cows' milk was the source of *L. monocytogenes* infection among 20 people in France; "pregnant women were affected, of whom two suffered spontaneous abortions, two had stillbirths, and five gave birth prematurely *(49)*. A case-control study linked acute hemolytic uremic syndrome that occurred in four children in a French village to a cheese made with unpasteurized mixed cows' and goats' milk ($P = 0.006$) *(41)*. All four patients had fever, diarrhea, acute renal failure, anemia, schistocytosis, and thrombocytopenia *(41)*.

Interestingly, a risk assessment performed by Sanaa and colleagues revealed that the predicted probability of contracting severe listeriosis after consumption of both Brie de Meaux cheese and Camembert of Normandy made from raw milk is lower than after consumption of soft cheeses made from pasteurized milk *(81, 103)*. The incidence rate of severe listeriosis after consuming one of these two cheeses was 10^{-3} per year *(81)*. In 1997, a community-wide outbreak of *Salmonella enterica* serovar Typhimurium infection secondary to raw milk Morbier cheese consumption occurred in thirty-three of forty cases, compared to 23 of 42 controls matched in age and area of residence (OR = 6.5, 95% CI 1.4 – 28.8) *(39)*. All cases suffered from fever and/or diarrhea during the investigation period. Lastly, a cluster of four cases of bloody diarrhea and hemolytic uremic syndrome in 1994 was traced to consumption of fromage frais made from raw cows' and goats' milk *(7)*.

An outbreak of Q fever caused by *C. burnetii* occurred in a psychiatric hospital in southern France among support staff and patients who also worked on a dairy farm near the hospital *(46)*. A serologic survey performed among suspected cases (those with exposure to goats and their unpasteurized dairy products) revealed that 66% had elevated *C. burnetii* titers. Seropositive rates were significantly higher among persons who had worked on the farm and consumed unpasteurized milk products (69%, 22 of 32, $P = 0.007$), suspected cases who only had worked on the farm (75%, 9 of 12, $P = 0.009$),

FIGURE 4. U.S. states that have legalized the sale of raw milk for human consumption, but require warning labels (shaded)



and those who only had consumed unpasteurized milk products (75%, 9 of 12, $P = 0.009$), compared with those who had neither worked with the goats nor consumed unpasteurized goat milk products (0 of 5) *(46)*.

Other European countries have also had raw soft milk cheese-associated outbreaks. In Malta, a soft cheese made from unpasteurized goats' and sheeps' milk affected 135 people as a result of *Brucella melitensis* infection *(22)*. Cheeses made from unpasteurized cows' milk led to food poisoning in England and Wales; 42 people who consumed Irish soft cheese were infected with *S.* Dublin *(69)*. In Spain, 81 cases of brucellosis were associated with consumption of fresh unpasteurized cottage cheese (OR = 311.9, 95% CI 41.28 – 12,735) *(25)*. Consumption of fresh, unpasteurized goat cheese in a local dairy farm in Finland led six people to develop septicemia and one person to develop purulent arthritis secondary to *Streptococcus equi* subspecies *zooepidemicus* infection *(67)*.

Fresh, unpasteurized cheese curds are also a potential source of infection. In Wisconsin, 55 patients contracted *E. coli* infection after eating fresh cheese curds *(8)*. Furthermore, more than 40 people had symptoms of abdominal cramping, bloody diarrhea, fever, vomiting, and nausea after the ingestion of white cheese curds produced in Wisconsin *(8)*. The cheese curds tested positive for *C. jejuni* and, as a result, all dairy manufacturing activity was terminated *(64)*.

Unpasteurized hard cheese

From 1948 to 1988, six outbreaks implicated hard cheeses produced in the United States *(60)*. Several reports have called the existing 60-day aging period in the manufacture of hard cheeses made with unpasteurized milk into question because of safety concerns, suggesting that all cheeses should be made from pasteurized milk *(83)*. The FDA's Center for Food Safety and Applied Nutrition has also begun examining the safety of all raw milk cheeses and plans to conduct a full risk profile of each type of cheese *(83)*. Thirteen cases of *E. coli* hemorrhagic colitis associated with unpasteurized Gouda cheese in Canada led Honish and colleagues to suggest that Canadian authorities question current federal legislation that permits sale and consumption of unpasteurized milk cheeses aged over 60 days *(56)*. After consuming Stilton cheese, 155 people were thought to have been infected with *S. aureus* enterotoxin *(69)*. In 2008, several hard raw milk cheeses were recalled in Indiana because of high levels of *S. aureus* in Colby cheese, jalapeño natural cheese, garlic pepper cheese, and Monterey Jack cheese *(21)*. There was also a recall of Berkshire Blue Cheese, a cheese made in Massachusetts, after routine FDA sampling discovered elevated levels of *L. monocytogenes* *(14)*. There is limited information in the scientific literature concerning pasteurized milk cheese disease outbreaks.

THE EUROPEAN SOLUTION

Europe has a rich tradition of producing unpasteurized milk products (mainly cheese), the safety of which is regulated by the European Commission (EC). The EC requires that these products meet process hygiene, food safety, and microbiological standards. It also regulates the production and labeling of raw milk products *(72)*. Countries of the European Union must then create their own laws and regulations in compliance with EC regulations. Products made with unpasteurized milk must bear the label 'made with raw milk' *(72)*. For instance, in England, the sale of raw milk is legal provided that the containers have a green top *(40)*.

RECOMMENDATIONS

Given the evidence, it is clear that unpasteurized milk and cheese have the potential to pose a risk to health. While some purport that an outright ban may help abate the incidence of unpasteurized milk and cheese outbreaks, many believe that imposing a ban on such products is an infringement on freedom of choice. If a ban were imposed, it would pose a variety of problems for key stakeholders, such as state agricultural departments, dairy farmers, and raw milk and cheese consumers. The time, energy, and resources needed to enact a ban would overstrain state agricultural departments. Furthermore, surveillance and regulation of sales is impractical because of labor and costs and may not be completely effective in preventing the illegal production and sale of these products, which would most likely continue.

A ban on unpasteurized milk cheeses would also cause a great deal of economic concern for states, as many cheeses in cheese-producing states are made using unpasteurized milk, and a large portion of state agricultural revenue may come from milk and milk products, particularly in states like Vermont.

A successful intervention called The Abuela Project has shown how effective safe cheese workshops encouraging the use of pasteurized milk can reduce the incidence of *S.* Typhimurium outbreaks *(17)*. The intervention focused on the use of pasteurized milk in the preparation of queso fresco among a Hispanic community in Washington state *(17)*. Two-hundred twenty-five attendees reported an acceptance of a new recipe and, as a

result, educators began conducting more workshops throughout the state.

The success of the Abuela Project suggests that a public health campaign informing potential raw milk consumers and producers about the safety of raw milk products would be beneficial. Such campaigns may be accomplished in a variety of ways, including information sessions, community meetings, and dissemination of brochures. Public health measures to help improve the pasteurization process include the use of a recording thermometer and air space heater, pasteurization at appropriate temperatures and time intervals, and regular phosphatase and bacteriologic testing.

Another alternative is to require warning labels on raw milk, thus allowing consumers to make informed choices. This would help reduce rates of infection, especially among the most vulnerable populations. Moreover, in the event that a disease outbreak occurs, the contaminated products could be traced easily to the source. The possible disadvantages of this approach include limited public health benefits and inaction among consumers after reading labels. Currently, 12 out of the 22 states where it is legal to sell raw milk for human consumption require warning labels (Fig. 4) *(15)*. In Washington state, all retail raw milk products must bear the following label *(11)*:

"**WARNING:** *This product has not been pasteurized and may contain harmful bacteria. Pregnant women, children, the elderly and persons with lowered resistance to disease have the highest risk of harm from use of this product.*"

States could use a warning such as this to properly inform all producers and potential consumers about hazards associated with raw milk and raw milk cheese consumption.

A measure such as this is feasible and not without precedent. Given these considerations, providing education to dairy producers and consumers and implementing the use of warning labels on unpasteurized milk and soft cheeses are the most effective ways for state agricultural departments to decrease the consumption of these products, prevent illness, and thus ensure increased public safety.

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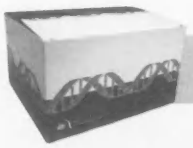

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Highlights of the Executive Board Meeting
February 8–9, 2009
Grapevine, Texas

Following is an unofficial summary of actions from the Executive Board Meeting held in Grapevine, Texas on February 8–9, 2009:

Approved the following:

- Minutes of October 28–29, 2008 Executive Board Meeting
- Minutes of October 28, 2008 Executive Board Executive Session Meeting
- Fellow Awards to be presented at IAFP 2009
- Policy on conflict of interest
- Policy on whistleblower
- Revoke charters of Mississippi and Tennessee Affiliates

Discussed the following:

- E-mail votes taken since the last meeting
- Constitutional amendment
- Committee appointments
- IAFP 2009 planning update
- Review of Program Committee meeting
- Change of deadline for symposia submissions
- Parkin and Silliker Lecturers
- Continuation of Fellow presentations at Opening Session
- Sponsorship of events
- IAFP 2011 contract signed – Milwaukee
- Long-range planning goals
- Financial results from 2008 European Symposium
- International meetings updates – China, Lisbon, Dubai, Korea
- Set dates for 2009 European Symposium – October 7–9 in Berlin
- Location for 2010 International Symposium
- Coordination of effort with Turkey Affiliate for a conference
- Proposal received to establish a "freezing research award"
- Agreement with Springer for food safety series of books
- Report on APHA compendium of methods – update
- WHO-NGO update
- 3-A Sanitary Standards
- Non O157 *E. coli* white paper
- Food safety capacity building within APEC
- Investment results for 2008
- India activity – establish Affiliate
- Rapid response for *Salmonella* in peanuts
- Newly designed Membership materials

Reports received:

- *IAFP Report*
- *Food Protection Trends*
- *Journal of Food Protection*
- IAFP Web site
- Membership update
- Advertising / sponsorship update
- Financial statements
- Board Members attending Affiliate meetings
- *Affiliate View* newsletter
- Future Annual Meeting schedule
- Exhibiting (IAFP on the Road)

Next Executive Board meeting – April 21–22, 2009.

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Gordon, New South Wales

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University of Newcastle, Australia
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Brussels, Belgium

WHAT'S HAPPENING IN FOOD SAFETY

ServSafe *Starters* Employee Online Course Launced by National Restaurant Association

National Restaurant Association has launched ServSafe *Starters* Employee Online Course at www.ServSafe.com/Starters. Designed for employee-level restaurant and foodservice workers, the ServSafe *Starters* online training program delivers core food safety training consistently and helps ensure that food is handled safely throughout the operation.

"Food safety is a number one priority for the NRA and our members so we are pleased to introduce this newest addition to our ServSafe family of products. ServSafe *Starters* Employee Online Program will allow more foodservice professionals to have access to this important training and stay abreast of the most recent developments in safe food handling. Created by the restaurant and foodservice industry, this program – with its convenient online format – is a solution to minimize training costs while keeping businesses and customers safe," said David Gilbert, acting executive vice president, products and services, National Restaurant Association Solutions.

"In addition, operators have told us that documentation of training is critical, so the new ServSafe *Starters* online program has an online tracking capability. It allows the employee's progress and status to be viewed online and recorded."

ServSafe *Starters* Employee Online Course is divided into five core sections: basic food safety, personal hygiene, cross contamination and allergens, time and temperature, and cleaning and sanitizing. A sixth section focuses on job-specific needs. Each of the five sections can be completed in as little as 10 minutes each. The course, available in English and Spanish, uses interactive simulations allowing the employee to practice and retain the critical food safety lessons.

3-A SSI Introduces New Symbol for Equipment Built to P3-A Standards

The Pharmaceutical 3-A (P3-A) Council of 3-A Sanitary Standards, Inc. announces the introduction of a new P3-A Symbol for use in conjunction with the marketing of equipment and machinery that meets the requirements of published P3-A Standards. The new registered mark combines the established and respected 3-A Symbol with the stylized 'P' to indicate conformance to a P3-A Standard.

The P3-A Symbol was designed for voluntary display on equipment or machinery that conforms to a P3-A Standard. Use of the P3-A Symbol is subject to the general licensing provisions of 3-A SSI, including the inspection of sample equipment by an accredited independent inspection authority, known as a Certified Conformance Evaluator (CCE). A prospective licensee must submit a report of conformance for specific names/models of equipment to obtain authorization to display the mark. The third party verification inspection requirement for use of the P3-A Symbol enhances the recognition and the value of the P3-A Symbol for equipment fabricators, regulatory professionals and processors alike.

The commercial display of the P3-A Symbol is intended to benefit equipment fabricators and customers:

- Equipment fabricators gain broad acceptance of their products because the P3-A Symbol conveys the equipment conforms to materials, design and fabrication criteria critical to acceptance by customers and regulatory authorities. P3-A Standards criteria help reduce the cost of dies, tools and intended delivery time that would result without uniform criteria.
- Users and specifiers of equipment used for the production of Active Pharmaceutical Ingredients (APIs) gain confidence in the compatibility of equipment because experts on equipment design, pharmaceutical production and other authorities helped develop each P3-A Standard. They know the equipment meets basic criteria for the intended application.

Complete details on the new P3-A Symbol and the application for authorization are available on the 3-A SSI Web site at www.3-a.org under Pharmaceutical 3-A and P3-A Symbol Authorization or go to: http://www.3-a.org/pharmaceutical/symbol_authorization.html.

In August 2008, 3-A SSI announced approval of the first three American National Standards for

equipment and systems used to produce and package active pharmaceutical ingredient (APIs).

The new P3-A standards include:

- General Glossary of Terminology Used in Pharmaceutical 3-A® Standards, P3-A 001 – This reference document is intended to support and facilitate the use of other P3-A Standards. Specifically, this standard provides users of P3-A standards and accepted practices with definitions of acronyms and terms widely used in these documents.
- Pharmaceutical 3-A® Sanitary/Hygienic Standards for Materials for Use in Process Equipment and Systems, P3-A 002 – These standards provide minimum materials and surface property requirements, including minimum fabrication related materials and surface property requirements for equipment and components utilized in the pharmaceutical manufacturing environment whereby those material and surface properties may directly, indirectly, or incidentally impact the strength, identity, safety, purity or quality of the active pharmaceutical ingredient, excipient, or drug product.
- P3-A® End Suction Centrifugal Pumps for Active Pharmaceutical Ingredients, P3-A 003 – This standard covers the sanitary design requirements of mechanically sealed end-suction centrifugal pumps, conforming to ANSI/ASME B73.1, whereby those design criteria may directly, indirectly, or incidentally impact to the strength, identity, safety, purity or quality of the active pharmaceutical ingredient, excipient, or drug product.

Four other new standards for API equipment are currently under development, including Agitated Filter Dryers, Vessels and Agitators, Mills and Classification Equipment, and Process Heat Exchangers. The P3-A Council invites all interested stakeholders to participate in the new standards development.

Copies of the new standards are now available for purchase in electronic format or printed version through the 3-A SSI Web site. Details on participating in the P3-A standards activities and the role of the new standards for API equipment/materials relative to other standards or industry guidelines are also available at the 3-A SSI Web site.

Rod Nilsestuen Taps UW-Madison Food Scientist Steven Ingham to Lead Food Safety Division

Agriculture, Trade and Consumer Protection Secretary Rod Nilsestuen has appointed Steven C. Ingham administrator of the department's division of food safety.

Mr. Ingham comes to the department from the University of Wisconsin-Madison, where he has been at the forefront of developing real-world systems to protect food safety at critical, hazardous points in processing.

Mr. Ingham earned his bachelor's, master's and doctorate degrees from Cornell University. He held faculty posts at Louisiana State University and the University of Saskatchewan, Canada, before joining the UW-Madison Department of Food Science in 1993, where he is a full professor.

President – Georgia-Pacific Professional Food Services Solutions

Georgia-Pacific LLC has announced that William Donahue, vice president and general manager – Georgia-Pacific Professional Food Services Solutions, has been promoted to president of that business. He will continue to report to Kathy Walters, executive vice president – global consumer products.

"Bill has effectively led this business since it was formed during our Consumer Products reorganization in 2007," said Walters. "I have tremendous confidence in Bill's ability to lead the Food Services Solutions business through today's tough economic climate and into a strong future of superior performance and growth for our customers and our company."

Prior to the Food Services Solutions business, Mr. Donahue led Georgia-Pacific's bleached board business since joining the company in 2003. Previously, he spent 12 years in various domestic and international bleached board sales and marketing roles. Mr. Donahue received his bachelor's degree from Wake Forest University.

3-A SSI Announces Accreditation Exam for Expanded Inspection Programs

Applications are now available from 3-A Sanitary Standards, Inc. (3-A SSI) for candidates interested in obtaining certification as a 3-A SSI Certified Conformance Evaluator (CCE). Individuals who meet application requirements will be eligible to sit for the accreditation exam on May 18, 2009 at The Wyndham Milwaukee Airport Hotel and Convention Center, Milwaukee,

Wisconsin in conjunction with the 3-A SSI 2009 Annual Meeting and Education programs.

The CCE designation is required for those wishing to conduct Third Party Verification (TPV) inspections of dairy and food processing equipment covered by 3-A Sanitary Standards. Instituted in late 2003, the TPV inspection is required for equipment manufacturers or used equipment resellers to obtain or renew a 3-A Symbol. The TPV requirement was implemented to verify conformance to 3-A Sanitary Standards for sanitary equipment design, fabrication and construction materials. Equipment authorized for the 3-A Symbol must be re-inspected every five years.

3-A SSI expanded the TPV inspection program in late 2007 to include a new Replacement Part Qualification Certificate for parts used in equipment covered by 3-A Sanitary Standards and a 3-A Process Certificate for processing operations covered by most 3-A Accepted Practices. The TPV inspection requirement also applies to equipment that displays the new P3-A Symbol associated with conformance to new Pharmaceutical 3-A (P3-A) standards.

Complete CCE application packages must be received by 3-A SSI no later than Friday, April 17, 2009. Candidates meeting the application requirements will be eligible to sit for the accreditation exam scheduled for the morning of Monday, May 18, 2009 at The Wyndham Milwaukee Airport Hotel and Convention Center, Milwaukee, Wisconsin in conjunction with the 3-A SSI 2009 Annual Meeting and Education programs. Event registration is not required for CCE candidates to sit for the accreditation exam.

See a copy of the complete announcement and a link to the CCE Application Form at www.3-a.org.

New Interpack President Elected

The Interpack Processes and Packaging 2011 Advisory Council has unanimously elected the new president of the show: Christian Traumann, managing director of MULTIVAC Sepp Haggenmüller GmbH & Co. KG. The vice presidents are Friedbert Klefenz, president of Bosch Packaging Technology and Bernhard Borgardt, a representative of RPC Group, who is also president of the German Association for Plastics Packaging and Films (IK), the Central Federation of the Plastics Processing Industries (GKV) and the European Plastics Converters (EuPC).

Campden BRI Appoints New Director–General

Dr. Steven Walker has been appointed director–general designate of Campden BRI. Dr. Walker will assume the role of diretor general later this year.

Bob Clarke, chairman of Campden BRI commented, "I am very much looking forward to working with Steven in the further development and strengthening of Campden BRI. Steven joined the company in 1986 as a microbiologist and worked extensively in the areas of predictive food microbiology and chilled foods microbiology."

From 1994 to 2004, Dr. Walker undertook the newly created role of director of research, guiding, directing and managing the research program at CCFRA funded by member-subscriptions, UK government, the EC and the industrial consortia.

For the last four years, Dr. Walker has been director of the cereals and cereals processing division.

Jack Vresics Named Interim CEO of Component Hardware Group

Component Hardware Group (CHG), manufacturer of premium plumbing and hardware products for commercial, foodservice, institutional and healthcare applications, is pleased to announce the appointment of John J. (Jack) Vresics as interim chief executive officer. The company is currently conducting a formal search for a new president and CEO.

Jack brings to the company significant experience in general management, marketing, international manufacturing and sales, and new product development. Jack was most recently president and CEO of Technical Concepts (TC), one of the designers and manufacturers of touch-free, automated product systems used for hygiene and odor control in "away-from-home" washrooms. TC, also owned by CHG's major shareholder, Liberty Partners, was acquired by Newell Rubbermaid in April 2008. Prior to joining TC, Jack was group president of the Colson Group headquartered in Chicago, IL. With the Colson Group, Jack was responsible for the group of caster and wheel companies including Colson, Albion, Jarvis, Shepherd, Bassick and Flexello with 31 operations in North and South America, Europe, Asia and Australia.

Jack replaces Tom Carr, who resigned from the position of president and CEO to pursue other interests and will remain a consultant to the company.

INDUSTRY PRODUCTS

Synbiosis

Synbiosis New Automated Colony Counter Saves Food Manufacturers Money by Rapidly Detecting Hazardous Organisms

Synbiosis, manufacturer of automated microbiological systems, is pleased to announce its ProtoCOL automated colony counter which offers new features to exclude food debris from the count. This makes counting faster and more reliable, ensuring microbiologists can easily determine the levels of bacteria or molds in food earlier, thus avoiding costly product recalls.

The ProtoCOL system's new software can simultaneously analyze images of the same or several different colored colonies on spiral, pour or surface inoculated plates and has different levels of user access to provide lab managers with control of the system. The software has been upgraded so microbiologists can train the ProtoCOL to automatically recognize by either color and shape colonies they would expect to see, while excluding fibrous food debris such as meat or fish from the count. This helps reduce manual analysis and means results are quickly obtained.

Results from the ProtoCOL system are highly reproducible and can be automatically transferred into Excel where a sample name can be entered into the database, thereby reducing the operator variation that can occur from different microbiologists' manual colony counts. An image library is also created alongside the Excel database making it easy to produce evidence for each food tested and allowing lab managers the option to re-visit a plate if there is any query after its disposal. The ProtoCOL software is GLP compliant and tracks any changes to results, making the ProtoCOL ideal for use as part of a HACCP program.

Paula Maia of Synbiosis commented: "Rapid microbiological testing of food products and raw materials is vitally important in food production. However, the accurate analysis of colonies on plates is frequently made difficult by the presence of debris or bubbles, either embedded within or on the agar's surface. By utilizing the ProtoCOL's excellent new software features, microbiologists can overcome these problems with ease to ensure food and ingredients are released more rapidly, thus saving money on storage costs and allowing products to have a longer shelf life."

Synbiosis
44 (0) 1462.635327
Hitchin, Hertfordshire, UK
www.synbiosis.com

Thermo Fisher Scientific Develops Hydride Generation AA Solution for Accurate Analysis of Mercury in Fish

Thermo Fisher Scientific Inc., a leader in serving science, announced the publication of a new application note demonstrating the capability of the Thermo Scientific iCE 3000 Series AA spectrometers and Thermo Scientific VP100 vapor generation accessory to accurately detect trace levels of mercury in fish. Mercury is a significant environmental toxin that is capable of entering the marine food chain. The consumption of contaminated fish is the main route of human exposure to mercury, which can prove fatal. The application note entitled "Accurate analysis of low levels of mercury in fish by hydride generation AA," gives details of the reagents, sample preparation and instrument conditions needed to accurately analyze low levels of mercury. It is available to download free-of-charge via the literature library at www.thermo.com/ice.

Growing concerns about the possible presence of this toxic chemical in the food supply chain have led to tighter restrictions on its presence in the food we eat. Countries and organizations around the world have developed regulations that enforce maximum concentrations of mercury in fish of approximately 0.5 mg/kg wet weight. Coupled with the VP100 vapor generation accessory, the iCE 3000 Series AA spectrometers are capable of reaching detection limits of 0.014 mg/kg. The sensitivity and precision of this configuration easily

meets the detection limits detailed in all current international guidelines. Standards in this application were prepared from a 1000 ppm (mg/L) mercury standard solution and the results demonstrated excellent linearity up to 100 ppb, equivalent to 20 mg/kg in a fish sample.

The speed and efficiency of the VP100 allows the analysis of a sample approximately every 90 seconds, while the ease-of-use of the iCE 3000 Series AA allows further method optimization, providing full control over the analysis. In addition, this combination allows users to analyze mercury samples more easily and cost-effectively, compared with more complex and expensive techniques, such as HPLC-ICP-MS or GC-ICP-MS.

The iCE 3000 Series range of AA spectrometers combine high-precision optics and state-of-the-art design to provide unrivalled analytical performance, while the VP100 offers fast, repeatable and robust analysis. The iCE 3000 Series AA operates on the intuitive Thermo Scientific iCE SOLAAR software platform. The SOLAAR software is easy-to-use and gives step-by-step instructions to allow quick set-up and easy optimization of the analyses.

Thermo Fisher Scientific, Inc.
800.532.4752
Waltham, MA
www.thermo.com/trace

Colilert-18® and Colisure® Receive PMO Approval from NCIMS

IDEXX Laboratories, Inc. has received Pasteurized Milk Ordinance (PMO) approval from the National Conference on Interstate Milk Shipments (NCIMS) for Colilert-18®

Weber Scientific

and Colisure® for coliform and *E. coli* testing in dairy source waters. This approval follows other official recognitions by the USEPA, AOAC, IBWA and APHA.

Colilert-18 and Colisure are easy-to-use, one-step tests that provide fast and accurate results for total coliform and *E. coli* testing in dairy source waters. They are newer versions of IDEXX's Colilert® test, which has been approved by the FDA for dairy source waters since 1994.

"IDEXX is pleased to announce that Colilert-18 and Colisure are now also FDA approved," said James Spitzer, IDEXX senior worldwide marketing manager.

Distinguishing features include Colilert-18's ability to provide confirmed test results in only 18 hours, and Colisure's easy-to-read magenta color endpoint and 24–48 hour read-window.

"This represents a great opportunity for the dairy industry to use an easy, rapid, accurate test that has already been widely accepted by the water testing industry," Mr. Spitzer added.

Regulatory agencies recognize the presence of coliform bacteria in water as a reliable indicator that other pathogens may be present. For this reason, coliform testing is required to ensure that source water is pathogen free. Coliform testing is also a faster, easier, and more affordable alternative to testing water for all possible pathogens—often a lengthy, involved and expensive process. IDEXX Colilert and Colisure tests are among the most convenient and affordable coliform tests available.

Colilert and Colisure are the only rapid chromogenic substrate (MUG) tests that are PMO approved and recognized for use by certified milk laboratories for negative and positive confirmation for total coliform testing.

The proposal to NCIMS was co-authored by Cathy Costa, senior regulatory affairs specialist – dairy, and Dr. Manja Blazer, senior market development and government affairs Manager, both of IDEXX.

In addition to their full range of regulatory approvals, Colilert and Colisure tests boast several features that make them ideal for a wide variety of source water applications, such as sanitation, product rinsing, and water as an ingredient.

With less than one minute of hands-on time, Colilert and Colisure tests provide total coliform and *E. coli* results within 18 or 24 hours—30 to 72 hours sooner than traditional methods. The premeasured, unit dosed products are ready to use and allow collection, incubation and reading to be done in the same vessel. Besides saving time and labor, the tests are extremely affordable—20 to 50% less expensive than traditional methods (AWWARF Research Applications, May 1993 #4).

Weber Scientific is the authorized distributor for IDEXX Laboratories for dairy and food industry

end-users within the USA. The company offers a highly discounted, full range of Colilert and Colisure tests, containers and accessories.

Weber Scientific
800.328.8378
Hamilton, NJ
www.weberscientific.com

Jeio Tech, Inc.

New Line of Magnetic Stirrers

Jeio Tech, Inc. has introduced a new line of Lab Companion Magnetic Stirrers consisting of three sizes and four colors. These stirrers are designed right for today's lab and provide for simple usage.

They are available in three sizes, 120 mm, 170 mm and 220 mm with stirring capacities of 2, 4 and 5 liters, respectively. Stirring speed range is from 150 to 2,500 rpms. Tops are polypropylene and come complete with two non-slip silicon covers (black and white) to prevent sliding of the sample vessel. With a wide base and rubber feet, these stirrers are extremely stable and very quiet.

Jeio Tech, Inc. is the manufacturer of Lab Companion shakers, ovens, incubators, baths, circulators, stirrers and environmental chambers for laboratory and industrial applications.

Jeio Tech, Inc.
781.376.0700
Woburn, MA
www.jeiotech.com

Huco Dynatork Tools Assist Coupling Selection for Design Engineers

Huco Dynatork, an Altra Industrial Motion company, offers the most comprehensive range of small precision couplings from a single manufacturer. Huco's precision couplings are ideal for use in high-end servo drives, pulse generators, scanners, X-Y positioning slides, high speed dyna-mometers, measuring instruments, robotics, machine tools and in many other applications where specific dimensional or performance criteria is required.

Because there is such a wide range of different motion control couplings from which the design engineer can choose, Huco offers a complete Design Guide to coupling performance characteristics on the company's Web site.

The Web site also contains a unique Coupling Selector designers can use as a tool to identify the coupling types that meet their design criteria for angular, radial or axial misalignment, or a combination of all three. The interactive tool helps designers understand whether they need a bellows, membrane, sliding disc or helical beam, or another design.

The Coupling Selector takes the key information provided about the application and presents all the couplings that fit the criteria, with a link to the detailed specification of each coupling. Selection is based upon coupling type (mechanism), dimensions, shaft connections, performance, displacement and other conditions.

Altra Industrial Motion
781.917.0600
Braintree, MA
www.altramotion.com

Bio-Rad Purchases Food Safety Product Line from SafePath Laboratories LLC

Bio-Rad Laboratories, Inc. a multinational manufacturer and distributor of life science research and clinical diagnostics products, announced that it has completed the purchase of certain assets of SafePath Laboratories, LLC's food diagnostics business. The sale is effective immediately. The terms of the purchase were not disclosed.

With the purchase of SafePath's high performance serological immunoassay test kits for Trichinella, Toxoplasma, and *Salmonella* pathogens, Bio-Rad further expands its food diagnostics product line. "We are excited to be able to offer SafePath's unique pathogen test products," said Brad Crutchfield, Bio-Rad vice president and life science manager. "With these new products we are realizing our goal to be a one-stop shop for our customers' food safety testing needs."

Bio-Rad Laboratories, Inc.
510.724.7000
Hercules, CA
www.biorad.com

Bonneville Power Selects Web-Based Energy Monitoring Systems from Onset

Onset Computer Corporation has announced that the Bonneville Power Administration (BPA), a non-profit federal agency under the US Dept. of Energy serving the Northwest, has purchased 14 Web-based energy monitoring systems for measuring the energy performance of packaged rooftop HVAC units on commercial buildings.

BPA has installed the 14 HOBO® U30 Remote Monitoring Systems in various service territories throughout the Pacific Northwest to collect data on HVAC unit energy consumption and building thermostat call settings. Each 15-channel monitoring system enables multiple HVAC units to be monitored at once, and the data is made available on the web via Onset's HOBOlink£ Web site.

"The data is being analyzed and will assist in determining the energy savings associated with performing advanced maintenance services to packaged rooftop HVAC units," said Erik Boyer, an engineer with BPA. "Ultimately, this information will help us determine the amount of money BPA will offer businesses to perform these services in the Northwest."

According to Boyer, the monitoring equipment also helps ensure that the HVAC systems were connected properly and has enabled BPA to investigate system performance. BPA will be funding another project this summer aimed at measuring the energy performance of packaged rooftop HVAC units and is planning to utilize the Onset monitoring systems to collect the energy performance data.

Onset Computer Corporation
800.564.4377
Pocasset, MA
www.onsetcomp.com

What is "Before" Data? from Dickson

Before data documents the accuracy of your data logger or chart recorder before it is calibrated. When your instrument is re-calibrated by Dickson it is returned to original specifications. You cannot obtain "before" data once an instrument has been re-calibrated.

"Before" data is required for ISO 17025/A2LA Accredited NIST Traceable calibrations N450 Compliance-Max).

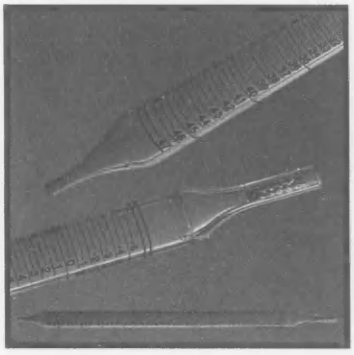
"Before" data is required to accurately determine application-specific calibration schedules (N550 Before & After or N450 Compliance Max).

Many regulations (e.g., QS 9000, FDA 21 CFR Part 11, CDC Vaccine recommendations, among others) require notifications of out-of-tolerance conditions creating a need for "before" data. In addition, quality control manuals and standard operating procedures (SOP), such as those specifying standards for various automotive parts, require the same information.

If your application is subject to liability claims, the only way you can demonstrate due diligence in maintaining instruments' accuracy is by including documentation of "before" calibration data and step-by-step determination of required calibration schedules.

"Before" Calibration Data is the only way to document that your conditions remained within specified tolerances.

Dickson
800.323.2448
Addison, IL
www.dicksondata.com



Excel Scientific, Inc.

Excel Scientific's New 50 mL Serological Pipet Offers Improved Accuracy and Sterility

Excel Scientific's redesigned 50 mL Serological Pipets are constructed from high clarity virgin polystyrene. They are certified RNase-, DNase-, pyrogen-free, and non-cytotoxic.

The smooth non-welded tip eliminates sample hang-up, leakage, and breakage. A 3 mm I.D. opening minimizes shear. Sterile, individual one-side-paper, one-side-plastic packaging is easily opened by peeling or pushing through the paper. A colored woven polypropylene plug provides easy size identification. There are forward and reverse 0.5 mL graduations with printed volumes at 1 mL intervals and negative graduations to -5.5 mL. Accuracy is ± 1.5% and sterility better than 10^{-6}.

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Victorville, CA
www.excelscientific.com

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IVAN PARKIN LECTURE

SUNDAY, JULY 12
6:00 P.M. - 7:30 P.M.

Dr. Paul A. Hall

AIV Microbiology and Food Safety Consultants, LLC
Hawthorn Woods, Illinois

Dr. Paul A. Hall is the President and Chief Operating Officer for AIV Microbiology and Food Safety Consultants, LLC, a company dedicated to providing an array of food safety solutions for the global food and beverage industry. Dr. Hall is also on the Board of Directors of Purfresh, Inc., the leading provider of sustainable clean technology solutions for food and water including advanced ozone-based applications for cold storage and disinfection.

During his professional career, Dr. Hall has held a number of positions in the food industry, including Vice President of Global Food Safety for ConAgra Foods, and the position of Vice President of Global Business Development for Matrix MicroScience, Inc., a leading technology company that focuses on the concentration, capture, and detection of foodborne pathogens and spoilage organisms.

Dr. Hall also had a seventeen-year career with Kraft Foods where his last position was Chief Microbiology and Food Safety Officer for Kraft, Global. Dr. Hall has also held positions as a Microbiology Manager in Corporate Research and Development for Anheuser Busch Companies, Inc. and in Central Research for Ralston Purina Company, both in St. Louis, MO. He is Past President of the International Association for Food Protection and has been actively involved with various professional organizations and institutes, including the International Life Sciences Institute, the University of Georgia Center for Food Safety, the American Society for Microbiology, the Institute of Food Technologists, the Grocery Manufacturers' Association, and the International Dairy Foods Association, among others. He serves on the editorial boards of the *Journal of Rapid Methods and Automation in Microbiology* and *Food Safety Magazine*.

Dr. Hall holds a bachelor's degree in Microbiology from the University of Missouri-St. Louis, a master's degree in Technology Management from Washington University, and a Ph.D. in Quality Management from LaSalle University. He has lectured extensively around the world on microbiological food safety, HACCP, rapid testing and detection methods, and microbiological risk management.

Dr. Hall was the recipient of IAFP's prestigious 2006 Harold Barnum Industry Award for excellence in leadership and contributions to the area of microbiological food safety for the industry and in 2007 he was inducted as a Fellow of IAFP.

JOHN H. SILLIKER LECTURE

WEDNESDAY, JULY 15
4:00 P.M. - 4:45 P.M.

Dr. Patrick Wall

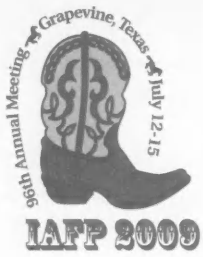
University College Dublin
School of Public Health and Population Sciences
Belfield, Ireland

Dr. Patrick Wall is Associate Professor of Public Health in University College Dublin's School of Public Health and Population Sciences which hosts the National Nutrition Surveillance Centre. His research interests include food safety, foodborne diseases, lifestyle-related diseases and health damaging consumer behaviour. He is a co-director of the UCD Centre for Behaviour and Health.

Dr. Wall was the first Chief Executive of the Irish Food Safety Authority (FSAI) and contributed to the setting up of this science-based consumer protection agency created partly in response to the BSE crisis. He has just completed a term as the Chairperson of the European Food Safety Authority, a pan EU Agency with a remit in risk assessment and communication. Dr. Wall was one of seven non-Chinese nationals on the committee advising on food safety arrangements for the 2008 Beijing Olympics. He was a member of the crisis management team convened to deal with the recent Irish dioxin contamination incident. He is a member of the Ireland's Healthy Eating Guidelines Steering Committee and is the Chairperson of the Irish Government's CJD Advisory Committee.

Dr. Wall is the Chairperson of the UK Food Standards Agency's (FSA) Advisory Body for the Delivery of Official Controls which is currently overseeing the transformation of the UK Meat Hygiene Service.

In addition to qualification in veterinary and medicine from University College Dublin and the Royal College of Surgeons, Dr. Wall has an MSc in Infectious Diseases from the University of London and an MBA. He is a Diplomat of the European College of Veterinary Public Health and a Fellow of the UK Faculty of Public Health Medicine.



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PRELIMINARY PROGRAM

SUNDAY, JULY 12

Opening Session – 6:00 p.m. – 7:30 p.m.

Ivan Parkin Lecture – Paul A. Hall, AIV Microbiology and Food Safety Consultants, LLC, Hawthorn Woods, Illinois

MONDAY, JULY 13

All Day – 8:30 a.m. – 5:00 p.m.

Poster Session

P1 Meat and Poultry, Pathogens, Seafood, and Education

Morning– 8:30 a.m. – 12:00 p.m.

Symposia

S1 ICMSF Symposium on International Developments in Food Safety
S2 Sterilant Gas Decontamination of Food and Environments and Emerging Technologies
S3 Harnessing Irradiation for the Marketplace Today
S4 Epidemiological Trends of Noroviruses

Roundtables

RT1 Public Health Decision Making – A Character Building Exercise
RT2 Selling Food Safety to Employees: Creating a Fully Functioning Food Safety Culture in Retail Grocery and Foodservice Operations

Technical Session

T1 Dairy, General Microbiology, and Sanitation

Afternoon – 1:30 p.m. – 5:00 p.m.

Symposia

S5 Pathogen and Spoilage Persistence in the Processing Environment and Food Products: Where, Why and How We Know
S6 Zapped! Optimizing the Consumer Experience of Microwave Cooking through Labeling, Infrared Thermography, and Validation
S7 *Listeria monocytogenes* Controls from Local to Global – Are They Working?
S8 The Effect of Climate Change on Food Availability and Safety
S9 Tracking and Tracing Technologies – Do You Know Where Your Steak and Tomatoes Come From?
S10 International Food Protection Issues: Overview and Global Commodity Trade

Technical Sessions

T2 Antimicrobial, Seafood, and Non-microbial Food Safety
T3 Applied Laboratory Methods

TUESDAY, JULY 14

All Day – 8:30 a.m. – 5:00 p.m.

Poster Session

P2 – Risk Assessment, Applied Laboratory Methods, Novel Laboratory Methods, Toxicology, Water, Sanitation, and Microbial Spoilage

Morning – 8:30 a.m. – 12:00 p.m.

Symposia

S11 Foodborne Disease Outbreak Update: *Campylobacter* in Fresh Peas, *Salmonella* Schwarzengrund in Pet Food, *Salmonella* Saintpaul in Tomatoes/Peppers
S12 Attribution of Foodborne Illness/Disease
S13 Best Practices for Cleaning and Validation
S14 Enhancing Oyster Safety through Vibrio Control Plans
S15 Less Recognized and Underappreciated Foodborne Pathogens – No Crystal Ball for the Next Big Bug

Technical Sessions

T4 Education and Novel Laboratory Methods
T5 Produce

Afternoon – 12:15 p.m. – 1:00 p.m.

IAFP Business Meeting

Afternoon – 1:30 p.m. – 5:00 p.m.

Symposia

S16 Facing a Persistent Challenge: *Salmonella* Control in Low-Moisture Foods
S17 Food Safety in Global Food Trade
S18 Looking for Thresholds: A Multi-Disciplinary "Key Events" Approach
S19 Round Up Your Pathogen Plan: Enrichment, Sample Preparation and the Legal and Social Perspectives
S20 Environmental Reservoirs of Major and Emerging Foodborne Pathogens
S21 Integrating Epidemiology and Microbiology to Solve Complex Food Safety Problems

Technical Session

T6 Meat and Poultry

WEDNESDAY, JULY 15

All Day – 8:30 a.m. – 5:00 p.m.

Poster Session

P3 General Microbiology, Antimicrobials, Produce, Dairy and Epidemiology

Morning – 8:30 a.m. – 12:00 p.m.

Symposia

S22 Third Party Certification Systems: Can It Make Our Food Safer?
S23 A Systems Approach to Minimize *Escherichia coli* O157:H7 Food Safety Hazards Associated with Fresh and Fresh Cut Leafy Greens
S24 Emerging Chemical Hazards in Food

Roundtable

RT3 Measuring and Interpreting Food Handling Behavior and Its Impact on Policy Emerging Chemical Hazards in Food

Technical Sessions

T7 Risk Assessment, Spoilage, and Beverages and Water
T8 Pathogens

Afternoon – 1:30 p.m. – 3:30 p.m.

Symposia

S25 Food Safety Challenges for Unrefrigerated Display of Ready-to-Eat Foods
S26 Shigatoxin *E. coli*: The Bad, the Worse, and the Pathogenic
S27 Food Defense Session (Title to be determined)
S28 CSI Beverage Plant: Case Studies in Yeast and Mold Spoilage
S29 Food Safety Programs Across an Integrated Poultry Industry

Debate

Pros and Cons of Zero-Tolerance Policy for Pathogens in Food

4:00 p.m. – 4:45 p.m.

John H. Silliker Lecture – *The 2008 Irish Dioxin Crisis: A Public Health, Food Safety, Economic, Legal, or a Risk Communication Challenge?* – Dr. Patrick Wall, University College Dublin, School of Public Health and Population Sciences, Belfield, Ireland

Program subject to change

IAFP 2009 EVENT INFORMATION

GOLF TOURNAMENT

Saturday, July 11

Golf Tournament at Tour 18 — 6:00 a.m. – 2:00 p.m.

Have you ever dreamed of playing Amen Corner at Augusta National? How about a round of golf at Murifield Village, Firestone Country Club, or Southern Hills? Oakmont? Sawgrass? Crooked Stick? Doral? Each of these famed golf courses and more are represented in this unique golfing experience at "Tour 18" Golf Course, the site of IAFP's 2009 Golf Tournament. "Tour 18" has duplicated legendary holes from the most celebrated golf courses for your enjoyment.

Imagine yourself playing on carefully simulated holes from some of the greatest golf holes in America. This collaboration of incredible replicas offers one fantastic challenge after another, creating a uniquely memorable experience.

This will be an opportunity you won't want to miss! Sign up now to join your friends and colleagues in this best-ball, pre-meeting tournament to start IAFP 2009 off with some fun!!! Price includes transportation, greens fees with a cart, range balls, breakfast, lunch and prizes.

DAYTIME EVENTS

Saturday, July 11

JFK and Dallas City Tour — 9:00 a.m. – 3:00 p.m.

Do you remember where you were on November 22, 1963? On this day, John F. Kennedy, the 35th President of the United States of America was assassinated in downtown Dallas. Visit the Sixth Floor Museum to learn more about this historic day. Continue to explore the heart of Dallas including the Historic West End District, Pioneer Plaza, the renowned Dallas Farmer's Market and more.

Sunday, July 12

Grapevine Historical Tour — 10:00 a.m. – 3:00 p.m.
(Lunch included)

After a scrumptious brunch at Willhoittes on Main Street you will visit Nash Farm and witness the life and times of the early farmers and settlers who established Grapevine. Your journey will continue to the Grapevine Vintage Railroad, the Grapevine Heritage Museum and the Vetro Glass Studio, where you can watch the glass blowing artisans. A memorable wine tasting experience at Cross Timbers will complete your day.

Monday, July 13

Fort Worth Stockyards Tour — 12:00 p.m. – 5:00 p.m.
(Lunch included)

Begin your day with lunch at Risky's Barbeque before you are transported back in time to the Wild West, visiting the Fort Worth Historic Stockyards, the largest horse and mule market in the world during WWII. Explore the Texas Cowboy Hall of Fame and then see an actual boot making demonstration at the Ponder Boot Company. End your day with the Fort Worth Herd Cattle Drive, the only true cattle drive left in the US.

Tuesday, July 14

Fort Worth Arts Tour 10:00 a.m. – 3:00 p.m.
(Lunch included)

The Kimbell Art Museum's holdings range in period from antiquity to the 20th century and includes masterpieces by Duccio, El Greco, Rembrandt, Monet and Picasso to name a few. Next you will have lunch at the famed Joe T. Garcia's Mexican Cuisine, one of the most popular restaurants in the area. Then it's on to the Sid Richardson Museum to see the finest and most focused collections of Western art in America.

EVENING EVENTS

Sunday, July 12

Opening Session 6:00 p.m. – 7:30 p.m.

Cheese and Wine Reception 7:30 p.m. – 9:30 p.m.
Sponsored by Kraft Foods

Monday, July 13

Exhibit Hall Reception 5:00 p.m. – 6:00 p.m.
Sponsored by DuPont Qualicon

Monday Night Social

Texas Fun on the Ranch 6:30 p.m. – 10:00 p.m.

Howdy, partner! Pull on your boots and get ready to kick up your heels at Circle R Ranch. Hop aboard a horse-drawn hay wagon for a leisurely ride, try your hand in a quick-draw "shoot-out," learn to rope and work up a Texas-sized appetite for an all-you-can-eat barbecue. Enjoy the country-western band and join the fun as you are taught a Texas line dance. Don't miss this Wild West experience!

Tuesday, July 14

Exhibit Hall Reception 5:00 p.m. – 6:00 p.m.

IAFP Foundation Fundraiser 6:30 p.m. – 9:30 p.m.
Dinner at Cowboys Golf Club

Support the IAFP Foundation and enjoy an evening of food and fun at the Cowboys Golf Club, a tribute to the five-time world champion NFL football team. The clubhouse features a hall of honor with a magnificent display of the coveted Super Bowl trophies and memorabilia of Cowboys legends both past and present. Participate in the putting contest to show off your skills or relax on the patio to enjoy the fresh air. Then, enjoy a delicious dinner and live music. What a perfect way to end your day and support the IAFP Foundation!

Wednesday, July 15

Awards Banquet Reception 6:00 p.m. – 7:00 p.m.

Awards Banquet 7:00 p.m. – 9:30 p.m.

SPECIAL EVENTS

Registration required

Saturday, July 11

NIFSI Project Directors Meeting 11:00 a.m. – 5:00 p.m.

The National Integrated Food Safety Initiative (NIFSI) is hosting its bi-annual Project Directors Meeting in conjunction with the International Association for Food Protection's Annual Meeting. This meeting will help to: (1) Facilitate regional and national coordination of efforts to avoid duplication and create synergy in productivity; (2) Foster alignment of program activities with national and international priorities in food safety research, education, and extension; and (3) Showcase the impacts of different NIFSI grants in food safety. This meeting will also provide a mechanism for gathering stakeholder input on emerging issues and priority areas impacting the safety of America's food supply.

Registration fee includes lunch and breaks.

Tuesday, July 14

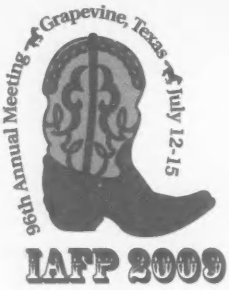
Texas A&M Breakfast 7:00 a.m. – 8:30 a.m.

Current and Former Students of Texas A&M University, get your "Gig 'em" going by joining fellow Aggies for breakfast before heading off to the symposia. Catch up on all the news and meet new members of the Aggie Network.

Tuesday, July 14

NFPA Alumni and Friends Reception 6:00 p.m. – 8:00 p.m.

National Canners Association has evolved to today's major food association GMA, and IAFP's Annual Meeting draws many of its alumni and friends. The Gaylord's shuttle bus will take us on the short ride to a local watering hole for this casual, strictly social event featuring drinks, snacks, billiards, and friends from GMA today and yesterday. All are welcome.



IAFP 2009 NETWORKING OPPORTUNITIES

IAFP FUNCTIONS

WELCOME RECEPTION
Saturday, July 11 • 5:00 p.m. – 6:30 p.m.
Sponsored by Quality Auditing Institute

Reunite with colleagues from around the world as you socialize and prepare for the leading food safety conference. Everyone is invited!

COMMITTEE MEETINGS
Saturday, July 11 • 3:00 p.m. – 4:30 p.m.
Sunday, July 12 • 7:00 a.m. – 5:00 p.m.

Committees and Professional Development Groups (PDGs) plan, develop and institute many of the Association's projects, including workshops, publications, and educational sessions. Share your expertise by volunteering to serve on committees or PDGs. Everyone is invited to attend.

STUDENT LUNCHEON (ticket required)
Sunday, July 12 • 12:00 p.m. – 1:30 p.m.
Sponsored by Unilever

The mission of the Student PDG is to provide students of food safety with a platform to enrich their experience as Members of IAFP. Sign up for the luncheon to help start building your professional network.

EDITORIAL BOARD RECEPTION
Sunday, July 12 • 4:30 p.m. – 5:30 p.m.

Editorial Board Members are invited to this reception to be recognized for their service during the year.

OPENING SESSION AND IVAN PARKIN LECTURE
Sunday, July 12 • 6:00 p.m. – 7:30 p.m.

Join us to kick off IAFP 2009 at the Opening Session. Listen to the prestigous Ivan Parkin Lecture delivered by Dr. Paul A. Hall.

CHEESE AND WINE RECEPTION
Sunday, July 12 • 7:30 p.m. – 9:30 p.m.
Sponsored by Kraft Foods

An IAFP tradition for attendees and guests. The reception begins in the Exhibit Hall immediately following the Ivan Parkin Lecture on Sunday evening.

IAFP JOB FAIR
Sunday, July 12 through Wednesday, July 15

Employers, take advantage of the opportunity to recruit the top food scientists in the world! Post your job announcements and interview candidates.

COMMITTEE AND PDG CHAIRPERSON BREAKFAST
Monday, July 13 • 7:00 a.m. – 9:00 a.m.

Chairpersons and Vice Chairpersons are invited to attend this breakfast to report on the activities of your committee.

EXHIBIT HALL LUNCH
Monday, July 13 • 12:00 p.m. – 1:00 p.m.
Sponsored by JohnsonDiversey

Tuesday, July 14 • 12:00 p.m. – 1:00 p.m.

Stop in the Exhibit Hall for lunch and networking on Monday and Tuesday.

EXHIBIT HALL RECEPTIONS
Monday, July 13 • 5:00 p.m. – 6:00 p.m.
Sponsored by DuPont Qualicon

Tuesday, July 14 • 5:00 p.m. – 6:00 p.m.
Partially sponsored by Quality Assurance and Food Safety Magazine

Join your colleagues in the Exhibit Hall to see the most up-to-date trends in food safety techniques and equipment. Take advantage of these great networking opportunities.

PRESIDENT'S RECEPTION (by invitation)
Tuesday, July 13 • 6:00 p.m. – 7:00 p.m.
Sponsored by Fisher Scientific

This by-invitation event is held each year to honor those who have contributed to the Association during the year.

BUSINESS MEETING
Tuesday, July 14 • 12:15 p.m. – 1:00 p.m.

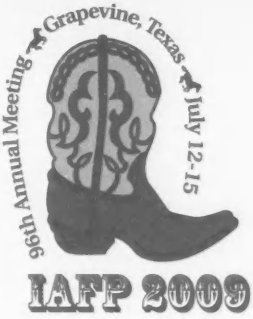
You are encouraged to attend the Business Meeting to keep informed of the actions of YOUR Association.

JOHN H. SILLIKER LECTURE
Wednesday, July 15 • 4:00 p.m. – 4:45 p.m.

The John H. Silliker Lecture will be delivered by Dr. Patrick Wall.

AWARDS RECEPTION AND BANQUET
Wednesday, July 15 • 6:00 p.m. – 9:30 p.m.

Bring IAFP 2009 to a close at the Awards Banquet. Award recipients will be recognized for their outstanding achievements and the gavel will be passed from Dr. Stan Bailey to Incoming President Vickie Lewandowski.



IAFP 2009 GENERAL INFORMATION

REGISTER ONLINE

Register online at **www.foodprotection.org**

REGISTRATION INCLUDES

Register to attend the world's leading food safety conference.

Full Registration includes:

- Program and Abstract Book
- Welcome Reception
- Ivan Parkin Lecture
- Cheese and Wine Reception
- Technical Sessions
- Poster Presentations
- Symposia
- Exhibit Hall Admittance
- Exhibit Hall Lunch (Mon. & Tues.)
- Exhibit Hall Reception (Mon. & Tues.)
- John H. Silliker Lecture
- Awards Banquet

PRESENTATION HOURS

Sunday, July 12	
Opening Session	6:00 p.m. – 7:30 p.m.
Monday, July 13	
Symposia & Technical Sessions	8:30 a.m. – 5:00 p.m.
Tuesday, July 14	
Symposia & Technical Sessions	8:30 a.m. – 5:00 p.m.
Wednesday, July 15	
Symposia & Technical Sessions	8:30 a.m. – 3:30 p.m.
Closing Session	4:00 p.m. – 4:45 p.m.

GOLF TOURNAMENT

Saturday, July 11	
Golf Tournament at Tour 18	6:00 a.m. – 2:00 p.m.

Join your friends and colleagues for an exciting round of golf before IAFP 2009.

DAYTIME EVENTS

Saturday, July 11	
JFK and Dallas City Tour	9:00 a.m. – 3:00 p.m.
Sunday, July 12	
Grapevine Historical Tour (Lunch included)	10:00 a.m. – 3:00 p.m.
Monday, July 13	
Fort Worth Stockyards Tour (Lunch included)	12:00 p.m. – 5:00 p.m.
Tuesday, July 14	
Fort Worth Arts Tour (Lunch included)	10:00 a.m. – 3:00 p.m.

EVENING EVENTS

Sunday, July 12	
Opening Session	6:00 p.m. – 7:30 p.m.
Cheese and Wine Reception *Sponsored by Kraft Foods*	7:30 p.m. – 9:30 p.m.
Monday, July 13	
Exhibit Hall Reception *Sponsored by DuPont Qualicon*	5:00 p.m. – 6:00 p.m.
Monday Night Social Texas Fun on the Ranch	6:30 p.m. – 10:00 p.m.
Tuesday, July 14	
Exhibit Hall Reception	5:00 p.m. – 6:00 p.m.
IAFP Foundation Fundraiser Dinner at Cowboys Golf Club	6:30 p.m. – 9:30 p.m.
Wednesday, July 15	
Awards Banquet Reception	6:00 p.m. – 7:00 p.m.
Awards Banquet	7:00 p.m. – 9:30 p.m.

SPECIAL EVENTS

Saturday, July 11	
NIFSI Project Directors Meeting	11:00 a.m. – 5:00 p.m.
Tuesday, July 14	
Texas A&M Breakfast	7:00 a.m. – 8:30 a.m.
Tuesday, July 14	
NFPA Alumni and Friends Reception	6:00 p.m. – 8:00 p.m.

EXHIBIT HOURS

Sunday, July 12	7:30 p.m. – 9:30 p.m.
Monday, July 13	10:00 a.m. – 6:00 p.m.
Tuesday, July 14	10:00 a.m. – 6:00 p.m.

HOTEL INFORMATION

Hotel reservations can be made online at **www.foodprotection.org**.

The IAFP Annual Meeting Sessions, Exhibits and Events will take place or depart from the Gaylord Texan Resort.

Gaylord Texan Resort $169.00 per night

CANCELLATION POLICY

Registration fees, less a $50 administration fee and any applicable bank charges, will be refunded for written cancellations received by June 26, 2009. No refunds will be made after June 26, 2009; however, the registration may be transferred to a colleague with written notification. Refunds will be processed after July 20, 2009.

Event and extra tickets purchased are nonrefundable.

International Association for Food Protection®
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Des Moines, IA 50322-2864, USA
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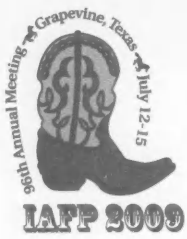


IAFP 2009 REGISTRATION FORM

3 Ways to Register

ONLINE
www.foodprotection.org

FAX
+1 515.276.8655

MAIL
6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2864, USA

Member Number: _____

First name (as it will appear on your badge) _____ Last name _____

Employer _____ Title _____

Mailing Address (Please specify: ❒ Home ❒ Work) _____

City _____ State/Province _____ Country _____ Postal/Zip Code _____

Telephone _____ Fax _____ E-mail _____

❒ Regarding the ADA, please attach a brief description of special requirements you may have.

❒ IAFP occasionally provides Attendees' addresses (excluding phone and E-mail) to vendors and exhibitors supplying products and services for the food safety industry. If you prefer NOT to be included in these lists, please check the box.

PAYMENT MUST BE RECEIVED BY JUNE 9, 2009 TO AVOID LATE REGISTRATION FEES

REGISTRATION FEES	MEMBERS	NONMEMBERS	TOTAL
Registration	$ 430 ($ 480 late)	$ 650 ($ 700 late)	_____
Association Student Member	$ 80 ($ 90 late)	Not Available	_____
Retired Association Member	$ 80 ($ 90 late)	Not Available	_____
One Day Registration* ❒ Mon. ❒ Tues. ❒ Wed.	$ 230 ($ 255 late)	$ 360 ($ 385 late)	_____
Spouse/Companion* (Name): _____	$ 60 ($ 60 late)	$ 60 ($ 60 late)	_____
Children 15 & Over* (Names): _____	$ 25 ($ 25 late)	$ 25 ($ 25 late)	_____
Children 14 & Under* (Names): _____	FREE	FREE	_____
*Awards Banquet not included			
Additional Awards Banquet Ticket – Wednesday, 7/15	$ 55 ($ 65 late)	$ 55 ($ 65 late)	_____
Student Luncheon – Sunday, 7/12	$ 10 ($ 15 late)		_____
DAYTIME EVENTS		**# OF TICKETS**	
Golf Tournament at Tour 18 – Saturday, 7/11	$ 145 ($ 155 late)	_____	_____
JFK and Dallas City Tour – Saturday, 7/11	$ 58 ($ 63 late)	_____	_____
Grapevine Historical Tour – Sunday, 7/12 (Lunch included)	$ 83 ($ 88 late)	_____	_____
Fort Worth Stockyards Tour – Monday, 7/13 (Lunch included)	$ 84 ($ 89 late)	_____	_____
Fort Worth Arts Tour – Tuesday, 7/14 (Lunch included)	$ 85 ($ 90 late)	_____	_____
EVENING EVENTS			
Monday Night Social – Texas Fun on the Ranch – Monday, 7/13	$ 45 ($ 55 late)	_____	_____
IAFP Foundation Fundraiser – Dinner at Cowboys Golf Club – Tuesday, 7/14	$ 140 ($ 150 late)	_____	_____
SPECIAL EVENTS			
NIFSI Project Directors Meeting – Saturday, 7/11	$ 80 ($ 90 late)	_____	_____
Texas A&M Breakfast – Tuesday, 7/14	$ 10 ($ 20 late)	_____	_____
NFPA Alumni and Friends Reception – Tuesday, 7/14	$ 35 ($ 45 late)	_____	_____
ABSTRACTS			
Annual Meeting Abstracts (citable publication to be mailed Sept. 1)	$ 30	$ 30	_____

Payment Options: ❒ **VISA** ❒ **Master Card** ❒ **American Express** ❒ **Discover**

❒ **Check Enclosed**

TOTAL AMOUNT ENCLOSED $ _____
US FUNDS on US BANK

CREDIT CARD # _____

CARD ID #* _____ EXP. DATE _____

SIGNATURE _____

*Visa, Mastercard and Discover: See 3-digit Card ID number on the back of the card after account number.
American Express: See 4-digit, non-embossed number printed above your account number on the face of your card.

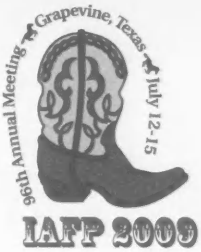
❒ Check box if you are a technical, poster, or symposium speaker.

Refunds subject to cancellation policy

JOIN TODAY AND SAVE!!!
(Attach a completed Membership application)

EXHIBITORS DO NOT USE THIS FORM

International Association for Food Protection



IAFP 2009 EXHIBITORS

as of March 4, 2009

3M Microbiology
Advanced Instruments, Inc.
Aemtek, Inc.
AES – Chemunex, Inc.
American Proficiency Institute
Analytical Food Laboratories
Applied Biosystems
ASI Food Safety Consultants
ASM Press
ATCC
BD Diagnostics
BioControl
BioLumix
bioMérieux, Inc.
Bio-Rad Laboratories
Charm Sciences
Chemstar Corporation
CRC Press – Taylor & Francis Group LLC
Decagon Devices, Inc.
Deibel Laboratories
DonLevy Laboratories
DuPont Qualicon
Ecolab Inc.
Elisa Systems
Exponent
Fisher Scientific
Food Quality Magazine, A Wiley-Blackwell Publication
Food Safety Net Services
Hanna Instruments, USA
Hardy Diagnostics
HiMedia Laboratories Pvt. Limited
Hygiena
Idaho Technology
IEH Laboratories & Consulting Group
Instant Recall by BellTower Technologies
International Food Information Council Foundation
LGC Standards
LITMUS RAPID-B, LLC
MATRIX MicroScience, Inc.
Michigan State University Online Master of Science in Food Safety
Microbial-Vac Systems, Inc.
MicroBioLogics, Inc.
Microbiology International
MO BIO Laboratories, Inc.
Nasco Whirl-Pak
The National Food Lab
Nelson-Jameson, Inc.
Neogen Corporation
Neutec Group, Inc
Nice-Pak Commercial
NSF International
Q Laboratories, Inc.
Quality Assurance & Food Safety Magazine
R&F Laboratories
Remel Inc. (Part of Thermo Fisher Scientific)
Rochester Midland Corporation, Food Safety Division
rtech laboratories
SGS
Silliker, Inc.
Society for Applied Microbiology
Springer
Steton
Strategic Diagnostics Inc.
Takara Bio
Tepnel Research Products & Services
University of Wisconsin-Madison Food Research Institute
Weber Scientific

COMING EVENTS

MAY

- **2–4, IDFA Spring Board Meeting,** The Wigwam Golf Resort and Spa, Phoenix, AZ. For more information, call Kellie Bland at 202.220.3557 or go to www.idfa.org.
- **4–6, Food Marketing Institute Future Connect Conference,** Hyatt Regency, Dallas, TX. For more information, go to www.fmifutureconnect.com.
- **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.
- **5–7, Sanitation Workshop,** Randolph Associates, Inc., Birmingham, AL. For more information, call 205.595.6455; E-mail: henry.randolph@raiconsult.com.
- **5–8, 2009 APHL Annual Meeting,** Egan Civic and Convention Center, Anchorage, AK. For more information, contact Terry Reamer at 240.485.2776; E-mail: terry.reamer@aphl.org.
- **6, Metropolitan Association for Food Protection Spring Seminar,** Rutgers University, Cook College Campus Center, New Brunswick, NJ. For more information, contact Carol Schwar at 908.475.7960; E-mail: cschwar@co.warren.nj.us or visit www.metrofoodprotection.org.
- **6–7, Associated Illinois Milk, Food and Environmental Sanitarians Spring Conference,** Eastland Suites, Bloomington, IL. For more information, contact Steve DiVincenzo at Steve.DiVincenzo@illinois.gov.
- **6–8, High-Throughput Methods for Detecting Foodborne Pathogens Workshop,** York College, Jamaica, NY. For more information, go to http://york.cuny.edu/conted/fdaworkshops/2008-fda-workshop/preliminary-program.
- **7–8, HACCP Workshop,** Nashville, TN. For more information, contact AIB International at 800.633.5137 or go to www.aibonline.org.
- **10–13, VTEC 2009 7th International Symposium on Shiga Toxin (Verocytotoxin) Producing *Escherichia coli* Infections,** Centro Cultural Borges, Bueno Aires, Argentina. For more information, go to www.vtec2009.com.ar/.
- **11–12, Introduction to HACCP,** (tentatively Eagan, MN). For more information, call 866.ECOSURI.
- **12–13, Dairy Cost Accounting Workshop,** Hyatt Rosemont, Rosemont, IL. For more information, call Kellie Bland at 202.220.3557 or go to www.idfa.org.
- **13–14, Implementing SQF 2000 Systems,** (tentatively Eagan, MN). For more information, call 866.ECOSURI.
- **13–14, Pennsylvania Association of Milk, Food and Environmental Sanitarians Meeting,** Nittany Lion Inn, State College, PA. For more information, contact Gene Frey at 717.397.0719; E-mail: erfrey@landolakes.com.
- **16–19, National Restaurant Association Show 2009,** McCormick Place, Chicago, IL. For more information, call 312.853.2525 or go to www.restaurant.org.
- **17–21, American Society for Microbiology 109th General Meeting,** Philadelphia, PA. For more information, call 202.737.3600 or go to http://gm.asm.org.
- **18–20, TAPPI's 12th European PLACE Conference,** Budapest, Hungary. For more information, call 1.800.446.9431 or go to www.tappi.org.
- **18–22, 2009 3-A SSI Education Meeting and Annual Meeting,** Milwaukee Airport Hotel and Convention Center, Milwaukee, WI. For more information, call 703.790.0295 or go to www.3-a.org.
- **18–22, Assessment of Laboratory Competence,** Southfield, MI. For more information, contact Julie Stevens at 301.644.3235; E-mail: jstevens@A2LA.org.
- **19–20, Arizona Environmental Health Association Conference and Membership Meeting,** ASU Memorial Union, Tempe, AZ. For more information, contact Tesann Achilles at 602.506.5359 or go to www.azeha.org.
- **25–27, Brazil Association for Food Protection Annual Meeting,** Conselho Regional de Quimica, São Paulo, Brazil. For more information, visit www.abrappa.org.

JUNE

- **1–3, Texas Association for Food Protection Annual Meeting,** Omni Southpark, Austin, TX. For more information, contact Toby Breland at 903.752.9459; E-mail: tobybreland@brookshires.com.
- **2–3, Principles of Inspecting and Auditing Food Plants Workshop,** San Antonio, TX. For more information, call AIB International at 800.633.5137 or go to www.aibonline.org.
- **3–6, 5th Med-Vet-Net Annual Scientific Meeting,** Euroforum Infantes, San Lorenzo de El Escorial, Madrid, Spain. For more information, call +34.913944097 or go to www.medvetnet.org/cms/.
- **3–6, HACCP Workshop for Packaging Suppliers Workshop,** Louisville, KY. For more information, call AIB International at 800.633.5137 or go to www.aibonline.org.
- **6–9, IFT Annual Meeting,** Anaheim Convention Center, Anaheim, CA. For more information, call 1.800.IFT.FOOD or go to www.am-fe.ift.org.
- **8–10, 2009 Midwest AOAC Annual Meeting and Exposition,** Embassy Suites on the River, Des Moines, IA. For more information, go to www.midwestaoac.org/2009Hotel_Information.html.
- **10–12, ISO/IEC 17025 and Accreditation,** Minneapolis, MN. For more information, contact Julie Stevens at 301.644.3235; E-mail: jstevens@A2LA.org.
- **17–18, IDFA Washington Conference,** Hotel Monaco, Washington, D.C. For more information, call Kellie Bland at 202.220.3557 or go to www.idfa.org.
- **19–26, Twenty-Ninth International Workshop/Sym-**

COMING EVENTS

posium–Rapid Methods and Automation in Microbiology, Kansas State University, Manhattan, KS. For more information, contact Dr. Daniel Y.C. Fung at 785. 532.1208; E-mail: dfung@ksu.edu.

- **21–24, NEHA's 73rd Annual Eduational Conference,** Atlanta, Georgia. For more information, call 303.756.9090 or go to www.neha.org.
- **24, New Zealand Association for Food Protection Annual Meeting,** Christchurch, New Zealand. For more information, contact David Lowry at 64.7.958.2306; E-mail: david.lowry@ecolab.com.
- **25–26, HACCP Workshop,** Harrisburg, PA. For more information, contact AIB International at 800. 633.5137 or go to www.aibonline.org.

JULY

- **1–3, National Association of Local Boards of Health 17th Annual Conference,** Philadelphia, PA. For more information, call 419.353.7714 or go to www.nalboh.org/NALBOH_Conference.htm.
- **6–9, Sfam Summer Conference 2009,** Manchester Metropolitan University, United Kingdom. For more information, go to www.sfam.org.uk/summer_conference.php.
- **9–10, HACCP Workshop,** Bloomington, MN. For more information, contact AIB International at 800. 633.5137 or go to www.aibonline.org.
- **10–11, IAFP Workshops,** Gaylord Texan Resort, Grapevine, TX. For more information, go to www.foodprotection.org.
- **12–15, IAFP 2009 Annual Meeting,** Gaylord Texan Resort, Grapevine, TX. For more information, go to www.foodprotection.org.
- **13–16, Australian Association for Food Protection Annual Meeting,** Brisbane, Australia. For more information, contact Ian Jenson at 61.2.9463.9264; E-mail: ijenson@mla.com.au.
- **22–25, HACCP Workshop for Packaging Suppliers,** Vancouver, WA. For more information, call AIB International at 800. 633.5137 or go to www.aibonline.org.
- **27–28, Engineering for Food Safety,** Manhattan, KS. For more information, contact AIB International at 800.633.5137 or go to www.aibonline.org.
- **29–31, The 2009 NACCHO Annual Conference,** Rosen Shingle Creek Resort, Orlando, FL. For more information, go to www.naccho.org/events/nacchoannual2009/.

AUGUST

- **9–13, Dietary Managers Association 49th Annual Meeting,** Hyatt Regency Atlanta On Peachtree Street, Atlanta, GA. For more information, call 800.323.1908 or go to www.dmaonline.org.

SEPTEMBER

- **8–12, 6th International Conference on Predictive Modeling in Foods,** Renaissance Washington, D.C. Hotel, Washington, D.C. For more information, contact Debbie Donze at ddonze@helmsbriscoe.com or go to www.6icpmf.org.
- **13–16, American Association of Cereal Chemists International Annual Meeting,** Baltimore Convention Center, Baltimore, MD. For more information, call 651.454.7250 go to www.aaccnet.org.
- **13–16, 123rd AOAC Annual Meeting,** Philadelphia, PA. For more information, go to www.aoac.org.
- **20–24, IDF World Dairy Summit–United Dairy World 2009,** Maritim Hotel Berlin, Berlin, Germany. For more information, go to www.wds2009.com.
- **22–24, New York State Association for Food Protection 86th Annual Conference,** Doubletree Hotel, East Syracuse, NY. For more information, contact Janene Lucia at 607.255.2892; E-mail: jgg@cornell.edu.
- **23–25, Washington Association for Food Protection Annual Conference,** Campbell's Resort, Lake Chelan, WA. For more information, contact Stephanie Olmsted at 206. 660.4594 or go to www.waffp.org.

IAFP UPCOMING MEETINGS

JULY 12-15, 2009
Grapevine, Texas

AUGUST 1-4, 2010
Anaheim, California

JULY 31-AUGUST 1, 2011
Milwaukee, Wisconsin

In Memory

Alfred Willy D. Acuna

Plano, Texas

We extend our deepest sympathy to the family of Alfred Acuna who recently passed away. IAFP will always have sincere gratitude for his contribution to the Association and the profession. Mr. Acuna has been a member of IAFP since 1999.

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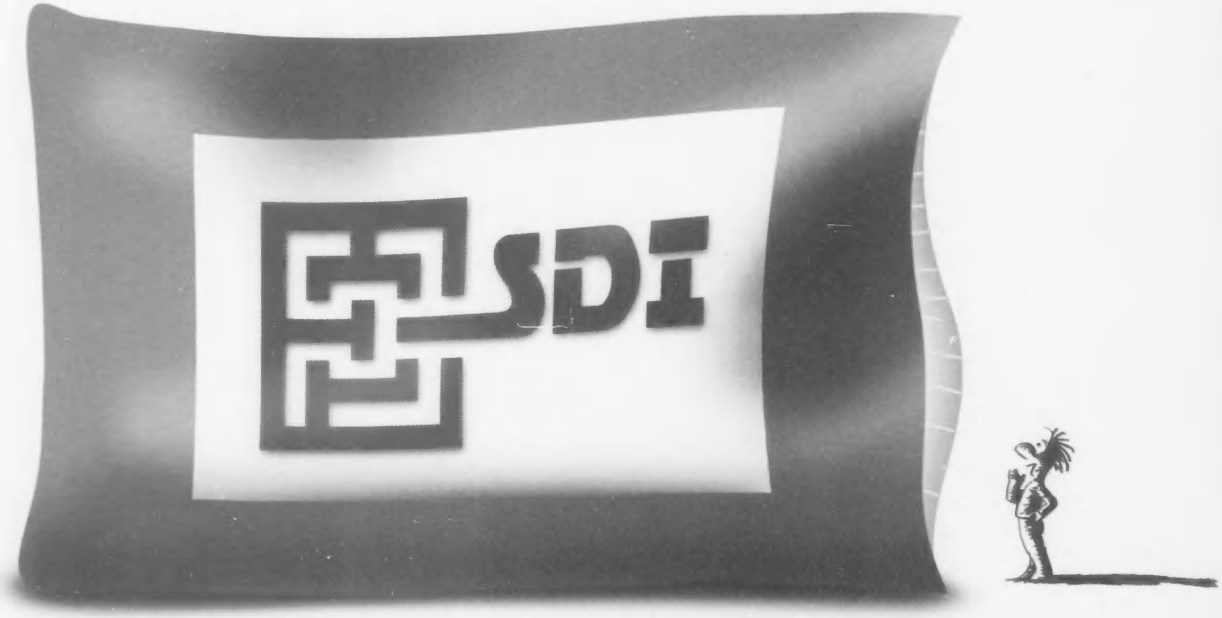

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