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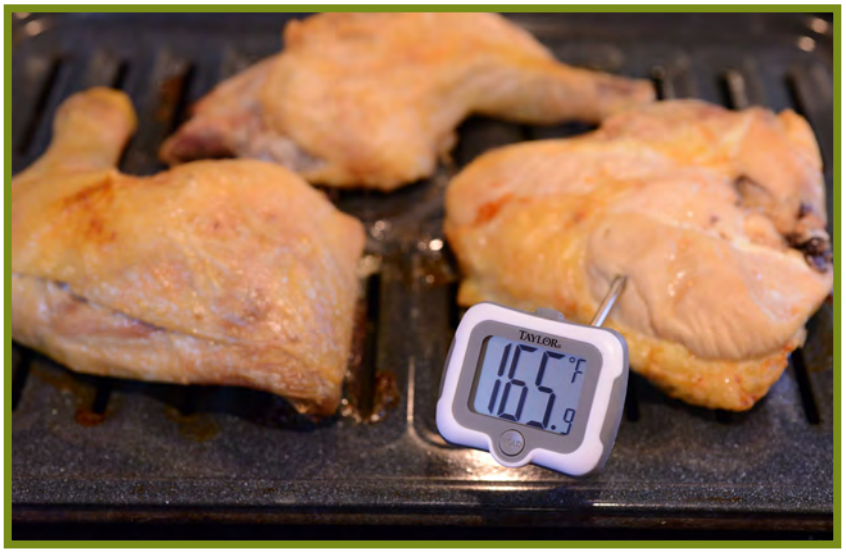

Barriers to Using a Food Thermometer When Cooking Poultry at Home: Results from a National Survey

ABSTRACT

Raw poultry may be contaminated with *Salmonella* and *Campylobacter,* so it is important that consumers properly handle and prepare poultry. Using a food thermometer is the only reliable way to ensure that poultry has reached a safe internal temperature. A nationally representative Web-enabled panel survey of U.S. adult grocery shoppers (n = 1,504) was conducted to describe consumers' handling and preparation practices for raw poultry. About 62% of consumers reported owning a thermometer. Among thermometer owners, the majority reported using one to determine doneness of whole turkeys (73.2%) and chickens (56.7%), but fewer used one to determine doneness of turkey breasts (42.6%), chicken breasts/other parts (26.3%), or patties (11.7%) made with raw ground poultry. Among owners who were nonusers, the majority reported using another method to determine doneness or reported they "never thought to use one." Few respondents expressed concerns on how to use a thermometer, or on ease or practicality of using one. Educators should address the unreliability of visual cues to determine doneness and emphasize that use of a thermometer is the only reliable way to ensure that bacteria are destroyed. It is also important to convey the risk of contracting *Salmonella* and *Campylobacter* infection from eating raw/undercooked poultry.

INTRODUCTION

Poultry is the food commodity most often implicated in foodborne illness outbreaks *(3, 27)*. Research has estimated that 70% of foodborne illnesses caused by *Campylobacter* are associated with poultry *(3)*, and CDC *(10)* estimates that 30% of foodborne illnesses caused by *Salmonella* are associated with poultry. Despite improved government standards and interventions to control *Salmonella* and *Campylobacter* contamination, consumers play a very important role in controlling *Salmonella* and *Campylobacter* infections by properly storing, handling, and preparing raw poultry when cooking at home. According to USDA, using

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a food thermometer is the only reliable way for consumers to ensure that poultry has reached the safe minimal internal temperature of 165°F and vegetative foodborne pathogenic bacteria have been destroyed *(40)*.

According to findings from a Food and Drug Administration (FDA) study *(22)*, food thermometer ownership has increased significantly, from 49% in 1998 to 70% in 2010. However, many consumers still do not use a food thermometer or are much more likely to use a food thermometer for roasts and whole turkeys than for smaller cuts of meat such as chicken and patties *(1, 18, 22, 25, 28, 34)*. For example, in an observational study, Anderson et al. *(1)* found that only five of 99 participants used a food thermometer to determine the doneness of a meat, poultry, or seafood. In another observational study, Kendall et al. *(18)* found that 16% of participants used a food thermometer to determine the doneness of chicken breasts or hamburger patties. Perceived barriers to action may impede consumer motivation to adopt new behaviors *(17)*, such as using a food thermometer. However, few studies have examined the barriers to using a food thermometer *(25, 26, 37)*. Furthermore, we are not aware of a nationally representative survey that quantifies these barriers.

To characterize consumer food thermometer use and barriers to use, we conducted a national survey of adult grocery shoppers to collect up-to-date information on consumer ownership and use of food thermometers for different cuts of poultry and to identify reasons why consumers did not use a food thermometer despite having one available as well as to identify the methods used to determine doneness in lieu of using a food thermometer. Obtaining a better understanding of consumer failure to use a food thermometer will provide useful information for developing messages that will motivate consumers to follow recommended cooking practices.

MATERIALS AND METHODS

The survey administration and analysis procedures are described in the following sections. RTI International's Committee for the Protection of Human Subjects, which serves as RTI's Institutional Review Board, reviewed and approved the study protocol.

Sample

The survey sample was selected from KnowledgePanel®, a Web-enabled panel developed and maintained by GfK Custom Research (New York, NY). The Web-enabled panel is statistically representative of the U.S. population *(36)*. The panel is constructed by use of a probabilistic address-based sampling (ABS) method that uses probability-based sampling of addresses from the U.S. Postal Service's Delivery Sequence File, which is a published sample frame of residential addresses that covers approximately 97% of all U.S. households, including Internet and non-Internet households and cell phone–only households. From the ABS sample, households were randomly selected to participate on the panel. Selected panelists can indicate their willingness to join the panel via mail, phone, or a Web site. Individual panelists who do not have a computer or Internet access are provided free basic laptops with Internet access in exchange for serving as panelists *(15)*.

At the time of sample selection, about 50,000 panel members were actively participating in the Web-enabled panel. All new panel members complete an initial survey that collects information on demographic characteristics to create member profiles, which can be used for sample selection and weighting. A sample of 4,531 adult panel members who had primary or shared responsibility for their household grocery shopping was randomly selected to receive the survey.

Survey procedures and response

The questionnaire was e-mailed to a random sample of panel members aged 18 years or older who had primary or shared responsibility for their household grocery shopping. Selected panel members were eligible to participate if they did at least half of the household grocery shopping and had prepared raw poultry and eggs in the past 30 days. To maximize response rate, we sent two e-mail reminders to nonrespondents. Data were collected over a 14-day field period in September 2013. On average, respondents completed the survey in 14 minutes.

Questionnaire

The questionnaire was developed using new and previous measures developed by the authors. A copy of the 67-item questionnaire is available upon request. The questionnaire asked respondents a series of questions to collect information on self-reported behavior the last time they had purchased and prepared: (1) raw poultry (e.g., whole turkey or chicken, turkey or chicken breasts or other chicken parts, such as legs or thighs); (2) raw ground poultry; and (3) shell eggs. To encourage respondents to report their actual behavior rather than their perceived usual behavior and to help minimize biases associated with self-reporting and socially desirable responses, we asked respondents to report on the last time they handled and prepared these products at home. This article reports on self-reported food thermometer ownership, on use of food thermometers, and on barriers to using a food thermometer.

Respondents were first asked to report whether they own a food thermometer. Respondents were instructed not to include candy thermometers, thermometers used to check frying oil temperature, and pop-up thermometers. Respondents who owned a food thermometer were then asked to indicate whether they used a food thermometer to check for doneness the last time they cooked the following products: whole turkeys, turkey breasts, whole chickens,

chicken breasts or other parts (e.g., legs or thighs), meatloaf or similar dish containing ground chicken or ground turkey, and patties made with ground chicken or ground turkey. Respondents who cook whole turkeys/chickens, turkey/chicken breasts or other chicken parts, or dishes (e.g., meatloaf) or patties made of raw ground poultry and did not use a food thermometer the last time they cooked the item were asked to select: (1) the reason(s) they did not use a food thermometer and (2) the method(s) they used to determine doneness. Respondents could select multiple response items when answering these questions, including "other," and could enter a "write-in" response if they had selected "other." It was not necessary to collect information on demographic characteristic because this information was available from the initial survey completed by panelists (which is updated on an ongoing basis).

By use of cognitive interviewing techniques *(46)*, the survey instrument was evaluated with six adults prior to survey administration and was subsequently refined. Additionally, with a sample of 30 panel members from the study target population, a pretest was conducted to test whether the programmed instrument was functioning correctly and to estimate the survey eligibility rate and the median survey length.

Analysis

Analysis weights were developed by use of standard poststratification weighting procedures, which adjust for survey nonresponse and noncoverage, so as to result in demographic distributions that align with demographic benchmarks from the March 2013 Current Population Survey. The final weights were trimmed and scaled to sum to the total U.S. population of adult grocery shoppers; thus, the weighted survey results are representative of the U.S. population of adult grocery shoppers.

We analyzed the responses to the survey questions to estimate the weighted percentage of U.S. adult household grocery shoppers (referred to as "consumers" for brevity) who own a food thermometer and used one the last time they cooked different cuts of poultry at home. We then described the demographic and other characteristics of thermometer owners and users by examining the following variables: gender, age, education, marital status, race/ethnicity, annual household income, metropolitan statistical area (MSA) status, and presence of a household member who was at risk for foodborne illness, (i.e., at least one household member was an adult aged 60 years or older; a pregnant woman; a child aged 5 years or younger; or an individual diagnosed with diabetes, kidney disease, or another condition that weakens the immune system). A chi-square test was performed to test for relationships between the variable of interest and the demographic and other characteristics. Among food thermometer owners, we estimated weighted percentages for the questions on reasons for not using a food thermometer and methods used to determine doneness for different cuts of poultry in lieu of using a food thermometer. The analysis was conducted using SAS, Version 9.3 (SAS Institute Inc., Cary, NC).

RESULTS

Of the 4,531 sampled individuals, 2,686 responded to the survey, for a completion rate of 59.2%. Of these individuals, 1,182 were ineligible to take the survey because they did not meet the aforementioned screening criteria. The remaining 1,504 were eligible and completed the survey, for a qualification rate of 56%. *Table 1* provides the respondents' demographic characteristics. Of the 1,504 respondents, 67% were women. The majority of respondents were white, non-Hispanic (70.5%), age 30 to 59 (59.8%), and had attended or completed college (63.5%). About one-third of the respondents had one or more individuals in the household at risk for foodborne illness.

Sixty-two percent of consumers reported owning a food thermometer. *Table 2* presents the weighted percentage of U.S. consumers who reported owning and using a food thermometer the last time they cooked different cuts of poultry at home. Food thermometer usage was highest among consumers cooking whole turkeys (73.2% of food thermometer owners) and lowest among those cooking patties made with raw ground poultry (11.7% of food thermometer owners). Fewer than 10% of food thermometer owners used a food thermometer to check the doneness of all cuts of poultry that were asked about in the survey.

Analyses were conducted to describe the demographic characteristics of consumers who reported owning and using a food thermometer the last time they cooked different cuts of poultry. As shown in *Table 3*, individuals who had attended/completed college and those living in nonmetropolitan areas were significantly more likely to own a food thermometer than were individuals with a high school education or less ($P \leq .05$) or those living in metropolitan areas ($P \leq .001$). Food thermometer owners who had attended/completed college ($P \leq .01$) and those living in nonmetropolitan areas ($P \leq .001$) were significantly more likely to use a food thermometer to check the doneness of large cuts of poultry than were those with less education and living in metropolitan areas. Food thermometer owners with one or more household members at risk for foodborne illness (i.e., at least one household member was an adult age 60 years or older; a pregnant woman; a child age 5 years or younger; or an individual diagnosed with diabetes, kidney disease, or another condition that weakens the immune system) were significantly less likely than others to use a food thermometer to check the doneness of small cuts of poultry ($P \leq .01$).

TABLE 1. Demographic characteristics of survey respondents

	n	Weighted %
Gender		
Female	1,003	67.0
Male	501	33.0
Age		
18–29	129	14.4
30–44	365	28.2
45–59	517	31.6
60+	493	25.9
Education		
Less than high school	72	7.8
High school	411	28.6
Some college	482	31.6
Bachelor's degree or higher	539	31.9
Race/Ethnicity		
White, non-Hispanic	1,178	70.5
Black, non-Hispanic	131	10.7
Hispanic	98	11.4
Other, non-Hispanic	97	7.4
Annual Household (HH) Income		
Less than $35,000	373	28.0
$35,000 or more	1,131	72.0
Marital Status		
Married	939	58.8
Divorced	184	11.8
Never married	175	14.8
Living with partner	113	8.9
Widowed	64	3.6
Separated	29	2.1
Metropolitan Statistical Area (MSA) Status		
Metro	1,263	84.1
Nonmetro	241	15.9
At-Risk Individual in HH[a]		
60 years or older	593	33.5
Pregnant	20	2.0
5 years of age or younger	152	12.4
Diagnosed with diabetes or kidney disease	196	12.4
Diagnosed with condition that weakens the immune system	46	3.0

Number of survey respondents = 1,504
[a]Respondents could select multiple responses.

TABLE 2. Number and weighted percentage of respondents who reported owning and using a food thermometer the last time they cooked poultry at home

	n[a]	Weighted Percentage	SE[a]
Own food thermometer	987	62.0	1.6
Used food thermometer to measure internal temperature last time cooked the food[b]			
Whole turkeys (780)	572	73.2	1.9
Whole chickens (685)	375	56.7	2.3
Turkey breasts (549)	244	42.6	2.6
Chicken breasts or other (871)	228	26.3	1.8
Meatloaf or similar dish containing ground poultry (702)	159	22.8	1.9
Patties made with ground poultry (632)	77	11.7	1.5

Number of survey respondents = 1,504

[a]n, number of respondents; SE, standard error.

[b]Number in parentheses is the number of respondents who owned a food thermometer and cooked the food.

As shown in *Table 4*, food thermometer owners identified various reasons for not using a food thermometer the last time they cooked poultry at home. For all cuts of poultry, the most common reason selected for not using a food thermometer was use of another method to determine doneness (49.8 to 61.5% of respondents). The next most common reason selected was "I never thought to use one" (27 to 37.6% of respondents). About 26% of respondents reported not using a food thermometer when cooking breasts or other parts because the pieces are too small.

Food thermometer owners reported using other methods, in lieu of using a food thermometer, to determine doneness the last time they cooked poultry at home *(Table 5)*. For whole turkeys/chickens, the most common methods were relying on cooking time (42.4% of consumers), cutting food to check that it was no longer pink (42.4% of consumers), and checking to see if juices ran clear (41% of consumers). Similarly, to determine doneness of turkey/chicken breasts or other chicken parts, 67.7% of consumers cut and checked that it was no longer pink, 46.2% of consumers relied on cooking time, and 40% of consumers checked to see if juices ran clear. To determine doneness of dishes made with raw ground poultry, 61.5% of consumers inserted a knife, toothpick, or other utensil into the dish and checked that it came out clean, and 55.4% of consumers relied on cooking time.

DISCUSSION

To reduce the risk of foodborne illness, consumers should cook poultry to a minimum internal temperature of 165°F (74°C). Using a food thermometer is the only reliable way to determine whether the safe internal temperature has been reached. This study found that 62% of consumers reported owning a food thermometer; however, owners generally used the thermometer only when cooking whole turkeys or chickens; fewer consumers used them to check the doneness of poultry parts and dishes or patties made with raw ground poultry. It is not known, however, whether respondents cooked poultry to a safe minimum internal temperature of 165°F. In addition, the findings suggest that consumers who have attended/completed college and those living in nonmetropolitan areas are more likely to own and/or use a food thermometer. Of particular concern is the finding that individuals with a household member at risk for foodborne illness are significantly less likely than other consumers to use a food thermometer to check the doneness of small cuts of poultry.

The 2010 FDA Food Safety Survey *(42)*, a random-digit-dialing telephone survey of 4,568 English- or Spanish-speaking, noninstitutionalized U.S. adults, found that 66% of consumers reported owning a food thermometer, of whom 28% "always" or "often" use it to check the internal temperature of smaller cuts of poultry. These findings are generally similar to those from the current study, in which 62% of consumers reported owning a food thermometer, of whom 26% used it to check the internal temperature of chicken breasts or other cuts of poultry.

Consumer studies have identified a variety of motivational, behavioral, and social barriers to safe food handling practices *(11, 33)*. Shapiro and colleagues *(34)* suggest that consumers would be more likely to use food thermometers if educational materials and programs specifically address how they can overcome the barriers to action. In the current study, among thermometer owners

TABLE 3. Demographic characteristics of respondents who reported owning and using a food thermometer to cook poultry (weighted percentages)

	Own food thermometer and used it to check doneness last time cooked poultry		
	Own food thermometer (%) Yes (%)	Large cuts[a] Yes (%)	Small cuts[b] Yes (%)
Gender			
Female	67.7	69.9	29.2
Male	69.8	74.7	32.9
Age			
18–29	61.9	63.9	36.1
30–59	69.3	72.3	32.0
60+	69.5	73.1	24.5
Education			
High school graduate or less	62.8	63.6	30.4
Some college or college degree	71.0*	75.4**	30.5
Race/Ethnicity			
White, non-Hispanic	68.8	72.0	29.5
Other race or ethnicity	67.1	70.1	33.7
Annual household (HH) income			
Less than $35,000	65.9	67.9	31.6
$35,000 or more	68.9	72.4	30.2
Marital Status			
Married	70.1	72.7	28.2
Not married	65.1	69.2	35.0
Metropolitan statistical area (MSA) status			
Metro	52.8	56.6	22.9
Nonmetro	71.1***	74.2***	31.8
At-risk individual in HH			
Yes	66.1	71.9	25.7
No	71.3	71.2	36.7
Number in HH			
One person	60.7	67.1	30.4
Two or more people	69.7	72.2	30.5

[a]Large cuts consisted of whole turkeys (n = 780), whole chickens (n = 685), and turkey breasts (n = 549). Respondents were included in the analysis if they cooked at least one of these items.

[b]Small cuts consisted of chicken breasts or other parts (n = 871), meatloaf or similar dish containing ground poultry (n = 702), and patties made with ground poultry (n = 632). Respondents were included in the analysis if they cooked at least one of these items.

*The *P*-value for the chi-square statistic for test of difference in proportion is statistically significant at ≤ .05.

**The *P*-value for the chi-square statistic for test of difference in proportion is statistically significant at ≤ .01.

***The *P*-value for the chi-square statistic for test of difference in proportion is statistically significant at ≤ .001.

TABLE 4. Reasons respondents who own a food thermometer did not use it the last time they cooked poultry (weighted percentages)

Reasons[a]	Whole turkey or chicken (n = 394)[b]	Turkey/chicken breasts or other chicken parts (n = 744)[b]	Raw ground poultry[c] (n = 646)[b]
I used another method to determine whether food was done and ready to eat	61.5	56.1	49.8
I never thought to use one	27.0	28.7	37.6
I used a pop-up thermometer *(write-in)*	5.7	NA	NA
I'm not sure if it is accurate or works properly	5.6	3.8	2.7
I forgot I had one	5.5	4.0	3.1
It is not practical to use	3.2	8.7	6.3
I don't need one/I'm experienced *(write-in)*	2.2	2.4	1.9
It takes too much time	2.1	1.8	1.7
It is not easy to find it when I need it	2.0	2.0	1.5
I don't know how to use one	1.8	1.2	1.0
It doesn't work	0.8	0.7	1.0
It is too hard to use	0.8	1.4	0.8
Other	1.5	10.3	1.7
Chicken pieces are too small	NA	25.5	NA
Grill is too hot	NA	4.1	NA
I didn't know I was supposed to use one	NA	NA	12.1

[a]Respondents could select multiple responses.
[b]n, number of respondents who cooked the food.
[c]Includes meatloaf or a similar dish or patties made with ground raw chicken or turkey.
NA = Not applicable

who did not use a food thermometer, most reported using another method to determine doneness or that they "never thought to use one," suggesting that these respondents do not consider it very important to use a food thermometer. Few respondents reported concerns regarding how to use a food thermometer, ease of use, or practicality of using one. In lieu of using a food thermometer, respondents most commonly determined the doneness of poultry by using visual cues (i.e., color, juice clarity, and cleanliness of probing utensil). Based on consumer focus group research sponsored by USDA, FSIS *(21, 38, 39, 41)*, consumers generally rely on visual inspection (e.g., the color of the meat and/or juices) to determine the doneness of smaller cuts of poultry instead of using a food thermometer. Visual inspection of doneness, however, is a potentially unsafe practice according to Byrd-Bredbenner et al. *(7)*, who concluded in their summary of the food safety literature that 70% of chicken pieces visually judged by consumers as "done" had not reached the safe internal temperature and had active *Campylobacter jejuni* cells present *(4, 19)*. In an observational study conducted by Bruhn *(5)*, 40% of the chicken considered "cooked" by food preparers did not reach the safe internal temperature. Phang and Bruhn *(28)* suggest educating consumers about the unreliability of visual cues to determine doneness and about the risk of foodborne illness resulting from unsafe food-handling practices at home.

A poor understanding of the nature, source, and frequency of foodborne illnesses can also be a barrier to adopting recommended food safety practices *(2, 43)*. Although one in six Americans suffers from foodborne illness each year *(31, 32)*, according to a 2013 national survey, only 19.4% of U.S. adults believe they have had foodborne illness caused by food prepared in the home *(8)*. According to the 2010 Food Safety Survey *(42)*, 50% of consumers think it is "not very common" for Americans to get foodborne illness because of the way food is prepared in their home, and 57% of consumers think it is more

TABLE 5. Methods used to determine doneness of poultry among respondents who own a food thermometer and did not use it (weighted percentages)

Methods[a]	Whole turkey or chicken (n = 394)[c]	Turkey/chicken breasts or other chicken parts (n = 744)[c]	Raw ground poultry[b] (n = 646)[c]
Relied on cooking time	42.4	46.2	55.4
Cut food and checked no longer pink	42.4	67.6	21.0
Checked the juices ran clear *(write-in for raw ground poultry)*	41.0	40.0	0.4
Relied on pop-up thermometer	28.7	4.6	NA
Tasted food	6.5	6.3	20.9
Touched food with my finger, and it was firm	5.3	5.9	4.7
Meat fell off the bone *(write-in)*	5.0	1.8	NA
Didn't need one/experienced *(write-in)*	0.4	0.9	0.8
Other	0.9	1.2	0.7
Inserted knife, toothpick, or other utensil, and it came out clean	NA	NA	61.5
Checked the outside was right color of brown	NA	NA	7.0
Cooked food until well done or overcooked (write-in)	NA	NA	0.2
Looked at food *(write-in)*	NA	0.9	0.8

[a]Respondents could select multiple responses.
[b]Includes meatloaf or a similar dish or patties made with ground raw chicken or turkey.
[c]Only respondents who own a food thermometer and did not use it the last time they cooked poultry answered this question.

common for Americans to get foodborne illness from eating restaurant food than from eating food prepared at home. However, experts agree the home is the primary location where foodborne disease outbreaks occur *(6, 7, 20, 24, 35)*. According to well-known health behavior models, to motivate behavior change, people must feel susceptible to the illness and feel that the illness is severe enough to warrant action *(17)*. In focus groups with older adults, Cates et al. *(9)* found that using a narrative to convey the susceptibility and severity of listeriosis sparked emotion and concern among participants and helped illustrate the potential severity of listeriosis. Similarly, Medeiros and colleagues *(26)* found that relating the practice of safe food handling to health can be effective in motivating at least older adults to use food thermometers. Thus, we recommend providing consumers with accurate information on the risks of illness and death associated with foodborne disease.

As with any survey, survey nonresponse may result in nonresponse bias. Although previous research conducted using KnowledgePanel® found no association between the type of sample (nonresponders versus consumers) and the survey responses *(16)*, the extent of nonresponse bias was not assessed for this study. Furthermore, several studies have concluded that self-reported practices as reported in surveys are often poor predictors of consumers' actual food handling practices *(11–14, 29, 30, 44, 45)*. For example, of those who owned a food thermometer, 20% of primary meal preparers reported using one to determine the internal temperature of chicken products, but when observed, only five participants (12%) used a food thermometer to determine doneness, and only three participants used one correctly *(13)*. To help minimize self-reporting bias, we asked respondents to consider what they actually did the last time they cooked poultry at home; thus, we were more likely to elicit respondents' actual behavior instead of their knowledge of recommended food safety practices or their usual practice. Another concern when conducting surveys is social desirability bias, in which respondents tend to report what they perceive to be the acceptable or "correct" behavior, which can overstate actual behavior *(23)*. Thus, asking about the last time the respondent prepared the product may help minimize social desirability response bias as well.

In conclusion, we recommend that educational materials assigned to promote food thermometer usage (1) address the unreliability of visual cues to determine doneness; (2) emphasize that foodborne illness frequently occurs in the home; and (3) explain the potential severity of *Salmonella* and *Campylobacter* infections caused by eating raw or undercooked poultry prepared at home. In addition, educational materials should emphasize that using a food thermometer is the only reliable way to ensure that pathogenic microorganisms have been inactivated. Findings from this study can be used to develop targeted consumer educational materials and interventions.

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In Memory

Dr. Yi-Cheng Su

We extend our deepest sympathy to the family of Dr. Yi-Cheng Su who recently passed away. Dr. Su was a member of the Association since 2000. IAFP will always have sincere gratitude for his contribution to the Association and the profession.

Assistant Professor of Food Microbiology

PennState

The Department of Food Science at The Pennsylvania State University is seeking an Assistant Professor of Food Microbiology (70% Teaching; 30% Research) to enhance educational programs in food safety. This is a 36-week appointment. The Department, housed in the Erickson Food Science Building, has state-of-the art research and teaching labs, three specialized and dedicated pilot plants, and the Berkey Creamery. The successful candidate will join a dynamic, productive, and collaborative faculty in a vibrant and growing Department. For more information on the department, visit http://foodscience.psu.edu. Teaching Responsibilities: The successful candidate will be expected to develop and teach courses at the undergraduate and graduate level in topics related to food microbiology, reducing microbial risks in foods, and other areas that will prepare students for careers in industry, regulatory agencies, and academia. In addition, the person in this role will be expected to advise undergraduate students; supervise graduate students in thesis research projects and participate in the outreach activities and programs of the department, college and university, as appropriate. Research Responsibilities: The successful candidate will be expected to establish an externally-funded research program in an area of food microbiology. Research interests should complement existing Departmental research and Extension activities in microbial food safety. The successful candidate will be encouraged to develop appropriate collaborations within the Food Science Department or with other units across Penn State such as the Interdisciplinary Program in Bioinformatics and Genomics, the Genome Sciences Institute, the Huck Institutes of the Life Sciences, The Milton S. Hershey Medical Center, the Center for Molecular Immunology and Infectious Diseases, the Center for Infectious Disease Dynamics, Departments of Animal Science, Plant Sciences, and Veterinary and Biomedical Sciences and/or The E. coli Reference Center.

Qualifications: A Ph.D. in food science or a closely related field with demonstrated expertise in microbial food safety. Postdoctoral or industrial experience focused on food safety as well as experience in developing courses and teaching is highly desirable. The ability to work professionally with faculty, staff, and students from diverse populations required. The applicant should possess a willingness to work as part of a multidisciplinary team. Applicants should upload a (1) letter of application, (2) curriculum vitae, (3) academic transcripts, (4) teaching philosophy, (5) statement of research interests and (6) names of at least three professional references (including address, telephone and e-mail address). For additional information about this position, please contact: Luke LaBorde, Ph.D., Chair of Search Committee,
Phone: 814-863-2298; Email: LFL5@psu.edu. Review of applications will begin on March 27, 2017 and will continue until a suitable candidate is found. Anticipated start date is July 1, 2017 or as negotiated.

CAMPUS SECURITY CRIME STATISTICS: For more about safety at Penn State, and to review the Annual Security Report which contains information about crime statistics and other safety and security matters, please go to http://www.police.psu.edu/clery/, which will also provide you with detail on how to request a hard copy of the Annual Security Report.

Penn State is an equal opportunity, affirmative action employer, and is committed to providing employment opportunities to all qualified applicants without regard to race, color, religion, age, sex, sexual orientation, gender identity, national origin, disability or protected veteran status.

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