

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Public Access Theses and Dissertations from  
the College of Education and Human Sciences

Education and Human Sciences, College of  
(CEHS)

---

8-2013

## Food Safety of Native American Families with Young Children in Nebraska: A Mixed Methods Study

Kara A. Vlasin-Marty

University of Nebraska-Lincoln, kvlasin-marty@hotmail.com

Follow this and additional works at: <https://digitalcommons.unl.edu/cehsdiss>

---

Vlasin-Marty, Kara A., "Food Safety of Native American Families with Young Children in Nebraska: A Mixed Methods Study" (2013). *Public Access Theses and Dissertations from the College of Education and Human Sciences*. 186.

<https://digitalcommons.unl.edu/cehsdiss/186>

This Article is brought to you for free and open access by the Education and Human Sciences, College of (CEHS) at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Public Access Theses and Dissertations from the College of Education and Human Sciences by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

FOOD SAFETY OF NATIVE AMERICAN FAMILIES WITH YOUNG CHILDREN  
IN NEBRASKA: A MIXED METHODS STUDY

by

Kara A. Vlasin-Marty

A THESIS

Presented to the Faculty of  
The Graduate College at the University of Nebraska  
In Partial Fulfillment of Requirements  
For the Degree of Master of Science

Major: Nutrition and Health Sciences

Under the Supervision of Professor Julie A. Albrecht

Lincoln, Nebraska

August 2013

# FOOD SAFETY OF NATIVE AMERICAN FAMILIES WITH YOUNG CHILDREN IN NEBRASKA: A MIXED METHODS STUDY

Kara A. Vlasin-Marty, M.S.

University of Nebraska, 2013

Adviser: Julie A. Albrecht

Food safety knowledge, attitudes, and behaviors of Native American families with young children were studied using a mixed methods approach. Quantitative and qualitative data was collected together, analyzed separately, and compared. A food safety knowledge survey was created using the FightBac!™ concepts. A total of 102 participants completed the knowledge survey during survey validation and as part of focus groups. Focus groups were conducted using a script based on the Health Belief Model to better understand the food safety beliefs and practices of Native Americans. Eight focus groups were conducted in Lincoln, Macy, Omaha, South Sioux City, Walthill (2), and Winnebago (2) at local community centers with a total of 66 participants. Participants were asked to complete the surveys before the focus group started. A majority of participants were female (81.4%), had at least a high school degree or some college, and were currently unemployed. Qualitative themes were: symptoms, consequences, and sources of foodborne illness; and misunderstanding of food that causes illness with food allergies or chronic diseases; and barriers to food safety including lack of control, time, money, and cooking knowledge; and preferred education methods and materials; and food preparation and practices in the Native American culture.

Specific food safety issues of concern were: bleach was used in dish water and cleaning solutions but the ratio of water to bleach was unknown and possibly misused; and a lack of knowledge to determine if meat has been cooked properly to kill harmful bacteria; and how to cool and store hot foods properly after cooking. They had a profound lack of trust in food prepared in restaurants. The knowledge score was  $45.4 \pm 6.6$  (61.4% correct) indicating a need for food safety education.

The participants were from Nebraska and not randomly selected, therefore the results cannot be generalized to the United States Native American population. Results will be used to develop a food safety education program for Native Americans in Nebraska.

## Author's Acknowledgements

No one can whistle a symphony. It takes a whole orchestra to play it. –H.E. Luccock

My deepest gratitude to:

Dr. Julie A. Albrecht, Dr. Ian Newman, Dr. Kaye Stanek Krogstrand, Dr. Christina Perry, Kristine Stenger, M.S., Mei Lum, Kelsey Crews, Maggie Siebert, M.S., Lindsey O'Connell, M.S., Grant Orley, Jeannie Pittam, Carol Larvick, Paula Ritter-Gooder, Nathan Marty, Gerald and Barb Vlasin, Ashley Vlasin, Stacy Parr, and all the employees of the focus group sites as well as all of the study participants.

## TABLE OF CONTENTS

LITERATURE REVIEW .....	1
METHODS .....	17
DATA ANALYSIS .....	20
RESULTS .....	22
DISCUSSION .....	37
REFERENCES .....	49

## MULTIMEDIA OBJECTS

FIGURE 1. LITERATURE REVIEW MAP .....	2
FIGURE 2. HEALTH BELIEF MODEL DIAGRAM .....	18
FIGURE 3. PROBABLE PREDICTIVE HEALTH BELIEF MODEL .....	42
TABLE 1. PARTICIPANT DEMOGRAPHICS .....	22
TABLE 2. QUANTITATIVE SURVEY FREQUENCIES .....	24
TABLE 3. QUALITATIVE THEME SUMMARY .....	29
TABLE 4. TOP FIVE FOODS MENTIONED IN FOCUS GROUPS .....	35
TABLE 5. MIXED METHODS SUMMARY .....	36
APPENDIX A. VALIDATION KNOWLEDGE SURVEY .....	53
APPENDIX B. FOCUS GROUP KNOWLEDGE SURVEY .....	64
APPENDIX C. FOCUS GROUP SCRIPT .....	73
APPENDIX D. VALIDATION CONSENT FORM .....	76
APPENDIX E. FOCUS GROUP CONSENT FORM .....	77
APPENDIX F. RECRUITMENT POSTER .....	79
APPENDIX G. PARTICIPANT INFORMATION FORM .....	80
APPENDIX H. RELIABILITY TEST .....	81
APPENDIX I. FOODS MENTIONED IN FOCUS GROUPS .....	82

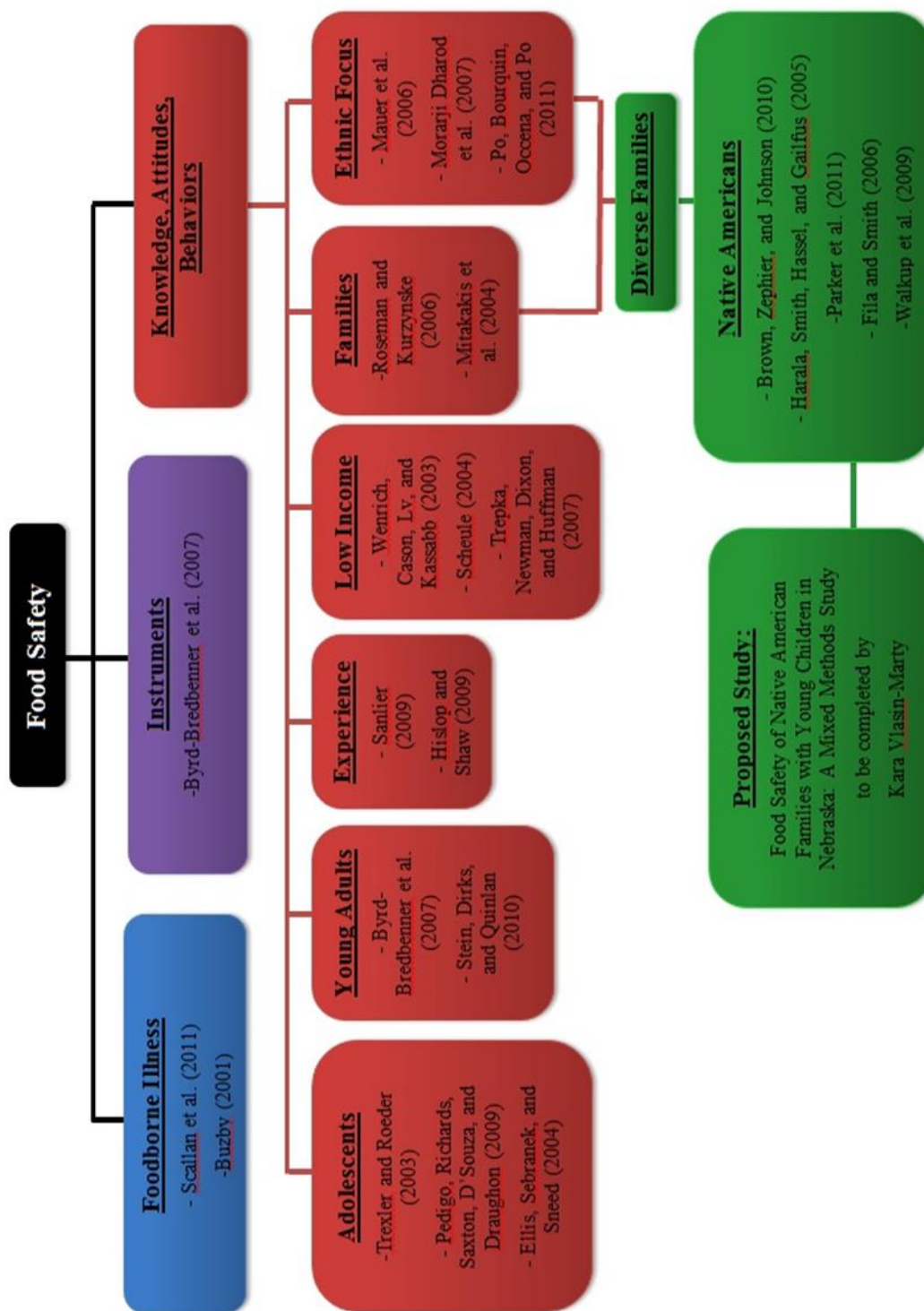
## Food Safety of Native American Families with Young Children in Nebraska: A Mixed Methods Study

### **Literature Review**

Incidence of foodborne illness (FBI) cases, hospitalizations, and deaths continues to be an issue in the United States as well as other countries. Many cases of FBI can be avoided if proper food safety procedures are followed. Procedures like washing hands, preventing cross contamination of raw meats and cooked meats or ready-to-eat items like vegetables, and ensuring meats have been cooked to high enough temperatures to kill bacteria are all simple yet effective measures that can prevent FBI.

Through this literature review, numerous studies have been conducted to determine food safety knowledge, attitudes, and behaviors of different populations. Despite the variety in populations studied (Figure 1.), no research has been completed focused solely on the food safety knowledge, attitudes, and behaviors of Native Americans. This literature review demonstrates the extent to which certain populations have been studied in relation to food safety and the absence of research conducted on Native American populations regarding food safety.

**Figure 1. A Literature Map Demonstrating Current and Proposed Studies in the Area of Food Safety**





## **Foodborne Illness**

Scallan et al. (2011) used data provided by the Centers for Disease Control and Prevention (CDC) to determine estimates of FBIs, hospitalizations, and deaths in the United States caused by 31 specific pathogens. Based on the 2006 population of 299 million, Scallan et al. (2011) determined tainted food containing these pathogens cause an estimated 9.4 million cases of FBI, almost 56,000 hospitalizations, and over 1,300 deaths. The pathogens most responsible for deaths were nontyphoidal *Salmonella* spp., *T. gondii*, *L. monocytogenes*, and norovirus. Knowing the magnitude of these pathogens and the pathogens causing the most havoc helps food safety educators focus their education to have the greatest impact in preventing FBI cases.

Buzby (2001) also used data from the CDC to determine which populations are most effected by FBI. Buzby (2001) found children are most at risk of contracting FBI due to their developing immune systems. Infants and children under age 10 had a higher incidence of *Salmonellosis*, *Listeriosis*, and *E. coli* O157:H7 disease, all of which are most likely to be contracted from contaminated food. Such FBIs can lead to long term health problems and death of infants and children as well as an estimated cost of 2.3 billion dollars a year. Considering infants and children do not prepare their own food, it is important to focus food safety education on the main food preparer in a family to decrease the incidence of FBI of these populations and ultimately decrease the costs resulting from these FBIs.

## **Instruments**

Byrd-Brenner et al. (2007) developed a survey to be used as a valid method of assessing the food safety knowledge of adults. The online survey was taken by 4343 college students ranging in ages from 17 to 26. Most of the participants were female, Caucasian, and had never worked as a food preparer or taken a food safety certification class. The survey had a mean difficulty index of 0.61 and a majority of the questions were in an acceptable range of difficulty. Questions on foodborne pathogens were found to be the most difficult. The survey was found to have a reliability of 0.91.

### **Food Safety Knowledge, Attitudes, and Behaviors of Adolescents**

Through concept maps and interviews, Trexler and Roeder (2003) were able to examine the food safety cognitions of fifth graders in a Midwestern school. Seven Caucasian students, three boys and four girls, were selected to participate in the qualitative study to determine what knowledge and experiences these students possessed of meat, how and why meat spoils, and whether or not the students' experience influenced their level of knowledge of meat spoilage. Students participated in an initial interview where the students' knowledge of meat spoilage was discussed. Students were then asked to draw a concept map depicting his or her knowledge of what causes meat spoilage and how to prevent such spoilage. A shorter, second interview was completed two weeks after the first interview to allow the interviewer to verify his or her understanding of the student's concept map and to give the student the option of changing his or her map. Trexler and Roeder (2003) discovered there were no connections between a student's experience with meat and the knowledge of meat spoilage. Most students did not know what causes meat to spoil but all of the students knew meat needed to be

refrigerated to prevent spoilage. Trexler and Roeder (2003) believe students and consumers in general need to be made aware of what causes food spoilage before methods of preventing spoilage can be successfully taught.

Pedigo, Richards, Saxton, D'Souza, and Draughon (2009) also used adolescents for their study to determine the gaps in food safety knowledge, attitudes, and behaviors of a diverse population of seventh graders and to find out if there was a connection between demographics and these gaps. Two hundred thirty-two students from 12 randomly selected schools in East Tennessee completed a survey consisting of demographic and food safety questions. A majority of these students were female and Caucasian but there were a small number of Native American students who participated. They found students who prepared both meals and snacks had better food safety attitudes and behaviors than those who prepared only snacks or did not prepare any foods. There were no significant differences in overall food safety knowledge between genders, but females scored remarkably higher in food safety attitudes and behaviors compared to males especially in relation to hygiene and hand washing. In terms of race, Caucasian participants scored higher in knowledge compared to Native American and Asian/Pacific students. Caucasian participants also scored higher in the attitudes and behavior components compared to Asian/Pacific students. This study demonstrates the value in studying various ethnic groups to fully grasp food safety education gaps across the United States.

Ellis, Sebranek, and Sneed (2004) studied high school students in Iowa to determine food safety perceptions in this group of adolescents. Two hundred eighty-nine students were recruited from randomly selected high schools to complete a survey

focusing on the knowledge of pathogens that cause FBI, perceptions of FBI, and participant demographics. Participants who had experience handling food, scored higher in food safety knowledge compared to participants who had no experience handling food. Students were found to be most concerned with contracting a FBI from meat products. It was also determined students felt they had more control over the safety of food in their home compared to food at school or restaurants. Consequently, participants felt they were more likely to contract FBI at school or a restaurant than from food cooked at home.

### **Food Safety Knowledge, Attitudes, and Behaviors of Young Adults**

Byrd-Bredbenner et al. (2007) wanted to determine the food safety knowledge, attitudes, and behaviors of college students with the goal of creating a food safety program for college students promoted through various mediums. College students were recruited through teachers of general education classes to complete an online survey. A total of 4343 students across the United States completed the survey. Caucasians and females made up the majority of participants. Thirty-six participants were Native American. A majority of participants reported their initial food safety knowledge was gained from their parents. Female participants were found to have a higher level of food safety knowledge than males. It was also determined young adults were more likely to eat foods that have been known to cause FBI like raw cookie dough and sushi compared to other populations. It was also discovered a majority of participants are either thinking about or planning to improve their food preparation practices to increase the safety of their food.

Stein, Dirks, and Quinlan (2010) implemented the food safety program created by Bryd-Bredbenner et al. (2007). This study consisted of two components; an online survey to collect reference information of undergraduate students and a post survey evaluating the effectiveness of the food safety knowledge program promoted through various mediums. Over 1100 students completed the online survey which included demographic and food safety knowledge, attitudes, and behavior components. Slightly more males than females completed the survey and the majority of the participants were Caucasian. Only one Native American student participated in the survey. Overall, students believed they could prepare food safely but unfortunately their knowledge and behaviors did not support their beliefs. Only 421 students participated in the post survey of the food safety program. The post survey was not limited to students who had taken the survey prior to the program. Stein et al. (2010) did see an increase of food safety knowledge following the completion of the program but it is difficult to determine whether or not the increase was because of the program or because the participants had more food safety knowledge than those who were used in the baseline survey. However, it was determined that email and posters were the most effective mediums for connecting with college students.

### **Food Safety Knowledge, Attitudes, and Behaviors in Relation to Experience**

Sanlier (2009) wanted to determine the food safety knowledge, attitudes, and behaviors of two populations in Ankara, Turkey; youth (ages 14 to 19) and adults (ages 20 or older). A total of 1,461 participants (815 youth and 646 adults) completed a survey as well as an interview. The interview was only to inform the participants about the purpose of the study. Surveys consisted of a demographic component as well as food

safety knowledge and practices components. Participants were recruited at large retail establishments, high schools, and at their homes. The study found youth were more likely than adults to eat raw egg containing foods and leave perishable foods out longer than two hours before refrigerating. Adults were also found to have significantly better hand washing practices than the youth. Overall the adults had a higher level of food safety knowledge and behaviors than the youth. Researchers attributed the findings to age and the increase of experience with preparing food throughout one's life.

Hislop and Shaw (2009) compared food safety knowledge among foodservice workers who have or have not completed food safety training as well as whether or not experience from working in foodservice can increase food safety knowledge. Six hundred and thirty participants completed a standardized survey created by the Environmental Public Health Services. It was determined neither length of time since food safety certification training or years of experience in foodservice among noncertified participants increased the likelihood of receiving a passing score on the survey. The highest survey failure rate was reported for participants who were not certified and had more than 10 years of foodservice experience. The second highest failure rate was reported for participants who had less than one year of foodservice experience and were not certified.

### **Food Safety Knowledge, Attitudes, and Behaviors of Low Income Populations**

Wenrich, Cason, Lv, and Kassabb (2003) conducted a study focusing on the food safety knowledge and behaviors of low income residents in Pennsylvania. Participants

were recruited through the state's Expanded Food and Nutrition Education Program (EFNEP) and the Food Stamp Nutrition Education Program (FSNEP), both of which are education programs for those living on a low income. A total of 139 participants completed a survey with demographic and food safety knowledge and behavior components. Most of the participants were Caucasian, female, and had a household income of less than \$15,000. Almost half of the participants stated they could tell if a food was contaminated with a foodborne pathogen by sight or smell. Only 35% of participants knew leftovers should be refrigerated immediately. Almost all of participants knew hands should be washed before preparing food but fewer participants were aware hands should be washed after handling raw meat or after going to the restroom. Participants also reported partaking in risky food behaviors like eating raw cookie dough and buying food from an unlicensed seller.

Scheule (2004) assessed the needs of clients in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) through the opinions of WIC professionals. One hundred and seventy WIC professionals completed a survey assessing the food safety education clients are provided, their perception of clients' food safety behavior, demographics of the professional, and what he or she found to be obstacles of providing food safety education in a clinical environment. Three-fourths of WIC registered dietitians, registered nurses, and dietetic technicians, registered reported providing food safety education to 20% of their clients daily. Most of those surveyed felt the food safety knowledge of WIC clients was poor and there is a great need for food safety education for their clients. The WIC professionals reported barriers to food safety

among clients which included low education and literacy levels, the absence of transportation to and from grocery stores, reluctance to throw away potentially contaminated food and baby formula due to cost, and homes without electricity or refrigeration.

Trepka, Newman, Dixon, and Huffman (2007) also focused on the food safety behaviors of WIC clients in Miami, Florida. Two hundred and ninety-nine WIC clients, consisting mostly of African Americans and Hispanics, completed a survey focused on food safety behaviors including food preparation, risky food consumption, and baby food and bottle handling. Only a quarter of participants reported using a thermometer to decide if meat was cooked adequately. Participants also reported leaving food, formula, or breast milk at room temperature for longer than two hours and improperly thawing foods at room temperature or in standing water. Since pregnant women and children are more susceptible to FBI, food safety education needs to be provided to correct current food mishandlings in this population.

### **Food Safety Knowledge, Attitudes, and Behaviors in Families**

Roseman and Kurzynske (2006) focused on the food safety attitudes, and behaviors of the primary food preparer in Kentucky households. Through randomized selection, 728 participants, mostly Caucasian and female, were recruited to complete a telephone survey. Participants (mainly female) who believed FBI to be more common, were more likely to stop eating a food they considered unsafe compared to males and those who considered FBI to be uncommon. Participants who believed FBI incidence to



be less common were also more likely to keep leftovers longer than three days, eat undercooked meat and raw eggs, and to demonstrate poor hand washing practices after touching raw meat.

Mitakakis et al. (2004) completed a study surveying individuals in four member families with at least two children in Melbourne, Australia. Participants in 524 households completed a survey based on the food safety recommendations of the Australian Food Safety Information Council and the Victorian Department of Human Services. Of those 524 households, 515 were also asked to complete a second survey on food refrigeration and thawing of chicken. A significant number of participants inconsistently washed their hands before handling food or touching raw meat. One in three participants also reported not properly sanitizing cutting boards used for raw meat before using them for cooked meat. A majority of participants (83.8%) improperly thawed chicken in their homes. Overall, almost all of participants failed in some aspect of food safety in their homes.

### **Ethnically Focused Food Safety Knowledge, Attitudes, and Behaviors**

Mauer et al. (2006) used an online survey to assess what food safety concerns food safety professionals had for ethnic foods. Over 340 national and international food safety professionals completed the survey which focused on the types of ethnic foods these professionals encounter along with their familiarity with such foods and what resources they use to educate themselves on unfamiliar foods. Chinese and Mexican or Latin American establishments were the most common ethnic foods encountered by the

professionals. Fifteen participants did report having encountered Native American establishments as well. Overall, issues of food temperature control, cross-contamination, and employee hygiene and illness in all ethnic food establishments were reported amongst the participants. A majority of participants reported using the Internet or the United States Food and Drug Administration Food Code as their primary source for ethnic food information while a significant amount of participants reported not using any sources of information about ethnic foods.

Morarji Dharod et al. (2007) focused on main food preparers in the Latino community in Hartford, Connecticut. Sixty Latino women were recruited to take part in this cross-sectional study. The purpose of the study was to determine whether or not there was a difference in the self-reported food safety behavior compared to observed food safety behavior. This four day study consisted of three meetings between participants and bilingual researchers. The first meeting was to provide participants with ingredients to prepare a meal of chicken and salad. Participants were told to put the chicken in the freezer, but to have it thawed for use in three days. During the second meeting of the study, participants were observed preparing the meal. During the final meeting participants were asked to complete a survey focused on food safety behaviors. Almost all of the participants reported thawing the chicken in the refrigerator however, researchers observed mixed methods of thawing the chicken in the refrigerator, in water, or on the counter being used. Proper thawing methods were more likely in participants who reported previous food safety education. A majority of participants misreported their hand washing throughout the meal preparation. Participants were also observed not using

thermometers to determine doneness of the chicken stating they had their own way of determining doneness or they did not know how to use a meat thermometer.

Po, Bourquin, Occena, and Po (2011) wrote an article discussing food safety education specifically for ethnic audiences. They believed food preparing habits of ethnic populations is influenced by their culture. The authors also stressed the importance of keeping a population's culture in mind when creating education programs and materials. Doing so can increase communication and overall acceptance of food safety concepts with ethnic populations. Finally, they encouraged educators to evaluate the level of acculturation of their ethnic audience before preparing education. Those who are more acculturated may be more accepting of information whereas those who are less acculturated may believe the less they follow food safety recommendations will make them more authentic and may not be accepting of information.

### **Native Americans**

According to Brown, Zephier, and Johnson (2010) Native Americans have changed their diets to include more nontraditional foods and practices common among the general United States population like convenience foods and excessive portion sizes. Most Native Americans receive government food assistance through commodities, WIC, and Food Stamps now known as the Supplemental Food Assistance Program (SNAP). Brown et al. (2010) also reported Native Americans are more likely to use traditional methods for medicine and illness like visiting healers, herbalists, and medicine men instead of physicians. Native Americans look to family members and elders for guidance.

As a nutrition professional, it is recommended to get family and elders involved in nutrition interventions to have the most success with compliance. Overall, the authors recommended establishing trust through respect and consideration for traditional beliefs to have the most success with counseling Native American populations.

A qualitative study conducted by Harala, Smith, Hasel, and Gailfus (2005) consisted of interviewing professionals who worked in both Native and non-Native institutions to discuss their recommendations for completing research involving Native Americans. A total of 20 participants who had previous experience in researching Native Americans were recruited and interviewed. Participants suggested researchers working with Native Americans should work to understand their culture and how it might differ from their own. Participants also believed it is important to keep Native American communities involved throughout the research process since Native Americans “on reservations feel that they’ve been stuck and probed many times” and “they’ve really come out on the short end of the deal” after being researched. (Harala et al., 2005) Overall, the professionals believed research involving Native American communities should be conscious and respectful of Native American culture, beneficial to the participants, and involve a mutual relationship of trust between communities and the researchers.

After completing focus groups with 42 Native American women of the Chickasaw Nation in Oklahoma, Parker et al. (2011) were able to develop a social marketing campaign addressing diabetes. Through the focus groups, it was revealed food availability, time constraints including work and school, money, and lack of child care

were the most common barriers to behavior change, to participating in diabetes education, and to eating healthy. One benefit of behavior change divulged by the participants was being able to be a role model for their children to live healthier lives. For future education programs, participants wanted them to be convenient and to include print materials with step-by-step instructions. Parker et al. (2011) also believed future education programs should include “opportunities for participants to come together and share experiences, which is in keeping with the oral traditions of the Native American populations.” (Parker et al., 2011)

Fila and Smith (2006) recognized Native American youth have a higher obesity rate than other populations in the United States. The researchers recruited 139 Native American adolescents of both genders, 9 to 18 years of age, to participate in their study. The participants completed a written survey focused on what foods the participants eat and why. Height and weight measurements were taken of each participant to calculate Body Mass Index. The researchers discovered a majority of the youth surveyed were either overweight or at risk of becoming overweight. Overall, gender of the adolescents had the most influence on their responses. Male participants’ behavior was most influenced by other people’s perceptions of the behavior and the individual’s perception of his control over the behavior. Female participants’ behavior was most predicted by perceived barriers to the behavior, personal attitudes about the behavior, their confidence in their ability to participate in a behavior, as well as other people’s perceptions of the behavior. A majority of female participants wanted to be thinner because they believed thinner people are the healthiest.

Walkup et al. (2009) acknowledged how Native American teens give birth more frequently compared to other races in the United States. The authors also acknowledged Native American mothers receive less prenatal and parenting education compared to other races. The purpose of this study was to determine if a Family Spirit intervention or a breastfeeding and nutrition program had a greater impact on mothers and infants. Both programs were delivered in Native American mothers' homes by paraprofessionals during pregnancy and through six months after giving birth. One hundred sixty seven participants were recruited and randomly assigned to one of the two programs. Both groups were evaluated four times throughout pregnancy to one year postpartum. Assessments included surveys focused on the mother's parenting knowledge and personal wellbeing. Infants were assessed for "social and behavioral outcomes." (Walkup et al., 2009) Almost half (47%) of the mothers were 14 to 17 years of age with the rest being 18 to 22 years of age. A majority of the participants were not married (92%) and did not have any additional children (90%). Mothers in the Family Spirit group had greater parenting knowledge than those in the breastfeeding and nutrition program. Infants of the Family Spirit group were also observed to have less behavioral issues than those in the other group.

### **Objective**

As this literature review demonstrated, numerous studies have been conducted on the food safety knowledge, attitudes, and behaviors of populations with demographics similar to Native Americans. Food safety studies have been completed on adolescents, young adults, low income groups, and families yet Native Americans have been highly

underrepresented or unrepresented in these studies. Native Americans are made up of mostly low income families with adolescents and young adults being the main food preparers who will ultimately have the greatest influence on decreasing FBI in their homes. Further research needs to be conducted focusing on the main food preparer of Native American families with young children to prevent FBI incidence of this population. The purpose of this study was to determine the food safety knowledge, attitudes, and behaviors of the main food preparer in Native American families with young children age 10 or younger.

## **Methods**

### **Quantitative**

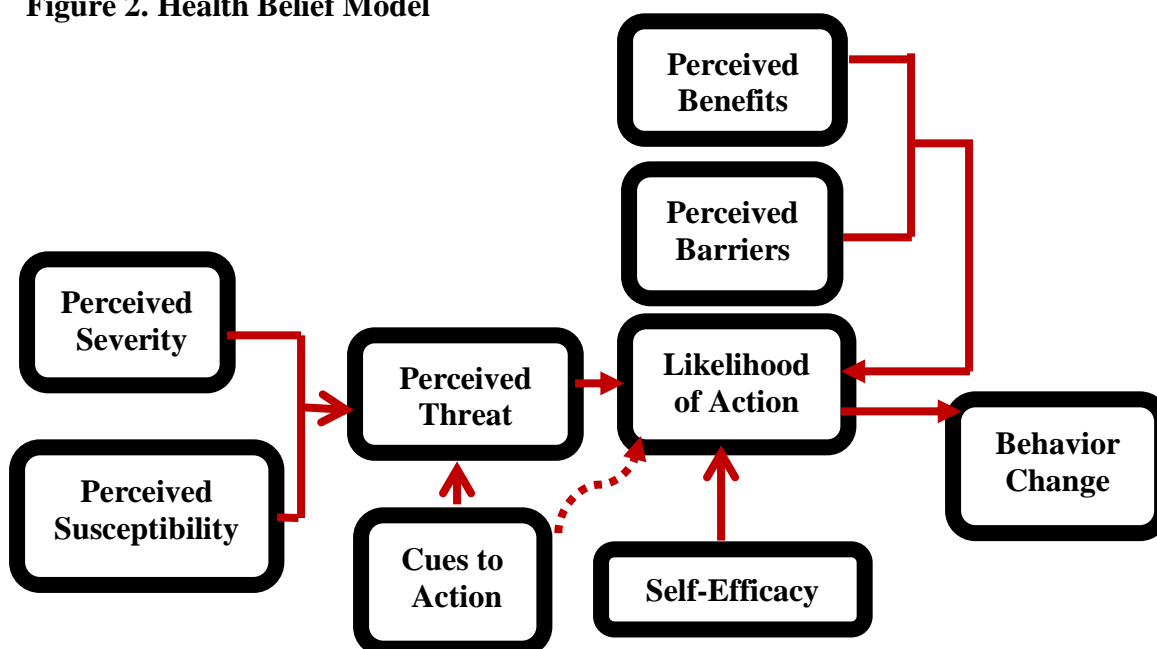
The knowledge survey used for this project was based on the food safety messages in the FightBac!<sup>TM</sup> and Be Food Safe<sup>TM</sup> (USDA) campaigns and previous validated surveys developed by Byrd-Brenner et al. (2007) to assess the food safety knowledge of adults. The knowledge survey was created through the collaboration of the primary investigators from both the University of Nebraska-Lincoln and the University of New Mexico along with their students. The completed survey for validation (Appendix A) was comprised of 33 multiple choice questions, 8 true or false questions, and 13 demographic questions. After validation was complete, investigators and students from both colleges discussed validation findings and made final modifications to the knowledge survey to lessen participant burden by decreasing the number and complexity of some questions and to address cultural issues. Changes and edits were based on

participant feedback as well as the advice of food safety experts and professionals well versed in Native American culture. The final survey (Appendix B) used for the focus group was comprised of 23 multiple choice questions, 6 true or false questions, and 10 demographic questions.

### Qualitative

The focus group script (Appendix C) was developed using the constructs of the Health Belief Model (Figure 2.) to elicit information about current food handling practices, typical sources of food safety information, food safety beliefs including cultural beliefs related to food, barriers to current food safety recommendations, and how and what methods should be used to reach Native American families with young children with food safety information. Initial questions focused on what foods are prepared at home.

**Figure 2. Health Belief Model**





### **IRB Approval**

Approval was obtained from the Institutional Review Board (IRB) prior to both the validation of the survey (Appendix D) and the focus groups (Appendix E). A waiver of consent was also obtained for those participants who were under the age of 18 and the main food preparer in a Native American home with young children. Requested changes to the recruitment poster and letter of consent were made per IRB's request.

### **Subject Recruitment**

Researchers and Extension Educators identified key people within the Native American communities both on and off reservations to obtain contact information for individuals associated with communities and community centers where focus group discussions would be conducted. Convenience sampling techniques were used, including the snowball technique. (Creswell, 2009) Subjects had to be the main food preparer in a Native American home with children 10 years of age or younger. Recruitment posters (Appendix F) containing information about the focus groups were created and posted at focus group sites and community centers.

### **Focus Group Methods**

Focus group discussions were conducted in local community centers on and off Native American reservations in Nebraska. In Nebraska, the Native American tribes (Omaha, Ponca, Winnebago, and Santee Sioux) are considered plains Indians. All focus groups were audio taped for later transcription. To achieve the project objective, focus groups were conducted with a sample of primary food handlers within Native American

families with children 10 years of age or younger. The Krueger (1994) methodology for conducting focus group discussions was followed. Focus group discussions lasted from 45 to 90 minutes. Focus group discussions were conducted until no new information was obtained and common themes were being repeated.

Upon arrival at the focus group site, participants confirmed verbally they were the main food preparer in a Native American home with children 10 years of age or younger. After signing the informed consent, participants were then asked to complete the knowledge survey and participant information form (Appendix G). Once surveys were completed by all participants, the researcher explained the purpose of the focus group, the general procedures of the focus group, and the anticipated duration time of the focus group. The researcher then began asking questions from the focus group script and continued until all questions had been asked and participants no longer had any further questions or comments. Participants then received their \$25 Walmart gift card. All focus groups were conducted by the same researcher for increased consistency.

## **Data Analysis**

### **Quantitative**

Surveys were numbered with a participant number beginning with a zero if they were a validation participant and a one if they were a focus group participant. Survey data was coded and recorded in an Excel spreadsheet. Participants' answers were totaled and a percentage was calculated for each response to determine the percentage of total participants who selected each answer. A Levene's Test for Equality of Variances was

ran using SPSS (SPSS Version 21, 2012) to determine any significances for each question and for the subcategories of the survey including the FightBac!™ concepts (Clean, Cook, Chill, and Separate), food at increased risk, groups at increased risk as well as the survey as a whole. Questions with only one correct answer were scored as one point each. Multiple correct answer questions were scored as one point for each answer and were ran as individual questions. With this scoring method the knowledge survey had a total of 74 questions. A Cronbach's alpha was completed on the survey to determine its reliability.

Cronbach's alpha is a measure of internal consistency. According to Tavakol and Dennick (2011), internal consistency “describes the extent to which all the items in a test measure the same concept or construct and hence it is connected to the inter-relatedness of the items within the test.” Internal consistency is expressed as a number between zero and one. Surveys with a Cronbach's alpha of 0.70 to 0.95 are considered to be acceptable surveys. (Tavakol et al., 2011)

### **Qualitative**

The focus groups transcriptions were transcribed using the focus group audio recordings and notes. All transcriptions were reviewed and coded. Coding was also compared and discussed with two independent reviewers. Final coding and themes were completed by researcher.

### **Mixed Methods**

Themes determined from the focus groups were compared to the knowledge

survey responses and results to determine similarities and contradictions between the quantitative and qualitative data.

## Results

### Participant Demographics

From the validation of the knowledge survey and focus groups, 102 participants were involved in this study (Table 1.). Participants were mostly female (n=83) with an average age of  $38.3 \pm 13.9$  years. A majority of participants had at least a high school degree or GED (n=32) or some college education (n=29). Over half of participants were unemployed (n=54).

<b>Table 1. Demographic Characteristics of Validation and Focus Group Participants</b>						
	<b>Validation n=36 (%)</b>		<b>Focus Group n=66 (%)</b>		<b>Total n=102 (%)</b>	
<b>Gender</b>	Male n=4 (11.1)	Female n=32 (88.9)	Male n=15 (22.7)	Female n=51 (77.3)	Male n=19 (18.6)	Female n=83 (81.4)
<b>Age</b>	Mean= $38.4 \pm 14.0$ years		Mean= $38.3 \pm 14.0$ years		Mean= $38.3 \pm 13.9$ years	
<b>Number of Children</b>	Mean= $2.5 \pm 1.1$		Mean= $2.4 \pm 1.3$		Mean= $2.4 \pm 1.3$	
<b>Age of Children</b>	Mean= $5.2 \pm 3.0$ years		Mean= $5.1 \pm 2.7$ years		Mean= $5.2 \pm 2.8$ years	
<b>Employment</b>	Full-time Part-time Unemployed	n=22 (61.1) n=4 (11.1) n=10 (27.8)	Full-time Part-time Unemployed	n=13 (19.7) n=9 (13.6) n=44 (66.7)	Full-time Part-time Unemployed	n=35 (34.3) n=13 (12.7) n=54 (53.0)
<b>Residency</b>	Reservation Resident n=16 (44.4)	Non-Reservation Resident n=20 (55.6)	Reservation Resident n=38 (57.6)	Non-Reservation Resident n=28 (42.4)	Reservation Resident n=54 (58.1)	Non-Reservation Resident n=39 (41.9)

	<b>Validation n=36 (%)</b>		<b>Focus Group n=66 (%)</b>		<b>Total n=102 (%)</b>	
<b>Education</b>	Less than high school	n=2 (5.5)	Less than high school	n=0 (0)	Less than high school	n=2 (2.0)
	Some high school	n=0 (0)	Some high school	n=12 (18.2)	Some high school	n=12 (11.8)
	High school/ GED	n=9 (25.0)	High school/ GED	n=23 (34.8)	High school/ GED	n=32 (31.4)
	Additional training beyond high school	n=5 (13.9)	Additional training beyond high school	n=4 (6.1)	Additional training beyond high school	n=9 (8.8)
	Some college	n=13 (36.1)	Some college	n=16 (24.2)	Some college	n=29 (28.4)
	College graduate	n=6 (16.7)	College graduate	n=10 (15.2)	College graduate	n=16 (15.6)
	Post-college graduate	n=1 (2.8)	Post-college graduate	n=1 (1.5)	Post-college graduate	n=2 (2.0)
<b>Tribal Affiliation*</b>	Omaha	n=13 (36.1)	Omaha	n=33 (55.0)	Omaha	n=46 (45.1)
	Santee Sioux	n=13 (36.1)	Santee Sioux	n=8 (12.1)	Santee Sioux	n=21 (20.6)
	Winnebago	n=1 (2.8)	Winnebago	n=13 (19.7)	Winnebago	n=14 (13.7)
	Ponca	n=1 (2.8)	Ponca	n=2 (3.0)	Ponca	n=3 (2.9)
	Yankton Sioux	n=1 (2.8)	Yankton Sioux	n=2 (3.0)	Yankton Sioux	n=3 (2.9)
	Rosebud Sioux	n=1 (2.8)	Rosebud Sioux	n=1 (1.5)	Rosebud Sioux	n=2 (2.0)
	Dakota	n=1 (2.8)	Oglala Sioux	n=2 (3.0)	Dakota	n=1 (1.0)
	Cheyenne	n=1 (2.8)	Cheyenne River Sioux	n=1 (1.5)	Cheyenne	n=2 (2.0)
	Arapaho	n=1 (2.8)	Northern Cheyenne	n=1 (1.5)	Arapaho	n=1 (1.0)
	Crow Creek	n=1 (2.8)	Gros Ventre	n=1 (1.5)	Crow Creek	n=1 (1.0)
	Missing Response	n=4 (11.1)	Sisseton Whapton	n=1 (1.5)	Oglala Sioux	n=2 (2.0)
			Lakota	n=1 (1.5)	Cheyenne River Sioux	n=1 (1.0)
			Sioux	n=1 (1.5)	Northern Cheyenne	n=1 (1.0)
			Cheyenne	n=1 (1.5)	Gros Ventre	n=1 (1.0)
			Missing Response	n=8 (12.1)	Sisseton Whapton	n=1 (1.0)
					Lakota	n=1 (1.0)
					Sioux	n=1 (1.0)
					Missing Response	n=12 (11.8)

\*Participants may have indicated more than one tribal affiliation.

## Quantitative Results

Results of the knowledge survey are provided in Table 2. The average score on the knowledge survey was 61.4% which is below the 70% passing percentage indicating inadequate food safety knowledge of the participants. The Cronbach's alpha for the survey was 0.650 (Appendix H). No significant differences were found for individual questions or subcategories.

<b>Table 2. Quantitative Knowledge Survey Frequencies Ordered by Concept</b>	
Correct Answers in <b>BOLD</b> Text	Total
Question	n (%)
<b>CLEAN</b>	
1. How should you wash fresh fruits and vegetables to keep you from getting food poisoning?	
Wash with regular soap	1 (1.0)
Wash with hot water	10 (9.8)
Wash with anti-bacterial soap	3 (2.9)
<b>Hold under cool running water</b>	<b>87 (85.3)</b>
Missing Response	1 (1.0)
2. How should dishes be washed to prevent food poisoning? (Check all that apply)	
<b>Hand wash them and rinse right after the meal and then let them air dry</b>	<b>65 (63.7)</b>
Hand wash and rinse them right after the meal and then dry them with a dish towel	67 (65.7)
<b>Wash and dry them in a dishwasher</b>	<b>55 (53.9)</b>
3. Which is an acceptable way to clean a cutting board or counter after it is used for raw meat? (Check all that apply)	
Wash with hot soapy water only	45 (44.1)
<b>Wash with hot soapy water, rinse with water, then rinse with bleach</b>	<b>63 (61.8)</b>
Clean with a disinfectant (example: Lysol, Clorox, bleach)	53 (52.0)
<b>Washing cutting board in a dishwasher</b>	<b>34 (33.3)</b>
Missing Response	2 (2.0)
4. How should kitchen counters be cleaned to prevent food poisoning?	
Spray with a strong bleach solution, rinse and wipe dry	30 (29.4)
<b>Wash with hot soapy water, rinse and wipe with a bleach solution</b>	<b>24 (23.5)</b>
Wash with hot soapy water and let air dry	20 (19.6)
Brush off any dirt or food, wipe with a bleach solution and let air dry	26 (25.5)
Missing Response	2 (2.0)

5. What is the best way to wash your hands?	
Apply sanitizer, run water, rub hands together for 20 seconds, rinse hands, dry hands, rub on an antiseptic hand lotion	3 (2.9)
Apply soap, rub hands together for 20 seconds, rinse hands under water, dry hands, apply sanitizer	35 (34.3)
<b>Run water, moisten hands, apply soap, rub hands together for 20 seconds, rinse hands, dry hands</b>	<b>52 (51.0)</b>
Run water, moisten hands, apply sanitizer, rub hands together for 20 seconds, rinse hands, dry hands, rub on antiseptic hand lotion	10 (9.8)
Missing Response	2 (2.0)
6. Washing hands after changing a diaper:	
Increases the chance of food poisoning	15 (14.7)
<b>Decreases the chance of food poisoning</b>	<b>79 (77.4)</b>
Makes no difference	6 (5.9)
Missing Response	2 (2.0)
<b>SEPARATE</b>	
7. If you have a cut or sore on your hand, what should you do before you prepare food for your family?	
Nothing, if it is not infected	0 (0)
Put a bandage on the cut or sore	7 (6.9)
Wash hands	8 (7.8)
<b>Wash hands, put a bandage on the sore, and wear a glove</b>	<b>86 (84.3)</b>
Missing Response	1 (1.0)
8. Where is the best place to store raw meat in the refrigerator?	
On the top shelf	34 (33.3)
Where there is space	5 (4.9)
<b>Below ready-to-eat foods, like salad</b>	<b>62 (60.8)</b>
Missing Response	1 (1.0)
9. Putting raw meat in a separate bag (away from other food items) before placing it in the grocery cart:	
Increases the chance of food poisoning	3 (2.9)
<b>Decreases the chance of food poisoning</b>	<b>82 (80.4)</b>
Makes no difference	15 (14.7)
Missing Response	2 (2.0)
10. When preparing food, you should wash your hands after touching which of these? (Check all that apply)	
<b>Dirty pots and pans</b>	<b>92 (90.2)</b>
<b>Fresh fruit</b>	<b>42 (41.2)</b>
Dishes that came out of the dishwasher	25 (24.5)
Clean countertop	27 (26.5)
<b>Cell phone or home telephone</b>	<b>88 (86.3)</b>
Missing Response	1 (1.0)
<b>COOK</b>	
11. What is the best way to tell if hamburgers are cooked enough to prevent food poisoning?	
Cut one to check the color of the meat inside	44 (43.1)
Check the color of the juice to be sure that it is not pink	14 (13.7)
<b>Measure the temperature with a food thermometer</b>	<b>37 (36.3)</b>
Check the texture or firmness of the meat	5 (4.9)
Missing Response	2 (2.0)

12. What is the best way to tell when chicken has cooked long enough?		
The juices run clear	15 (14.7)	
The meat is not pink in the center	35 (34.3)	
The meat falls off the bone	13 (12.7)	
<b>Test with a meat thermometer</b>	<b>38 (37.3)</b>	
Missing Response	1 (1.0)	
13. To prevent food poisoning, how long should leftover soup be heated?		
<b>Until it is boiling hot</b>	<b>39 (38.2)</b>	
Just until it is hot, but not too hot to eat right away	49 (48.0)	
When it is at least room temperature	10 (9.8)	
Reheating isn't necessary	2 (2.0)	
Missing Response	2 (2.0)	
14. A food is properly cooked in a microwave oven when (Check all that apply)		
<b>You follow directions on the package</b>	<b>82 (80.4)</b>	
You stir the food about half way through cooking	66 (64.7)	
You use a turntable in the microwave	46 (45.1)	
The food feels hot	14 (13.7)	
<b>You test the food with a thermometer</b>	<b>49 (48.0)</b>	
Missing Response	2 (2.0)	
<b>CHILL</b>		
15. Your electricity went off in your freezer and the meat, chicken, and fish thawed and felt warm. What should you do to prevent food poisoning?		
<b>Throw them away</b>	<b>51 (50.0)</b>	
Cook them right away	18 (17.6)	
See how they smell or look before deciding what to do	32 (31.4)	
Immediately re-freeze until solidly frozen, then cook it	1 (1.0)	
16. Your child is going to be eating 2 hours after you cook a meal. How should you keep the meal safe before your child eats it?		
<b>Store it in the refrigerator and reheat it when the child is ready to eat it</b>	<b>64 (62.7)</b>	
Place it on the kitchen counter until the child is ready to eat it	0 (0)	
Store it in a cool oven until the child is ready to eat it	5 (4.9)	
Store it in a warm oven until the child is ready to eat it	33 (32.4)	
17. Which food needs to be refrigerated to prevent food poisoning?		
Apples	6 (5.9)	
Dried corn	2 (2.0)	
Open box of raisins	7 (6.9)	
Corn bread	6 (5.9)	
<b>An open can of corn</b>	<b>80 (78.4)</b>	
Missing Response	1 (1.0)	
18. What is the safest way to cool a large pot of hot soup?		
<b>Put the soup in a clean shallow pan and refrigerate right away</b>	<b>17 (16.6)</b>	
Keep the soup in the cooking pot and refrigerate right away	6 (5.9)	
Put the soup in a clean, deep pot before and refrigerate right away	6 (5.9)	
Cool the soup to room temperature on the counter, then refrigerate it	72 (70.6)	
Missing Response	1 (1.0)	



19. How long can you store cooked hamburger and chicken in the refrigerator to eat later?		
	1-2 days	84 (82.3)
	<b>3-4 days</b>	<b>16 (15.7)</b>
	5-7 days	1 (1.0)
	More than a week	1 (1.0)
20. How long can you store raw hamburger and chicken in the refrigerator to eat later?		
	<b>1-2 days</b>	<b>68 (66.7)</b>
	3-4 days	28 (27.4)
	5-7 days	5 (4.9)
	More than a week	1 (1.0)
21. It is safe to give an infant a bottle of baby formula that has been out of the refrigerator for longer than 2 hours?		
	True	12 (11.8)
	<b>False</b>	<b>90 (88.2)</b>
22. Refrigeration eliminates harmful germs in food.		
	True	42 (41.2)
	<b>False</b>	<b>59 (57.8)</b>
	Missing Response	1 (1.0)
23. If a leftover food looks and smells good, it is still safe to eat.		
	True	24 (23.5)
	<b>False</b>	<b>78 (76.5)</b>
<b>FOODS THAT INCREASE RISK</b>		
24. Eating which of these foods will increase a person's risk of food poisoning? (Check all that apply)		
	<b>Baked potato that was left on the counter overnight</b>	<b>61 (59.8)</b>
	Leftover turkey eaten cold	42 (41.2)
	Cake that was left on the counter overnight	22 (21.6)
	<b>Soup cooled on the counter</b>	<b>29 (28.4)</b>
	<b>Fried eggs with a runny or soft yolk</b>	<b>60 (58.8)</b>
	Purchased cookie dough	36 (35.3)
	<b>Raw homemade cookie dough or cake batter</b>	<b>63 (61.8)</b>
	<b>Sushi</b>	<b>73 (71.6)</b>
	<b>Raw shellfish</b>	<b>50 (49.0)</b>
	<b>Unpasteurized fruit juice</b>	<b>43 (42.2)</b>
	<b>Sliced melons or cantaloupe</b>	<b>15 (14.7)</b>
	<b>Raw sprouts (alfalfa, bean, clover, radish)</b>	<b>31 (30.4)</b>
	Fresh homemade tomato sauce	13 (12.7)
	<b>Leftover soup reheated until warm but not boiling</b>	<b>35 (34.3)</b>
	<b>Raw milk (not pasteurized) or fresh cheese made with raw milk</b>	<b>66 (64.7)</b>
	<b>Infant milk or formula with honey added</b>	<b>38 (37.3)</b>
	Meat cooked medium-well	42 (41.2)
	<b>Milk with raw egg added</b>	<b>50 (49.0)</b>
	<b>Hamburger cooked rare</b>	<b>88 (86.3)</b>
25. E. coli (a harmful germ) in undercooked hamburger can cause kidney failure in children.		
	<b>True</b>	<b>88 (86.3)</b>
	False	13 (12.7)
	Missing Response	1 (1.0)

26. Undercooked chicken and raw eggs can carry Salmonella (a harmful germ).		
	<b>True</b>	<b>101 (99.0)</b>
	False	1 (1.0)
27. It is safe to use raw eggs in recipes that will not be cooked.		
	True	19 (18.6)
	<b>False</b>	<b>83 (81.4)</b>
<b>GROUPS AT INCREASED RISK</b>		
28. Which foods will likely cause food poisoning for pregnant women, infants, and children? (Check all that apply)		
	<b>Cottage cheeses</b>	<b>20 (19.6)</b>
	Cold smoked fish	62 (60.8)
	<b>Cold potato salads</b>	<b>19 (18.6)</b>
	<b>Hot dogs that have not been heated</b>	<b>65 (63.7)</b>
	<b>Raw eggs</b>	<b>91 (89.2)</b>
	<b>Undercooked eggs</b>	<b>78 (76.5)</b>
	Canned vegetables	6 (5.9)
	Canned fruit juice	5 (4.9)
29. Which of these people will likely get sick from harmful germs in food? (Check all that apply)		
	<b>Preschool children</b>	<b>91 (89.2)</b>
	Teenagers	46 (45.1)
	<b>Pregnant women</b>	<b>93 (91.2)</b>
	<b>Older people (age 60 and over)</b>	<b>94 (92.2)</b>
	<b>People with type 2 diabetes</b>	<b>69 (67.6)</b>
	<b>Cancer patients</b>	<b>68 (66.7)</b>
	People who frequently eat at restaurants or get take-out food often	47 (46.1)
	None of these individuals	2 (2.0)

## Qualitative Results

A total of eight focus groups were held; Winnebago (2), Walthill (2) and Macy on the Omaha reservation, South Sioux City, Omaha, and Lincoln. Themes and codes identified from the focus group discussions are provided in Table 3. The five most frequently mentioned foods in the focus groups are provided in Table 4. A full list of foods mentioned in the focus groups is provided in Appendix I.

**Table 3. Themes and Codes Identified in the Focus Group Discussions**

Construct	Theme	Codes	Quotes
<b>Perceived Severity</b>	Symptoms of FBI	Symptoms: Nausea, diarrhea, fever, cramps, stomach pain, vomiting, dehydration	"I got really sick...I kept throwing up constantly..." "She just got stomach cramps real bad, vomiting really bad." "My stomach hurt real bad, got nauseous."
	Consequences of having an FBI	Consequences: Hospitalization, liver damage, kidney damage and failure, death, affects schedule, inconvenient, have to be more careful, main food preparer unable to cook for family, lost wages	"I stayed home from work." "Be more careful in how you prepare your food." "No one to cook." "I had to miss school that day...I didn't want to leave him with anybody else you know if he's sick." "I would have to change the whole day...probably have to find a way to take them to the doctor." "I'm a single parent so I would just have to cancel the whole day and just stay home with them." "Die...it could mess up something with the organs."
	FBI source believed most often to be the last food eaten usually from a restaurant	FBI Source: Restaurants, unknown, flies, last food eaten	"I got sick a couple months ago...I ordered a couple taverns and I ate them and I got sick right away and a couple hours later you know I just got really sick...I think it was from that food because as soon as I ate it my stomach started hurting." "A girlfriend of mine ate at Burger King and got food poisoning from a burger she ate." "Yeah I got sick from Chinese food."
	Lack of control when dining at a restaurant leads to distrust	Restaurant Distrust	"That's why we don't go out to eat... cause you don't know what they are going to put in your food." "Cause there's a lot of people handling the food. It isn't as processed and stuff" "...they may not cook it right." "...we have so many fast food chains and restaurant and who knows if they do what they are supposed to do properly..."
	Confusion on how to tell if illness is due to the flu or FBI	Food vs. Flu: Started vomiting with diarrhea, quick onset, 14-16 hrs., 24 hrs., after food, fever present	"That bacteria was just like growing in me very slowly." "Don't you usually get sick right away?" "Well with the flu you get body aches, you get fever, you get like tired or whatever you feel bad and all..." "Cause if it was the flu they'd be feverish and you're like achy or something but when its food poisoning it is more like throwing up a lot and their stomach hurts..." "Cause as soon as I got done eating I started throwing up." "Well with the stomach flu you would constantly throw up and you would throw up that yellow acidic stuff."
	Avoiding perceived unsafe food is prevention	Identify and Avoid	"If it is only that one particular person we're able to narrow it down." "If someone probably got sick from chicken in the house, stop cooking chicken for a while." "I quit eating ravioli." "Don't buy it." "Don't let them eat it." "Stop cooking it."

Perceived Susceptibility	Theme	Codes	Quotes
	Association between foods that have been recalled or have caused FBI outbreaks as being the main sources of FBI	Risky Foods: peanut butter, cantaloupe, pork, beef, honey, eggs, ground beef, chicken	"...there's stuff that gets recalled." "You see that in those papers." "Your bag of lettuce, they recalled that..." "You read up on like in the paper and stuff if there is a recall...there's a possibility of poisoning and this and that like with cantaloupe...there was a scare on that and there was a scare on peanut butter..."
	Proper Food Safety Practices	Washing produce, cook meat well done, chicken falling off the bone indicates doneness, reading labels/packages for cooking instructions, hand washing, refrigerating, clean kitchen, putting leftovers in different containers, washing cutting boards between raw meat and produce, sanitizing baby bottles, thawing meat in the refrigerator, 2 hour rule	"Every time you switch doing something, turn around wash your hands, my hands are so dry from washing them so much." "Mine was like taking the meat out ahead...and making it that day. You know taking it out the day before and letting it thaw in the fridge." "...you're not supposed to feed it [formula] after like two hours...just throw it out or put it in the refrigerator then feed it to them but don't let it sit out for more than two hours." "You know all your vegetables I'll wash it before I cut it."
	Improper Food Safety Practices	Color checking of meat, overcooking/burning food, cool hot foods on the counter before refrigeration, using detergent on fresh produce, timed cooking of raw meat, washing raw meat	"I burn it." "They just seem like they're done...or burn them kind of get them extra brown." "I don't store it when it's hot...like room temperature then put it in the fridge." "Time limit...for chicken and example would be 20 minutes on each side." "You know they always say you need a meat thermometer but I mean just by looking at it you can tell if it's red or pink."
	Confusion about "foods that make people sick" with allergies and chronic diseases/conditions	Foods that make people sick: alcohol, chicken, ground beef, fish, eggs, shellfish, milk, peanuts	"That [chicken] and turkey can go bad really fast...mostly if you put it on the kitchen counter and stuff you really have to watch that and get it up right away because it can ...to your other meats and stuff and then throughout the day germs and stuff collect on it, you need to sanitize that and it's really greasy." "Shellfish...cause it's always cold...never heated...so I don't mess with fish cause I don't want to get sick." "Some kids are allergic to it [honey]."

Perceived Susceptibility	Theme	Codes	Quotes
	Confusion about "people at risk of FBI" with allergies and chronic diseases/conditions	People at Risk: Elderly, infants, pregnant women, diabetics, people with food allergies, people with acid reflux, lactose intolerant, people with unclean water, improper electricity/storage, homeless people	"People who can't eat or who do not have clean water." "Elderly. Because they have different diets, meals..." "Keep a closer eye on the child maybe, make sure there wasn't a reaction or something." "Diabetics. You know sugar, starches, proteins, fats, and what not." "I never heard of any kids getting sick from food." "A different taste...if they don't like it they will probably get sick from it." "Well with my mom sugar makes her more sick because she's diabetic." "...like Native Americans a lot of them are lactose intolerant."
	Both trust and distrust in the United States food sources	Higher Risk of FBI in the United States: imports, recalls, under checked	"It's just because of the trade markets because of everything coming in from foreign countries...you don't know what they have over there or who is handling it before it gets here..." "I think the biggest concern is the transporting temperature..." "Because we still get foreigners in this country every day and they're bringing whatever they have in their country here."
		Lower Risk of FBI in the United States: cleaner, better practices/research/packaging/planning/regulations	"...you can just tell there are less and less people dying from foodborne illnesses because our country is more developed than underdeveloped countries..." "We have tighter restrictions on how they fix meat...how it's prepared." "I think we are kind of at a lower risk cause we have regulations in our restaurants..." "...we are at a lower risk because if you look at the other countries because I mean it's kind of scary sometimes...they're not really big on regulations and stuff like that..." "I think we're pretty good here with our standards and the USDA trying with inspections..."
	Bleach use/misuse in cleaning, sanitizing, and dish washing	Bleach Use/Misuse	"I have a cleaning solution, half water half bleach." "I use bleach in my dishes in my dish water with soap." "I just put a couple drops." "Half a capful." "I always have to have bleach in mine, in everything that I clean." "I think that bleach is better than anything...I use it to wipe out my microwave and my tables..." "Just that little capful." "Just like bleach and water for dishes...a gallon with a punch." "Make sure you wipe down counters, use soap and water, place bleach in it."

Barriers	Theme	Codes	Quotes
	Believe they need commercial kitchens/ equipment to prevent their family from FBIs	Equipment Needs: thermometer, refrigeration (bigger refrigerator/ freezer), Tupperware®, cutting boards, stainless steel, cleaning supplies, stove, clean water	“When I watch the cooking channels the stuff for everything they cook, at home I only have the basic stuff.” “You know at fast food restaurants there's a lot of stuff I don't have...stuff for counter tops like a mixture, I don't have that.” “I don't have a meat thermometer but I think if I had one I would use that.” “I need a big freezer so I can store a lot more foods.” “I think pans. You know how the nonstick stuff is scratching off...I always think that is getting in my food.” “I heard that wood is actually good and I noticed that a lot of the cooks on the TV Food Network always have wood cutting boards...” “If I have Rachel Ray's kitchen...” “A nicer fridge would help. It would work better.”
	Believe if they control the food preparation their family will be safe from FBI	Control	“Cause at home, you're the one preparing the food, making sure it is clean, you pay attention to how clean your stuff is...” “I'd rather do it myself and make sure it's done right.” “When you're at home you can care for your food the way you want it.” “Cleaner, more sanitary, you can control what it is, how you cooking it and preparing it, and you know it is going directly to the kitchen to the table to yourself.”
	Time constraints prevent safe food preparation practices	Time	“Some days you're in a rush you know trying to get food out there quickly, maybe take a shortcut some days, rushing to get water boiling over here and don't have time to wash your hands again, kids are cry, phones ringing, there's always something.” “You just don't feel like cleaning up everything right away, you're in a hurry...” “I would say time...if I'm in a rush I forget to wash sometimes...”
	Lack of money biggest barrier to safe food practices	Money	“I think it's that way for everything financial wise you know.” “It's not like money grows on trees outside the house.”
	Lack of cooking knowledge leads to avoidance of certain food items	Cooking Knowledge	“Cause I don't really know how to cook it [seafood] and you know so I just stay away from it.”

	Theme	Codes	Quotes
<b>Barriers</b>	Children cause chaos in the kitchen thus decreases main food preparer's control	Children	"A bunch of kids running around." "My twins like playing in the fridge." "The kids when I'm doing something want to see what we are cooking and are touching the counter and at the table you know." "My granddaughters know how to get in the fridge, they'll get food out and I'll find it later...it's really bad." "You have to watch everybody's little hands."
	Since they don't believe anyone has gotten sick from their food, they must be doing everything right in terms of food safety	Overconfidence in Abilities	"I've done pretty good so far." "Cause nobody has ever gotten sick from my cooking." "Cause you know like none of my kids ever got sick from it." "Haven't gotten sick yet."
<b>Self-Efficacy</b>	Over-confidence in preparing foods safely	Confidence in preparing foods safely	"I just make sure everyone is healthy." "I watch how I pack my meat and clean my kitchen...I'm pretty confident." "The things I can make I'm confident that it's ok." "I'd say a ten. All the food I can cook I am pretty good at, I'm pretty good at doing it." "10 cause I'm careful. I kind of check dates on everything and I rinse food..."
	Those with previous food safety education more familiar with concepts	Previous Education	"I have taken like 3 food handler permit classes...I avoid cross contamination..." "I work in a restaurant...I wash my hands."
	Lack of confidence in food supply rather than personal ability	Lack of confidence in purchasing food	"You can think that you are purchasing good food but maybe you're not...my ability is probably just 50/50...you don't know what is inside of it..." "Cause they [store] have mice...they have bread that's chewed."
<b>Cues to Action</b>	Participants' FBI Experiences	FBI Experience	"My son was born with <i>Salmonella</i> in his system...after about three days he was able to keep formula down and back to normal...They could never tell why or how it happened but the doctors said more than likely he had it in his system...when he was about a year and half old he got it again and it was bad for him, he was losing weight, it was terrible for him." "I know someone who passed away... <i>E. coli</i> ...she got ice cubes out of a cooler that they were keeping hamburger patties in and it shut her kidneys down...she wasn't too much older, about eight."

Cues to Action	Theme	Codes	Quotes
	Prefer easy to read and simple printed materials	Materials: Posters, pamphlets, handouts, videos	"It was easier for me because of the handouts they gave, they were easy to read..." "I think like fliers are helpful...like I have one on my fridge..."
	Currently get education/ information from trusted individuals in their communities and media sources	Education Sources: Doctors, clinics, TV (news), Internet, classes (community and Home Ec), health fairs	"If I don't know how to cook something I'll look it up on the Internet." "Ponca clinic they give out literature." "WIC...they have those little classes on nutrition that you get that they offer sometimes...it pretty much helped me with my kids and teach me how much food to have." "I watch cooking shows all the time."
	Prefer a hands on class in their town with a competent individual	Preferred Education: Class, relevant information, hands on, incentives, foods the population is familiar with, video recording for class for those who couldn't attend, from the University of Nebraska-Lincoln or dietitian, in their town	"A lot of reading material and hands on." "I like hands on and when people talk to you because they give out a lot of information that is good but like our food handlers classes that we go to every year we learn things that we hadn't learned the year before." "If it's relevant to me than I use it." "Someone who knows what they are doing." "They learn better hands on...a lot of Native Americans they learn better at hands on, if you incorporate us." "In Winnebago they had a summer program for diabetes. You went up there and they had a little presentation and then after that we cooked something healthy and you were able to eat it. I really enjoyed that. Hands on. Show them how to cook healthy." "Here in town."
	Family members primary source of food preparation education/ information	Influential People: Family Members	"I have an older sister-in-law she is a housewife and she is really big on sugar free things and food being kept cold..." "My dad gave me information on how to cook my food and how much food, how much water, how to feed my kids." "A lot of times I get it from my mom or my grandmom...I usually trust them a lot more because they know everything..." "My mom is a chef so I always talk to her." "Well I grew up watching my mom and auntie cook so I think they're pretty good cooks...I never ever got sick from their food so."



Non-HBM	Theme	Codes	Quotes
	Native American Culture	Cooking soups	“That's a secret, I really can't tell you.” “We do make them on the stove but that is about as far as I can tell you.” “Lots of soups.”
		Drying Corn	“Sun drying corn. I take it to my friend's...who has a farm take it out there and put it under their silo or something and just use the air to dry them. Well it's not like a silo, it's just a big old barn where he's got the air and stuff to go through them. He's got boxes to put them in layers...just blow air through them.”
		Feasts	“Like chicken soup they have at the feast I won't eat it in the summer. I got sick off of it once, so I won't eat chicken soup.” “Cause you don't know who long it sits cause at feasts they'll make it like in the morning and then it'll sit there.” “Cooking every day, all day.” “Cook over an open flame.” “Well there's a breakfast, noon meal, you're feeding everybody.” “Just that final day you just start cooking in the morning and they'll eat at like one or two depending on who's talking and the food sits for quite a few hours.”
		Events: Funerals, birthdays, pow wows, showers, graduations	“It's just like what you guys do when you have a shower, bridal shower or baby shower or graduation or anything like that you know that's what we do too. Only difference is that we have soup or fry bread but we have everything else.”
		Acculturation	“I don't know about traditional. The things they ate a long time ago no one would eat.”
		Practices	“She said that the chief said if you have kids make sure your kids eat first if you're married you and your husband you can eat last.”

Table 4. Top 5 Mentioned Foods in Focus Groups		
Rank	Food	Frequency
1	Ground Beef	25
2	Spaghetti	18
3	Fry Bread	9
4	Chili	7
5	Goulash	6
	Hot Dogs	

## Mixed Methods Results

Themes discovered in the focus groups were compared to relevant questions and concepts from the knowledge survey to determine mixed methods themes in Table 5.

**Table 5. Quantitative and Qualitative Data Comparison**

Theme	Quantitative	Qualitative	Mixed Methods
<b>Bleach Use/Misuse</b>	61.8% selected the acceptable way to clean a cutting board or counter after it is used for raw meat is to wash it with hot soapy water, rinse with water, and then rinse with bleach	Many participants mentioned using bleach directly in their dish water not as a rinse after they have washed dishes in hot soapy water or using a bleach solution to clean their countertops.	Know bleach kills bacteria however are unaware of the correct procedure of using bleach to clean dishes or countertops. Current practices could cause severe illness due to improper chemical use.
	54.9% reported counters should be cleaned with only a bleach solution to prevent food poisoning		
<b>Restaurant Distrust</b>	46.1% believe those who eat at restaurant or get take-out frequently are likely to get a FBI	Stated they will not eat at a restaurant because the employees do not know what they are doing and they might put something in the food. Those who have had a FBI typically believed the cause was a restaurant food they had eaten.	Do not trust restaurants because those who are in control of preparing their food are not competent or skilled which causes FBIs.
<b>Risky Foods</b>	14.7% correctly selected sliced melons or cantaloupe as a food that increases risk	Participants mentioned cantaloupe, ground beef, and eggs as risky foods or foods that make people sick.	Although they mentioned cantaloupe and melons as being risky foods in the focus group they were less likely to identify foods other than meat as foods that increase risk of FBI.
	86.3% correctly selected hamburger cooked raw as a food that increases risk		
	58.8% correctly selected fried eggs with a runny or soft yolk as a food that increases risk		
<b>Cooking Meat</b>	36.3% and 37.3% correctly selected using a thermometer is the best way to tell if hamburger or chicken is cooked long enough	Color checking was frequently mentioned in the focus groups as a way to tell when meat was cooked long enough. Some participants did mention they should use a thermometer however they do not.	Lack of knowledge of the correct way to tell when a meat has cooked long enough may lead to increased risk of FBI.
	43.1% and 34.3% incorrectly selected checking the color of the inside of the hamburger and chicken is the best way to tell if it is done		
<b>Cooling of Hot Foods</b>	70.6% believe the safest way to cool a large pot of hot soup is to cool it to room temperature on the counter and then refrigerate it	Participants mentioned cooling hot foods on the counter before refrigerating them.	Lack of knowledge of the proper way to cool hot foods may lead to increased risk of FBI.
	28.4% selected soup cooled on the counter as a food that increases risk		
<b>Preparing Food Safety</b>	Low knowledge score of 61.4%	Very confident in ability to prepare food safely based on the belief that no one has gotten sick from their food.	Lack of food safety knowledge with high self-efficacy may decrease a participant's willingness to receive food safety education.

## **Discussion**

### **Health Belief Model Constructs in Themes**

#### **Perceived Severity**

Participants were aware of the severity of getting a FBI. They knew the health consequences of a FBI include hospitalization, kidney failure, and death. They were also aware of other consequences including lost wages, inconvenience, and their family being without a food preparer. They recognized the symptoms of a FBI but believe because the symptoms come on quickly after eating, the illness is from food as opposed to being the flu. Participants were also more likely to completely avoid an unsafe food to prevent them and their family from getting a FBI.

#### **Perceived Susceptibility**

Participants felt they are more susceptible to contracting a FBI from a food that has been recalled or was involved in a FBI outbreak. There also seemed to be some confusion about foods that can cause a FBI with foods associated with allergies or diet modifications for chronic diseases like diabetes. Some participants felt they were at a higher risk of obtaining a FBI because of the food supply in the United States not being as regulated as it should be and because there are food recalls. However, some participants felt they were at a lower risk of obtaining a FBI in the United States because we have better regulations than other countries.

There were many proper and improper food safety practices mentioned. The most improper practices were associated with determining doneness of meat by checking the color of the meat or by overcooking it. Cleanliness seemed to be the most common proper food safety practice with participants mentioning frequent hand washing and dish and countertop washing during food preparation. It does seem that because participants feel they are susceptible to a FBI, they are misusing bleach in dish water and when cleaning countertops in hopes of eliminating all disease causing bacteria. Their practices may put them at an increased risk of getting sick from chemical residue.

Trepka, Newman, Dixon, and Huffman (2007) also found improper food safety practices including low thermometer use, improper thawing of frozen meat, and leaving food at room temperature for longer than two hours among WIC clients. Similarly Mitakakis et al. (2004) found poor hand washing, cross contamination of raw meat with cooked meat on cooking boards, and improper thawing among families in Melbourne, Australia. Morarji Dharod et al. (2007) also found poor hand washing, thawing methods, and lack of thermometer use in Latino women.

### **Perceived Benefits**

Although the focus group script included questions to assess what the participants viewed as perceived benefits of food safety, the answers were more consistent with perceived barriers and self-efficacy. As mentioned in the literature review, other studies have shown Native Americans strive to be a positive health role model for their children. (Parker et al., 2011) The participants' willingness to participate in the focus groups could

be evident of them viewing the study as a way to better themselves to benefit themselves as well as their families.

### **Perceived Barriers**

Many participants believed they need commercial grade kitchens and equipment similar to what they see on cooking television shows to adequately prevent their family from getting sick from FBIs. They lack the funds to purchase such equipment but believe they are doing the best they can with the equipment they can afford. Trepka, Newman, Dixon, and Huffman (2007) also found their participants were less likely to throw away food they believed to be contaminated because they lacked money to purchase food.

Another barrier to safe food practices was the need to be in complete control of the food preparation. If the main food preparer is not in complete control when preparing food they believe their family will get sick. Children were mentioned to decrease the main food preparer's control of food preparation. Other barriers to safe food preparation included lack of time and cooking knowledge. Parker et al. (2011) also found lack of time, money, and child care as the biggest barriers to behavior change among their Native American participants.

### **Self-Efficacy**

Overall, participants were very confident in their ability to prepare foods safely for their families. This is similar to what Stein, Dirks, and Quinlan (2010) found among their college participants including one Native American participant. Many believe since no one has become ill after eating the food they have prepared must mean they are doing

everything right. The overconfidence can also be a barrier since they do not believe they are doing anything wrong then there is no need for them to receive food safety education or change their behavior. However, Scheule (2004) reported WIC professionals strongly believe their clients lack food safety knowledge and need education. Participants had a lack of confidence in the food supply when food was obtained from grocery stores, commodity foods, food pantries, and other food assistance programs like WIC.

### **Cues to Action**

Many participants had a previous FBI or knew of someone who did. In some of these cases, the participant or the person they knew with the FBI was hospitalized or died. Participants have previously received health information from clinics, physicians, classes, health fairs, and media sources like television and the Internet. Participants were also likely to have received a majority of their food preparation education from family members. Byrd-Bredbeener et al. (2007) also found their participants learned cooking and food safety knowledge from family members in their study that included 36 Native Americans. Participants in this study were interested in an education program consisting of a hands on class accompanied with easy to read and simple printed materials. Participants preferred these classes to be conducted in their communities by people who are competent in food safety education.

### **Health Belief Model**

A probable predicted Health Belief Model based on the findings of this study is depicted in Figure 3. The participants believed FBIs to be severe illnesses and that they

and their family could be susceptible to getting FBIs. Since the participants perceived FBIs to be severe and themselves susceptible may result in a potentially high perceived threat of FBIs. If the participants perceive the threat of a FBI to be significant, it could increase their likelihood of taking action to make a behavior change to decrease the threat of a FBI. However, if the participants perceive the barriers to behavior change to outweigh the benefits of behavior change, they will be less likely to take action and make the behavior change. In addition, if the participants have low self-efficacy and believe they will not be able to make a behavior change then a behavior change is less likely to happen. The participants of this study are very confident in their ability to prepare food safely for their families. This is a false confidence because of the overall low score of the knowledge survey. This false confidence could deter participants from making a behavior change as well. But if the participants have been significantly impacted by an external influence or cue to action, he or she will be more likely to take action and make a behavior change. Many participants had personal experiences with previous FBIs, some severe and even fatal. The impact of these experiences could be significant enough to influence them to make a behavior change. The desired behavior change would be for Nebraska Native Americans to increase proper food safety procedures in their homes to protect their families, specifically their children. They value their children which could motivate them to make changes in their behavior to decrease their child's risk of FBI. The intervention for this population to make such a behavior change would be a food safety education program.





### **Food Safety Education Program**

The participants of this study wanted food safety education despite being overly confident in their ability to prepare food safely for their families. This could indicate they are not as confident as they believe or they will do what they can to protect their children and families from FBI. The education program should address the food safety knowledge deficits identified in the results of the knowledge survey. The program should be advertised to families with young children since young children are at a higher risk of getting a FBI. Since Native Americans value their children, the education program should inform them of how FBI can affect their children and how they can protect their children from FBI through proper food safety practices. This information could greatly increase the likelihood of the participants taking action and making the behavior changes to increase the food safety in their homes. This education program should also have an incentive for participation. An incentive may influence Native Americans to participate in the food safety education program even if they believe they are already taking the necessary steps to keep their families safe from FBI. This incentive could be a gift card to a grocery retailer or even kitchen tools like cutting boards or thermometers.

### **FightBac!™ Concepts in Themes**

#### **Clean**

Participants frequently mentioned cleanliness in the focus groups. Participants mentioned hand washing with meal preparation and as an overall healthy practice. Participants were aware of the need to wash cutting boards after using them for raw meat.

Only once was sanitizing of baby bottles discussed. It is unknown if this is a common practice among Native Americans. There also was a reoccurring theme of over cleaning. For example, multiple participants mentioned washing raw poultry and hamburger prior to cooking it to wash away the germs. This practice is not recommend because washing raw meat can cause the juices to splatter onto other surfaces and increases the risk of cross-contamination. (USDA, 2011)

### **Separate**

The separate concept was the least mentioned in the focus groups. Cross-contamination is most commonly associated with keeping fresh produce separated from raw meats especially on cutting boards which is what was most mentioned in the focus groups. Although the concept also includes keeping shell eggs separate from fresh produce but this was never mentioned as a precaution participants take. More investigation needs to occur with this concept with Native Americans.

### **Chill**

Refrigeration was a common theme in the focus groups. Most participants desired a larger refrigerator to hold more foods which would keep them and their families safe from FBIs. This belief is very confusing because a larger refrigerator does not make foods safer unless the refrigerator is too full for air to circulate efficiently and cool the food. However, the focus seemed to be on just holding more food not on the air circulation. Native American reservations are often food deserts. Native Americans also receive food assistance through WIC, SNAP, and commodities. The participants most

likely have to make large grocery shopping trips to larger cities when they receive their food assistance funds thus needing a larger refrigerator to hold more food that has to last from a week up to a month.

Thawing of frozen meat was discussed during several focus groups. Some participants did mention thawing meats in the refrigerator. Others mentioned thawing meat on the counter at room temperature or in a warm water bath in the sink. This concept needs to be addressed in this population as the latter methods are unsafe and can greatly increase the risk of FBI.

### **Cook**

Cook was also a frequent topic of discussion among participants. A few participants mentioned using a meat thermometer at home to test meat doneness but it was noted these individuals currently or previously worked in foodservice. Some participants mentioned testing with a thermometer is the safest way to check meat but they prefer to check the color of the meat instead. Color checking of meat was a common practice among participants.

### **Recommendations**

#### **Knowledge Survey**

Several questions were confusing to participants. Changes to consider include the wording on demographic question 5 from “What is the last grade or year of school that you have completed,” to “What is the highest level of school you have completed,” and

remove the “some college” option. Since the question is inquiring about the highest grade or year of education completed it is confusing to include the “some college” option since it does not qualify as a grade or year of school completed. Many participants would choose “high school” and “some college” possibly due to the confusion. The “additional training beyond high school (not college)” option on the same questions should also be removed because it does not inquire about the subject of the training so it is very invaluable to the researcher especially when there is another demographic question inquiring about previous training in food safety or nutrition.

Add a “retired” option to the employment status demographic question 9. Many participants expressed they are not unemployed but retired. Due to the high levels of unemployment of Native Americans they wanted credit for having worked in the past because they are proud of the fact.

Change demographic question 4 from “Where do you live,” to “What City and State do you live in.” Some participants would write “reservation” or “modular home”. Changing the question would provide a better understanding of where participants live and pinpoint where future education sites could be.

### **Focus Group Script**

Based on the results of this study, the perceived benefits questions should be changed in the focus group script. The current questions unveiled participants’ perceived barriers and self-efficacy instead of perceived benefits. Questions like “how would a food safety education program benefit you or your family,” or “what are the benefits of food

safety,” would be more appropriate at discovering and evaluating perceived benefits in this population.

### **Food Safety Education Program**

Future food safety education programs should consist of a class which encompasses a hands on aspect with handouts reflecting lessons learned in the class for easy home reference. The education should be relevant to the needs of the population discovered from this study. The education program should also be sensitive to the cultural practices of Native Americans as well as the specific situations they face being a generally low income population who may lack the funding and access to food and equipment. This program should be held in the communities both on and off reservations at times convenient for participants to attend. Participants should be able to bring their children with them since many may not be able to attend if they cannot bring their children.

Since participants would be able to bring children, incorporating an education or activity program for the children of participants would be beneficial. Many times during the focus groups for this study, parents and caregivers were not able to focus on the discussion because they were tending to their children. If the children were preoccupied with their own education, the participants would be able to focus on the material and hopefully retain more of the information.

### **Limitations**

Since the participants were not randomly selected, the data cannot be generalized to the whole Native American population in the United States. However, since all participants were from Nebraska, results can be generalized to the Native American population in Nebraska.

## References

- Brown, T. L., Zephier, E., & Johnson, M. L. (2010). Chapter 1: American Indian food practices. In C. M. Goody & L. Drago (Eds.), *Cultural food practices* (pp. 1-19). Chicago, IL: American Dietetic Association.
- Buzby, J. C. (2001). Children and microbial foodborne illness. *FoodReview*, 24(2), 32-37.
- Byrd-Bredbenner, C., Maurer, J., Wheatley, V., Schaffner, D., Bruhn, C., & Blalock, L. (2007). Food safety self-reported behaviors and cognitions of young adults: Results of a national study. *Journal of Food Protection*, 70(8), 1917-1926.
- Byrd-Bredbenner, C., Wheatley, V., Schaffner, D., Bruhn, C., Blalock, L., & Maurer, J. (2007). Development and implementation of a food safety knowledge instrument. *Journal of Food Science Education*, 6, 46-55.
- Cassidy, C.M. (1994). Walk a mile in my shoes: Culturally sensitive food habits research. *American Journal of Clinical Nutrition*, 59, 190S-197S
- Creswell, J.W. (2009). *Education research: Planning, conducting, and evaluating quantitative and qualitative research* (4<sup>th</sup> ed.). Boston: Pearson Education.
- Ellis, J. D., Sebranek, J. G., & Sneed, J. (2004). Iowa high school students' perceptions of food safety. *Food Protection Trends*, 24(4), 239-245.
- Fila, S. A., & Smith, C. (2006). Applying the Theory of Planned Behavior to healthy eating behaviors in urban Native American youth. *International Journal of Behavioral Nutrition and Physical Activity*, 3(11).

- Harla, K., Smith, C., Hassel, C., & Gailfus, P. (2005). New moccasins: Articulating research approaches through interviews with faculty and staff at Native and non-Native academic institutions. *Journal of Nutrition Education and Behavior*, 37(2), 67-76.
- Hislop, N., & Shaw, K. (2009). Food safety knowledge retention study. *Journal of Food Protection*, 72(2), 431-435.
- Krueger, R. (1994). *Focus groups: A practical guide for applied research*. Thousand Oaks, CA: Sage Publications.
- Kvale, S. (1996). *Interviews: An introduction to qualitative research interviewing*. London: Sage Publications.
- Mauer, W. A., Kaneene, J. B., DeArman, V. T., Roberts, C. A., Miller, R., Pong, L., & Dickey, T. E. (2006). Ethnic-food safety concerns: An online survey of food safety professionals. *Journal of Environmental Health*, 68(10), 32-38.
- Mitakakis, T. Z., Sinclair, M. I., Fairley, C. K., Lightbody, P. K., Leder, K., & Hellard, M. E. (2004). Food safety in family homes in Melbourne, Australia. *Journal of Food Protection*, 67(4), 818-822.
- Morarji Dharod, J., Perez-Escamilla, R., Paciello, S., Bermudez-Millan, A., Venkitanarayanan, K., & Damio, G. (2007). Comparison between self-reported and observed food handling behaviors among Latinas. *Journal of Food Protection*, 70(8), 1927-1932.



- Parker, S., Hunter, T., Briley, C., Miracle, S., Hermann, J., Van Delinder, J., Standridge, J. (2011). Formative assessment using social marketing principles to identify health and nutrition perspectives of Native American women living within the Chickasaw Nation boundaries in Oklahoma. *Journal of Nutrition Education and Behavior*, 43(1), 55-62.
- Pedigo, A. S., Richards, J. K., Saxton, A. M., D'Souza, D. H., & Draughon, F. (2009). Characterization of food safety knowledge, attitudes, and behaviors of adolescents in east Tennessee. *Food Protection Trends*, 29(10), 626-641.
- Po, L.G., Bourquin, L.D., Occena, L.G., & Po, E.C. (2011, June/July). Food safety education for ethnic audiences. *Food Safety Magazine*, 26, 28-31, 62-63.
- Roseman, M., & Kurzynske, J. (2006). Food safety perceptions and behaviors of Kentucky consumers. *Journal of Food Protection*, 69(6), 1412-1421.
- Sanlier, N. (2009). The knowledge and practice of food safety by young and adult consumers. *Elsevier*, (20), 538-542.
- Scallan, E., Hoekstra, R. M., Angulo, F. J., Tauxe, R. V., Widdowson, M., Roy, S. L., ... Griffin, P. M. (2011). Foodborne illness acquired in the United States-major pathogens. *Emerging Infectious Diseases*, 17(1), 7-15.
- Scheule, B. (2004). Food safety education: health professionals' knowledge and assessment of WIC client needs. *Journal of The American Dietetic Association*, 104(5), 799-803.
- Statistical Package for Social Sciences (Version 21) [Computer Software]. Armonk, NY: IBM

- Stein, S. E., Dirks, B. P., & Quinlan, J. J. (2010). Assessing and addressing safe food handling knowledge, attitudes, and behaviors of college undergraduates. *Journal of Food Science Education*, 9, 47-52.
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53-55.
- Trepka, M., Newman, F. L., Dixon, Z., & Huffman, F. G. (2007). Food safety practices among pregnant women and mothers in the women, infants, and children program, Miami, Florida. *Journal of Food Protection*, 70(5), 1230-1237.
- Trexler, C. J., & Roeder, D. (2003). Using qualitative research methods to ascertain elementary students' understanding of food safety. *Journal of Food Science Education*, 2, 25-31.
- United States Department of Agriculture, Food Safety and Inspection Service. (2011) Washing food: Does it promote food safety? Retrieved from [http://www.fsis.usda.gov/factsheets/Does\\_Washing\\_Food\\_Promote\\_Food\\_Safety/](http://www.fsis.usda.gov/factsheets/Does_Washing_Food_Promote_Food_Safety/)
- Walkup, J. T., Barlow, A., Mullany, B. C., Pan, W., Goklish, N., Hastings, R., ... Reid, R. (2009). Randomized controlled trial of a paraprofessional-delivered in-home intervention for young reservation-based American Indian mothers. *Journal of American Academy of Child Adolescent Psychiatry*, 48(6), 591-601.
- Wenrich, T., Cason, K., Lv, N., & Kassab, C. (2003). Food safety knowledge and practice of low income adults in Pennsylvania. *Food Protection Trends*, 23(4), 326-335.

## Appendix A.

**MULTIPLE CHOICE – PLEASE CHOOSE 1 ANSWER FOR EACH QUESTION**

1. Your electricity went off in your freezer and the meat, chicken, and fish thawed and felt warm. What should you do to prevent food poisoning?  
☐ Throw them away  
☐ Cook them right away  
☐ See how they smell or look before deciding what to do  
☐ Immediately re-freeze until solidly frozen, then cook it
2. Your child is going to be eating 2 hours after you cook a meal. How should you keep the meal safe before your child eats it?  
☐ Store it in the refrigerator and reheat it when the child is ready to eat it  
☐ Place it on the kitchen counter until the child is ready to eat it  
☐ Store it in a cool oven until the child is ready to eat it  
☐ Store it in a warm oven until the child is ready to eat it
3. Which food needs to be refrigerated to prevent food poisoning?  
☐ Apples  
☐ Dried corn  
☐ Open box of raisins  
☐ Corn bread  
☐ An open can of corn
4. What is the safest way to cool a large pot of hot soup?  
☐ Put the soup in a clean shallow pan and refrigerate right away  
☐ Keep the soup in the cooking pot and refrigerate right away  
☐ Put the soup in a clean, deep pot before and refrigerate right away  
☐ Cool the soup to room temperature on the counter, then refrigerate it
5. How long can you store cooked hamburger and chicken in the refrigerator to eat later?  
☐ 1-2 days  
☐ 3-4 days  
☐ 5-7 days  
☐ More than a week

## Appendix A.

6. How long can you store raw hamburger and chicken in the refrigerator to eat later?
- ☐ 1-2 days
  - ☐ 3-4 days
  - ☐ 5-7 days
  - ☐ More than a week
7. If you have a cut or sore on your hand, what should you do before you prepare food for your family?
- ☐ Nothing, if it is not infected
  - ☐ Put a bandage on the cut or sore
  - ☐ Wash hands
  - ☐ Put a bandage on the sore and wear a glove
8. Where is the best place to store raw meat in the refrigerator
- ☐ On the top shelf
  - ☐ Where there is space
  - ☐ Below ready-to-eat foods, like salad
9. Putting raw meat in a separate bag (away from other food items) before placing it in the grocery cart:
- ☐ Increases the chance of food poisoning
  - ☐ Decreases the chance of food poisoning
  - ☐ Makes no difference
10. How should you wash fresh fruits and vegetables to keep you from getting food poisoning?
- ☐ Wash with regular soap
  - ☐ Wash with hot water
  - ☐ Wash with anti-bacterial soap
  - ☐ Hold under cool running water
11. After you have used a cutting board to slice raw meat or chicken, or fish and need to cut other foods, which of these is the best way to prevent food poisoning?
- ☐ Wipe the cutting board off with a paper towel
  - ☐ Rinse the cutting board under very hot water
  - ☐ Turn the cutting board over and use the other side
  - ☐ Wash the cutting board with hot soapy water and rinse

## Appendix A.

12. How should kitchen counters be cleaned to prevent food poisoning?
- ☐ Spray with a strong bleach solution, rinse and wipe dry
  - ☐ Wash with hot soapy water, rinse and wipe with a bleach solution
  - ☐ Wash with hot soapy water and let air dry
  - ☐ Brush off any dirt or food, wipe with a bleach solution and let air dry
13. What is the best way to wash your hands?
- ☐ Apply sanitizer, run water, rub hands together for 20 seconds, rinse hands, dry hands, rub on an antiseptic hand lotion
  - ☐ Apply soap, rub hands together for 20 seconds, rinse hands under water, dry hands, apply sanitizer
  - ☐ Run water, moisten hands, apply soap, rub hands together for 20 seconds, rinse hands, dry hands
  - ☐ Run water, moisten hands, apply sanitizer, rub hands together for 20 seconds, rise hands, dry hands, rub on antiseptic hand lotion.
14. Before you begin preparing food, how often do you wash your hands with soap?
- ☐ All of the time
  - ☐ Most of the time
  - ☐ Some of the time
  - ☐ Rarely
15. Washing hands after changing a diaper:
- ☐ Increases the chance of food poisoning
  - ☐ Decreases the chance of food poisoning
  - ☐ Makes no difference
16. What is the **best** way to tell if hamburgers are cooked enough to prevent food poisoning?
- ☐ Cut one to check the color of the meat inside
  - ☐ Check the color of the juice to be sure that it is not pink
  - ☐ Measure the temperature with a food thermometer
  - ☐ Check the texture or firmness of the meat

## Appendix A.

17. What is the **best** way to tell when chicken has cooked long enough?
- ☐ The juices run clear
  - ☐ The meat is not pink in the center
  - ☐ The meat falls off the bone
  - ☐ Test with a meat thermometer
18. To prevent food poisoning, how long should leftover soup be heated?
- ☐ Until it is boiling hot
  - ☐ Just until it is hot, but not too hot to eat right away
  - ☐ When it is at least room temperature
  - ☐ Reheating isn't necessary

**IN THIS SECTION, EACH QUESTION MAY HAVE MORE THAN ONE CORRECT ANSWER. PLEASE SELECT ALL OF THE CORRECT ANSWERS.**

19. Check the safe way(s) to thaw frozen meat? (**Check all that apply**)
- ☐ In the refrigerator
  - ☐ In the microwave
  - ☐ On the countertop
  - ☐ Under running water
  - ☐ Put in a sink filled with water
20. To prevent food poisoning, which of these individuals should not prepare food for other people? (**Check all that apply**)
- ☐ A person with diarrhea
  - ☐ A person with sores or pimples on face
  - ☐ A person with a fever
  - ☐ A person with a rash
  - ☐ A person who smokes
  - ☐ A person with a sore throat
  - ☐ A person with allergies
  - ☐ A person who has just vomited
  - ☐ A person with a runny nose

## Appendix A.

21. When preparing food, you should wash your hands after touching which of these?

(Check all that apply)

- ☐ Your face
- ☐ Dirty pots and pans
- ☐ Fresh fruit
- ☐ Dishes that came out of the dishwasher
- ☐ Clean countertop
- ☐ Cell phone or home telephone
- ☐ Tissue after blowing nose
- ☐ Dirty diaper

22. How should dishes be washed to prevent food poisoning? (Check all that apply)

- ☐ Soak them in the sink for several hours and then wash them in the same water
- ☐ Hand wash them right after the meal and then let them air-dry
- ☐ Hand wash and rinse them right after the meal and then dry them with a dish towel
- ☐ Wash and dry them in a dishwasher

23. Which is an acceptable way to clean a cutting board or counter after it is used for raw meat? (Check all that apply)

- ☐ Rinse well with water
- ☐ Wipe with a dishrag
- ☐ Wash with hot soapy water only
- ☐ Wash with hot soapy water, rinse with water, then rinse with bleach
- ☐ Clean with a disinfectant (example: Lysol, Clorox, bleach)
- ☐ Wash cutting board in a dishwasher

24. A food is properly cooked in a microwave oven when (Check all that apply)

- ☐ The food looks done
- ☐ You follow directions on the package
- ☐ You stir the food about half way through cooking
- ☐ You use a turntable in the microwave
- ☐ The food feels hot
- ☐ You test the food with a thermometer

## Appendix A.

25. Which foods will likely cause food poisoning for pregnant women, infants, and children? (**Check all that apply**)

- ☐ Cottage cheeses
- ☐ Cold smoked fish
- ☐ Cold potato salads
- ☐ Hot dogs that have not been heated
- ☐ Raw eggs
- ☐ Undercooked eggs
- ☐ Canned vegetables (corn, green beans)
- ☐ Canned fruit juice

26. Which of these people will likely get sick from harmful germs in food? (**Check all that apply**)

- ☐ Preschool children
- ☐ Teenagers
- ☐ Pregnant women
- ☐ Older people (age 60 and over)
- ☐ People with type II diabetes
- ☐ Cancer patients
- ☐ People who frequently eat at restaurants or get take-out food often
- ☐ None of these individuals

27. Which food(s) will likely cause food poisoning? (**Check all that apply**)

- ☐ Slices of cantaloupe left on the counter overnight
- ☐ Baked potato that was left on the counter overnight
- ☐ Leftover turkey eaten cold
- ☐ Cake that was left on the counter overnight
- ☐ Cooked corn cooled on the counter

28. Which food(s) will likely cause food poisoning? (**Check all that apply**)

- ☐ Fried eggs with a runny or soft yolk
- ☐ Purchased cookie dough
- ☐ Raw homemade cookie dough or cake batter
- ☐ Soft scrambled eggs
- ☐ Hard cooked (boiled) eggs



## Appendix A.

29. Which food(s) will likely cause food poisoning? (**Check all that apply**)

- ☐ Raw oysters, clams, or mussels
- ☐ Sushi
- ☐ Cooked shellfish
- ☐ Cooked catfish

30. Which food(s) will likely cause food poisoning? (**Check all that apply**)

- ☐ Home canned beans, carrots, peas or potatoes right from the jar
- ☐ Commercially canned vegetables right out the can without re-heating them
- ☐ Unpasteurized fruit juice
- ☐ Sliced cantaloupe
- ☐ Raw sprouts (alfalfa, bean, clover, radish)
- ☐ Fresh homemade tomato sauce

31. Which food(s) will likely cause food poisoning? (**Check all that apply**)

- ☐ Leftover soup reheated until warm but not boiling
- ☐ Potato salad that was left at room temperature for more than 2 hours
- ☐ Soft food like cottage cheese after scraping off mold
- ☐ Box of rice
- ☐ Food stored in a cabinet beside oven
- ☐ Cooked rice with raisins and sugar

32. Which food(s) will likely cause food poisoning? (**Check all that apply**)

- ☐ Raw milk (not pasteurized)
- ☐ Fresh cheese made with raw milk
- ☐ Infant milk or formula with honey added
- ☐ Mixed powdered milk

33. Which food(s) will likely cause food poisoning? (**Check all that apply**)

- ☐ Rare hamburgers
- ☐ Grilled steak served on the same plate that held raw steak without washing the plate
- ☐ Meat cooked medium-well
- ☐ Frozen foods with frost built up in the package

## Appendix A.

**TRUE/FALSE - PLEASE CHOOSE TRUE OR FALSE FOR THE FOLLOWING STATEMENTS**

34. *E. coli* (a harmful germ) in undercooked hamburger can cause kidney failure in children  
☐ True  
☐ False
35. Undercooked chicken and raw eggs can carry *Salmonella* (a harmful germ).  
☐ True  
☐ False
36. It is safe to use raw eggs in recipes that will not be cooked.  
☐ True  
☐ False
37. It is safe to give an infant a bottle of baby formula that has been out of the refrigerator for longer than 2 hours?  
☐ True  
☐ False
38. Chilling or freezing eliminates harmful germs in food.  
☐ True  
☐ False
39. Your TV dinner (frozen dinners) will be cooked properly in your microwave when you follow the package directions.  
☐ True  
☐ False
40. Pasta salad, luncheon meat and hotdogs kept beyond the expiration date are safe.  
☐ True  
☐ False
41. If a leftover food looks and smells good, it is still safe to eat.  
☐ True  
☐ False

## Appendix A.

## 1. Gender:

☐ Male      ☐ Female

## 2. Race/Ethnicity:

- ☐ Caucasian or White
- ☐ Native American (Tribe \_\_\_\_\_)
- ☐ African American or Black
- ☐ Hispanic, Latino or Spanish origin
- ☐ Asian
- ☐ Other, please specify \_\_\_\_\_

3. What is your birth date (month/year) ? \_\_\_\_\_

4. City, State, Country of birth \_\_\_\_\_

5. How long have you been living in the U.S.? \_\_\_\_\_

6. What is the last grade or year of school that you have **completed**?

- ☐ Less than high school
- ☐ Some high school
- ☐ High school (graduate or GED)
- ☐ Additional training beyond high school (not college)
- ☐ Some college
- ☐ College graduate
- ☐ Post-College graduate

## 7a. Which of the following best describes your experience in a food or nutrition related job? (This includes working in a restaurant or fast food)

- ☐ I have never worked in a food or nutrition related job; *Go to question 9*
- ☐ I currently work or did work in a food or nutrition related job; *Go to question 7b*

## Appendix A.

7b. How many year(s) did you work in a food or nutrition related job?

\_\_\_\_\_ Year(s)

8. Which of the following best describes any education/training you have had in food service or nutrition? (Choose all that apply)

- ☐ I have not had any education/training in food or nutrition
- ☐ I have had education/training in nutrition
- ☐ I have had education/training in food preparation
- ☐ I have had education/training in food safety

9. How many children aged 10 years or younger are currently living in your household?

\_\_\_\_\_

10. Please list the birth date of the children living in your household (example, May 2011):

First Child age: \_\_\_\_\_  
Second Child age: \_\_\_\_\_  
Third Child age: \_\_\_\_\_  
Fourth Child age: \_\_\_\_\_  
Fifth Child age: \_\_\_\_\_  
Sixth Child age: \_\_\_\_\_

11. How many meals a week do you make for your children (include snacks and school lunches)? \_\_\_\_\_

12. Are you:

- ☐ Employed full-time
- ☐ Employed part-time
- ☐ Not employed

## Appendix A.

13. Please check how you would like to receive food and nutrition information?

**Print:**

- ☐ Mail  
☐ Newspaper  
☐ Brochure  
☐ Magazine  
☐ Poster  
☐ Food label  
☐ Materials in waiting room at doctor's office. Please list \_\_\_\_\_  
☐ Materials from child's school  
☐ Other: \_\_\_\_\_

*Where would you like to see these materials?* \_\_\_\_\_

**Media:**

- ☐ Television  
☐ Radio  
☐ Video in waiting room at doctor's office  
☐ Other: \_\_\_\_\_

**Electronic:**

- ☐ Podcasts  
☐ Internet  
☐ E-mail  
☐ Text message  
☐ Blogs  
☐ Other: \_\_\_\_\_

**People:**

- ☐ Family member: Please list: \_\_\_\_\_  
☐ Friends  
☐ Tribal Member: Please list: \_\_\_\_\_  
☐ Doctor  
☐ Nurse  
☐ My child's Teachers  
☐ Other: \_\_\_\_\_

**Education:**

- ☐ Classes  
☐ Workshops  
☐ Other: \_\_\_\_\_

*Where would you like these classes to take place* \_\_\_\_\_

## Appendix B.

**PLEASE CHOOSE ONE ANSWER FOR EACH QUESTION**

1. Your electricity went off in your freezer and the meat, chicken, and fish thawed and felt warm. What should you do to prevent food poisoning?  
☐ Throw them away  
☐ Cook them right away  
☐ See how they smell or look before deciding what to do  
☐ Immediately re-freeze until solidly frozen, then cook it
2. Your child is going to be eating 2 hours after you cook a meal. How should you keep the meal safe before your child eats it?  
☐ Store it in the refrigerator and reheat it when the child is ready to eat it  
☐ Place it on the kitchen counter until the child is ready to eat it  
☐ Store it in a cool oven until the child is ready to eat it  
☐ Store it in a warm oven until the child is ready to eat it
3. Which food needs to be refrigerated to prevent food poisoning?  
☐ Apples  
☐ Dried corn  
☐ Open box of raisins  
☐ Corn bread  
☐ An open can of corn
4. What is the safest way to cool a large pot of hot soup?  
☐ Put the soup in a clean shallow pan and refrigerate right away  
☐ Keep the soup in the cooking pot and refrigerate right away  
☐ Put the soup in a clean, deep pot before and refrigerate right away  
☐ Cool the soup to room temperature on the counter, then refrigerate it
5. How long can you store cooked hamburger and chicken in the refrigerator to eat later?  
☐ 1-2 days  
☐ 3-4 days  
☐ 5-7 days  
☐ More than a week

## Appendix B.

6. How long can you store raw hamburger and chicken in the refrigerator to eat later?  
☐ 1-2 days  
☐ 3-4 days  
☐ 5-7 days  
☐ More than a week
7. If you have a cut or sore on your hand, what should you do before you prepare food for your family?  
☐ Nothing, if it is not infected  
☐ Put a bandage on the cut or sore  
☐ Wash hands  
☐ Wash hands, put a bandage on the sore, and wear a glove
8. Where is the best place to store raw meat in the refrigerator?  
☐ On the top shelf  
☐ Where there is space  
☐ Below ready-to-eat foods, like salad
9. Putting raw meat in a separate bag (away from other food items) before placing it in the grocery cart:  
☐ Increases the chance of food poisoning  
☐ Decreases the chance of food poisoning  
☐ Makes no difference
10. How should you wash fresh fruits and vegetables to keep you from getting food poisoning?  
☐ Wash with regular soap  
☐ Wash with hot water  
☐ Wash with anti-bacterial soap  
☐ Hold under cool running water
11. How should kitchen counters be cleaned to prevent food poisoning?  
☐ Spray with a strong bleach solution, rinse and wipe dry  
☐ Wash with hot soapy water, rinse and wipe with a bleach solution  
☐ Wash with hot soapy water and let air dry  
☐ Brush off any dirt or food, wipe with a bleach solution and let air dry

## Appendix B.

12. What is the best way to wash your hands?
- ☐ Apply sanitizer, run water, rub hands together for 20 seconds, rinse hands, dry hands, rub on an antiseptic hand lotion
  - ☐ Apply soap, rub hands together for 20 seconds, rinse hands under water, dry hands, apply sanitizer
  - ☐ Run water, moisten hands, apply soap, rub hands together for 20 seconds, rinse hands, dry hands
  - ☐ Run water, moisten hands, apply sanitizer, rub hands together for 20 seconds, rise hands, dry hands, rub on antiseptic hand lotion.
13. Washing hands after changing a diaper:
- ☐ Increases the chance of food poisoning
  - ☐ Decreases the chance of food poisoning
  - ☐ Makes no difference
14. What is the **best** way to tell if hamburgers are cooked enough to prevent food poisoning?
- ☐ Cut one to check the color of the meat inside
  - ☐ Check the color of the juice to be sure that it is not pink
  - ☐ Measure the temperature with a food thermometer
  - ☐ Check the texture or firmness of the meat
15. What is the **best** way to tell when chicken has cooked long enough?
- ☐ The juices run clear
  - ☐ The meat is not pink in the center
  - ☐ The meat falls off the bone
  - ☐ Test with a meat thermometer
16. To prevent food poisoning, how long should leftover soup be heated?
- ☐ Until it is boiling hot
  - ☐ Just until it is hot, but not too hot to eat right away
  - ☐ When it is at least room temperature
  - ☐ Reheating isn't necessary



## Appendix B.

**IN THIS SECTION, EACH QUESTION MAY HAVE MORE THAN ONE CORRECT ANSWER. PLEASE SELECT ALL OF THE CORRECT ANSWERS.**

17. How should dishes be washed to prevent food poisoning? (**Check all that apply**)

- ☐ Hand wash them and rinse right after the meal and then let them air-dry
- ☐ Hand wash and rinse them right after the meal and then dry them with a dish towel
- ☐ Wash and dry them in a dishwasher

18. When preparing food, you should wash your hands after touching which of these? (**Check all that apply**)

- ☐ Dirty pots and pans
- ☐ Fresh fruit
- ☐ Dishes that came out of the dishwasher
- ☐ Clean countertop
- ☐ Cell phone or home telephone

19. Which is an acceptable way to clean a cutting board or counter after it is used for raw meat? (**Check all that apply**)

- ☐ Wash with hot soapy water only
- ☐ Wash with hot soapy water, rinse with water, then rinse with bleach
- ☐ Clean with a disinfectant (example: Lysol, Clorox, bleach)
- ☐ Wash cutting board in a dishwasher

20. A food is properly cooked in a microwave oven when (**Check all that apply**)

- ☐ You follow directions on the package
- ☐ You stir the food about half way through cooking
- ☐ You use a turntable in the microwave
- ☐ The food feels hot
- ☐ You test the food with a thermometer

## Appendix B.

21. Which foods will likely cause food poisoning for pregnant women, infants, and children? (**Check all that apply**)

- ☐ Cottage cheeses
- ☐ Cold smoked fish
- ☐ Cold potato salads
- ☐ Hot dogs that have not been heated
- ☐ Raw eggs
- ☐ Undercooked eggs
- ☐ Canned vegetables
- ☐ Canned fruit juice

22. Which of these people will likely get sick from harmful germs in food? (**Check all that apply**)

- ☐ Preschool children
- ☐ Teenagers
- ☐ Pregnant women
- ☐ Older people (age 60 and over)
- ☐ People with type 2 diabetes
- ☐ Cancer patients
- ☐ People who frequently eat at restaurants or get take-out food often
- ☐ None of these individuals

## Appendix B.

23. Eating which of these foods will increase a person's risk of food poisoning?

(Check all that apply)

- ☐ Baked potato that was left on the counter overnight
- ☐ Leftover turkey eaten cold
- ☐ Cake that was left on the counter overnight
- ☐ Soup cooled on the counter
- ☐ Fried eggs with a runny or soft yolk
- ☐ Purchased cookie dough
- ☐ Raw homemade cookie dough or cake batter
- ☐ Sushi
- ☐ Raw shellfish
- ☐ Unpasteurized fruit juice
- ☐ Sliced melons or cantaloupe
- ☐ Raw sprouts (alfalfa, bean, clover, radish)
- ☐ Fresh homemade tomato sauce
- ☐ Leftover soup reheated until warm but not boiling
- ☐ Raw milk (not pasteurized) or fresh cheese made with raw milk
- ☐ Infant milk or formula with honey added
- ☐ Meat cooked medium-well
- ☐ Milk with raw egg added
- ☐ Hamburger cooked rare

**PLEASE CHOOSE TRUE OR FALSE FOR THE FOLLOWING STATEMENTS**

24. *E. coli* (a harmful germ) in undercooked hamburger can cause kidney failure in children.

- ☐ True
- ☐ False

25. Undercooked chicken and raw eggs can carry *Salmonella* (a harmful germ).

- ☐ True
- ☐ False

26. It is safe to use raw eggs in recipes that will not be cooked.

- ☐ True
- ☐ False

## Appendix B.

27. It is safe to give an infant a bottle of baby formula that has been out of the refrigerator for longer than 2 hours?

\_\_True

\_\_False

28. Refrigeration eliminates harmful germs in food.

\_\_True

\_\_False

29. If a leftover food looks and smells good, it is still safe to eat.

\_\_True

\_\_False

1. Gender:

☐ Male

☐ Female

2. Race/Ethnicity:

☐ Caucasian or White

☐ Native American (Tribe:\_\_\_\_\_)

☐ African American or Black

☐ Hispanic, Latino or Spanish origin

☐ Asian

☐ Other, please list \_\_\_\_\_

3. How old are you? \_\_\_\_\_

4. Where do you live? \_\_\_\_\_

## Appendix B.

5. What is the last grade or year of school that you have **completed**?

- ☐ Less than high school
- ☐ Some high school
- ☐ High school (graduate or GED)
- ☐ Additional training beyond high school (not college)
- ☐ Some college
- ☐ College graduate
- ☐ Post-College graduate

6. Have you worked in a food or nutrition related job?

- ☐ No
- ☐ Yes

7. Have you ever had training in food safety or nutrition? (Choose all that apply)

- ☐ I have not had any education/training in food or nutrition
- ☐ I have had education/training in nutrition
- ☐ I have had education/training in food preparation
- ☐ I have had education/training in food safety

8. Please list the ages of the children you make food for:

First Child age: \_\_\_\_\_  
Second Child age: \_\_\_\_\_  
Third Child age: \_\_\_\_\_  
Fourth Child age: \_\_\_\_\_  
Fifth Child age: \_\_\_\_\_  
Sixth Child age: \_\_\_\_\_

9. Are you:

- ☐ Employed full-time
- ☐ Employed part-time
- ☐ Not employed

## Appendix B.

10. Please check how you would like to get food and nutrition information.

- ☐ Print (example: mail, brochure, poster, materials from child's school)
- ☐ Media (example: TV, radio)
- ☐ Electronic (example: email, internet, text message, blogs)
- ☐ People (example: family/community member, doctor)
- ☐ Education (example: classes, workshops)

## Appendix C.

### **INTRODUCTION**

Good afternoon/evening and welcome to our session today/tonight.

Thank you for taking the time to join our discussion. My name is Kara and I am a student researcher from the University of Nebraska-Lincoln. This is my assistant \_\_\_\_\_ (name), also from the University of Nebraska-Lincoln. We are here today to better understand your thoughts about how to keep foods safe to eat.

Because you are the main person who prepares the food in your home and have at least one child under the age of 10, we are very interested in talking with you.

As we talk about food safety, there are no right or wrong answers but rather differing points of views and opinions. Please feel free to share your point of view or opinion even if it differs from what others have said.

We will need to audio-record our discussion so we can remember what was said. If several are talking at the same time, the recorder will get garbled and we'll miss your comments, so try to speak only one at a time. I will make sure that everyone gets a chance to be heard. We will be on a first name basis today/tonight; however in our reports we will not attach any names to any comments. Your responses will be kept private.

Our session will last about 1-1 1/2 hours and there will not be any breaks. If you need to get up to stretch or use the restroom (which is located \_\_\_\_), please feel free to do so quietly. We also ask that you turn the volume off on cell phones as this can be a distraction from our session.

### **ARE THERE ANY QUESTIONS YOU HAVE AT THIS TIME?**

Well, let's begin. We've given name cards to everyone but let's go around the room/table and tell everyone your name and something you like to make to eat with/for your kids.

### **ICE BREAKER QUESTION**

What are some traditional meals that you prepare?

-Prompt: Tell me more. How is that prepared? When do you prepare this?

Are there any foods made for special events?

-How is that made? Can you share how? What ingredients are used?

### **TRANSITION**

---

## Appendix C.

We are here today to talk to about food safety. Have you heard about anyone getting sick from food? What do you call that? Prompt: What does the word ‘food poisoning’ mean to you?

## INTERVIEW QUESTIONS

### Perceived Severity

---

When a person gets sick from food, what are the symptoms?

*(Get them to say diarrhea, vomiting, so others will be less shy saying these words)*

Have you or anyone living with you ever been sick from food?

*-If yes, ask, “Tell me about the last time you or someone in your household got sick from food?” or “Tell me more...”*

What made you think the sickness was caused by food?

*-How bad was it?*

*-(Could probe for specific symptoms)*

Do you think certain food or drinks caused this sickness?

*-Prompt for specific foods and beverages...What were these foods?*

If someone in your family got sick from food, how would it affect you?

*Prompt: (family/schedule) Would you have to do different that day?*

If your child(ren) got sick from food, what do you think could happen to them?

*-Are there more serious symptoms? (if they just say tummy ache, vomiting, etc.)*

### Perceived Susceptibility

---

Some people, more than others, get sick from eating food. Why do you think this is so?

*-(Add prompts related to age, where they eat, how they eat, etc.)*

*Prompt: do you think this makes them sick?*

What foods do you think make people sick?

*-How do you think these foods make you sick?*

What foods do you think make babies sick?

Do you think that you are more or less at risk for a food borne illness living in the United States? Why or why not?

*Prompts: level of perceived risk in US w/food regulation; learning to make US foods, What new foods do you make that your children want that they had at school?)*

### Perceived Benefits

---



## Appendix C.

What is one thing you would like to change to keep food safe in your home?

What would prevent you from doing these things?

Do you think you can prevent your family from getting sick from food?

If so, how? If no, why?

What steps can you take to prevent your family from getting sick from food?

What about others in your household? What steps can they take to prevent getting sick from food?

### **Perceived Barriers**

---

What gets in the way of you taking steps to prevent your family from getting sick from food?

*Prompts: To what extent do you think it takes more time, costs more money, is inconvenient, etc.)*

What would it take to help you make changes even though barriers exist?

Of the problems you have mentioned, which is most difficult to overcome?

### **Self-Efficacy**

---

To what extent do you feel confident in your ability to safely prepare food in your home so that your family won't get sick?

To what extent do you feel confident in your ability to safely store food in your home?

To what extent do you feel confident in your ability to safely purchase food for-your family?

*-How confident are you that the supply of food (from a grocery store, restaurant, carniceria, farmer's market) you and your family consumes is safe?*

### **Cues to Action**

---

Think about the last time you were given health information that you were able to use right away. What was unique about that information or how it was provided?

What made it useful to you?

Now think about the last time you were given health information that was not useful to you. What was unique about the information or how was it provided that made it not useful?

## Appendix D.



College of Education and Human Sciences  
Department of Nutrition and Health Sciences

## Consent Form

Dear Parent or Guardian,



You have been selected to complete the Food Safety for Native American Families with Young Children in Nebraska Survey because you are the primary food handler in your home with children 10 years old and younger. This survey is for research purposes only and there are no known risks involved. The benefits include adding to our body of knowledge of food safety. Results of this study could be reported in an abstract or publication submitted to a scientific association, professional journal, or thesis.

Participation in this study is voluntary. You can refuse to participate or withdraw at any time without harming your relationship with the researchers or the University of Nebraska-Lincoln, or in any other way receive a penalty or loss of benefits to which you are otherwise entitled.

Completion of the survey will take about 30 to 45 minutes, and to thank you for your participation, you will receive a \$5 Walmart gift card. To receive the gift card, you will need to fill out the attached form with your name and social security number. For payment purposes, we are required to collect your social security number. Personal information forms with your name and social security number will be kept separate from the data collected in a locked cabinet that only the researchers will have access to. These personal information forms will be destroyed after two years.

If you have any questions about the project please contact Dr. Julie Albrecht at 402-472-8884 (jalbrecht@unl.edu) or Kara Vlasin-Marty at 402-472-3717 (kvlasin-marty@hotmail.com). If you have any questions about your rights or wish to report any concerns, please contact the UNL Research Compliance Services Office at 402-472-6929.

Thank you.

Julie A. Albrecht, Ph.D., R.D.  
Professor/Extension Food Specialist

Kara Vlasin-Marty, DTR  
Graduate Research Assistant

## Appendix E.



College of Education and Human Sciences  
Department of Nutrition and Health Sciences

Dear Parent or Guardian,

You have been offered a chance to participate in a focus group and complete the Food Safety for Native American Families with Young Children in Nebraska Survey because you are the primary food handler in your home with children 10 years old and younger. This focus group and survey is for research purposes only and there are no known risks involved. The benefits include adding to our body of knowledge of food safety. Results of this study could be reported in an abstract or publication submitted to a scientific association, professional journal, or thesis.

Participation in this study is voluntary. Since the focus group is an open discussion, we cannot guarantee all information shared with the group will remain confidential among other participants. Participants should share information they feel comfortable sharing with the group. You can refuse to participate or withdraw at any time without harming your relationship with the researchers or the University of Nebraska-Lincoln, or in any other way receive a penalty or loss of benefits to which you are otherwise entitled.

Focus group discussion and completion of the survey will take about 90 minutes, and to thank you for your participation, you will receive a \$25 Walmart gift card. To receive the gift card, you will need to fill out the attached form with your name and social security number. For payment purposes, we are required to collect your social security number. Personal information forms with your name and social security number will be kept separate from the data collected in a locked cabinet that only the researchers will have access to. These personal information forms will be destroyed after 3 months.

If you have any questions about the project please contact Dr. Julie Albrecht at 402-472-8884 (jalbrecht@unl.edu) or Kara Vlasin-Marty at 402-472-3717 (kvlasin-marty@hotmail.com). If you have any questions about your rights or wish to report any concerns, please contact the UNL Research Compliance Services Office at 402-472-6929.

Thank you.

Julie A. Albrecht, Ph.D., R.D.  
Professor/Extension Food Specialist

Kara Vlasin-Marty, DTR  
Graduate Research Assistant

## Appendix E.



Please sign below to show your consent for participation in the Food Safety for Native American Families with Young Children in Nebraska focus group and survey.

Participant Signature: \_\_\_\_\_

Date: \_\_\_\_\_

110 Ruth Leverton Hall / P.O. Box 830806 / Lincoln, NE 68583-0806 / (402) 472-3716 / Fax (402) 472-1587

**If you are the main food preparer in a  
Native American family with  
children 10 years of age or younger,  
we would like to invite you  
to join us in our food safety study**

**Date: May 3**

**Time: 12:30 pm or 3:00 pm**

**Location: The Parent Room**

It takes about 90 minutes to complete the survey  
and then participate in the focus group.

**You will receive a  
\$25 Walmart Gift Card  
for participating in our study**

## Appendix G.

Name: \_\_\_\_\_

Social Security Number: \_\_\_\_\_

## Appendix H.

Reliability Statistics	
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
.650	.667

## Appendix I.

	<b>Food</b>	<b>Frequency</b>
<b>Meat</b>	Ground Beef	25
	Hot Dogs	6
	Chicken	4
	Meatloaf	4
	Bison	2
	Fried Chicken	2
	Pork	2
	Sausage	2
	Buffalo Wings	1
	Cat Fish Nuggets	1
	Chicken Nuggets	1
	Deer	1
	Ground Turkey	1
	Minute Steak	1
	Pork Chops	1
	Pork Loin	1
	Roast Beef	1
	Shrimp	1
	Tripe (Stomach Lining)	1
	Turkey	1
<b>Pasta/Rice</b>	Spaghetti	18
	Goulash	6
	Macaroni and Cheese	5
	Noodles	4
	Ramen Noodles	4
	Rice	4
	Rice and Vegetables	1
	Fettuccine Alfredo	1
	Sticky Rice	1
	Tuna Noodle Casserole	1
<b>Soup/Stew</b>	Chili	7
	Soups	4
	Chicken Soup	3
	Corn Soup	3
	Chicken Noodle Soup	2
	Beef Soup	1
	Beef Noodle Soup	1



## Appendix I.

	Cabbage Stew	1
	Ham and Bean Soup	1
	Macaroni and Hamburger Soup	1
	Vegetable Soup	1
<b>Native American Foods</b>	Fry Bread	9
	Indian Tacos	2
	Brown Bread	1
	Hominy	1
	Indian Dogs	1
	Wojapi	1
<b>Mexican Foods</b>	Tacos	3
	Nachos	2
	Spanish Rice	2
	Guacamole with Crabmeat/Shrimp	1
	Menudo	1
	Posole	1
	Steak Fajitas	1
<b>Vegetables</b>	Beans	5
	Mashed Potatoes	4
	Baked Potatoes	2
	Corn (Canned/Frozen)	3
<b>Salads</b>	Salad	4
	Potato Salad	3
	Pasta Salad	1
<b>Miscellaneous</b>	Pizza	4
	Casseroles	2
	Cereal/Oatmeal	2
	Cowboy Bread with Sausage Gravy	2
	Beans and Hamburger/Bologna	1
	Biscuits and Hamburger Gravy	1
	Cornbread	1
	French Fries	1
	Hamburger Helper	1
	Pot Pie	1
	Stir Fry	1
	Stromboli	1
	TV Dinners	1