

**Appendix A:
Detailed Study Description for Fiscal Year 2020 Study on
Adherence to the “Cook” Behavior When Grilling**

The purpose of the observational study is to evaluate adherence to the key behaviors of clean, separate, cook, and chill following exposure to food safety messaging and to assess the extent of cross-contamination in the kitchen due to failure to follow recommended practices. The study design and procedures for the fiscal year 2020 study are described below.

Experimental Design. The purpose of the fiscal year 2020 observational study/meal preparation experiment is to evaluate adherence to the key behavior of “cook” when grilling hamburgers and bratwursts or Italian sausages (i.e., whether a food thermometer is used and, if so, whether cooked to proper temperature) following exposure to direct messaging of food safety information on thermometer use, handwashing, and other safe handling behaviors in the form of a recipe formatted using the Safe Recipe Style Guide.¹ We will also examine whether participants follow recommended practices for repackaging leftover ground beef from a “chub”-style package. Furthermore, we will assess adherence to other food safety behaviors including handwashing, cleaning and sanitation, and produce washing. We will collect microbiological samples to assess the extent of cross-contamination in the kitchen due to failure to follow recommended cleaning and sanitation practices when grilling, preparing a side salad, and handling the leftover ground beef. An additional sample of participants who are not part of the experimental study will prepare guacamole (using avocados and fresh cilantro) in addition to the side salad and grilled burgers/brats to provide information on how consumers handle avocados and cilantro.

We will recruit individuals who self-report cooking ground beef burgers on an outdoor grill/barbeque within the past 6 months. A subset of participants will have prior experience purposefully purchasing meat or poultry in large quantities with the plan to repackage it for cooking at a later date. Participants will be randomly assigned to either a control group (the recipe card will not include safe food handling information) or one of two intervention (treatment) groups. Treatment group 1 will receive a recipe card with safe food handling information; for treatment group 2, the recipe card will include the same safe food handling information and the recipe will be endorsed by the celebrity chef J. Kenzi Lopez-Alt.

Study Hypotheses. The study will address the following hypotheses:

1. The presence of food safety information in recipes (Treatment 1) will lead to greater adherence to recommended safe food handling practices (compared with control).
2. The presence of food safety information in recipes and the celebrity chef endorsement (Treatment 2) will lead to greater adherence to recommended safe food handling practices (compared with control).

¹ <https://www.saferecipeguide.org/>

3. The presence of food safety information in recipes and the celebrity endorsement (Treatment 2) will lead to greater adherence to recommended safe food handling practices than food safety information alone (compared with Treatment 1).

Guacamole Study. We will recruit 50 participants who are not part of the experimental study to prepare guacamole (using avocados and fresh cilantro) in addition to a side salad and the grilled burgers/brats to provide information on how consumers handle avocados and cilantro. For example, do consumers rinse avocados? Do they use a brush? Do they use a clean knife to cut them? Do consumers rinse cilantro? Do they dry after rinsing? The recipe for the guacamole will not include safe food handling information. For microbiological reasons it is not possible to examine cross-contamination during preparation of the guacamole through the use of a microbiological surrogate.

Study Procedures. We will provide participants with the ingredients and recipes needed to prepare the specific meal/dishes. Participants will be provided with ground beef in 1-pound chub packaging so that we can instruct them to repackage the leftover ground beef and observe their adherence to recommended practices for packaging leftovers. Participants will be instructed to grill two burgers and two brats on an indoor grill in the kitchen; this will allow us to observe whether they cross-contaminate when handling raw and ready-to-eat foods. Initially, we will tell participants that they are evaluating recipes. Following the session, we will inform them of the real purpose of the study and why it was important from a scientific perspective to disclose the real purpose of the study after the study was complete (DeDonder et al., 2009). Before the observation and food preparation, the ground beef will be inoculated with traceable, nonpathogenic surrogate.

Under observation, participants will be asked to prepare the recipes as they would do so at home. We will begin recording food handling and meal preparation as soon as the participant enters the test kitchen and will end recording after the participant leaves. Participants' cleaning and sanitizing of equipment and environment before and after preparation will also be recorded to evaluate intra-meal and inter-meal contamination risks (Redmond et al., 2004). We will use notational analysis to assess recorded actions and their frequencies.

Following the observation portion of the study, trained sample collectors will take surface swab samples from sites in the test kitchen (e.g., from kitchen surfaces, utensils, food containers, appliance handles, kitchen towels, cutting boards, and the ready-to-eat dish). The swabs will be plated at an NCSU laboratory to determine presence and concentration of the tracer. The presence of the tracer will indicate that cross-contamination occurred during food preparation. The level of cross-contamination will be compared across the sampling

sites to determine the highest risk areas. Kitchen surfaces, appliances, and other potentially contaminated sites will be cleaned and sanitized after each participant.

Supplementing the observations, we will conduct a post-observation interview to provide insight into participants' views, opinions, and experiences of their preparation practices of these products. Collecting qualitative data will allow the project team to connect the knowledge, attitude, and perceived behavior with actual observed practices, allowing for development of a more targeted intervention. The results of these interviews, coupled with observation, will serve as the foundation for message development and delivery.

References

- DeDonder, S., Jacob, C. J., Surgeoner, B. V., Chapman, B., Phebus, R., & Powell, D. A. (2009). Self-reported and observed behavior of primary meal preparers and adolescents during preparation of frozen, uncooked, breaded chicken products. *British Food Journal, 11*, 915-929.
- Redmond, E. C., Griffith, C. J., Slader, J., & Humphrey, T. J. (2004). Microbiological and observational analysis of cross contamination risks during domestic food preparation. *British Food Journal, 106*(8), 581-97.