

Appendix A: Detailed Study Description

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 first observational study will focus on the food safety behavior of cook, specifically whether participants use a food thermometer to check doneness of the poultry product *and* the product is cooked to the recommended temperature. The study will also assess pathogen transfer during meal preparation.

We will randomly assign recruited participants to a control group (no exposure to food safety messaging) or an intervention (treatment) group. Prior to the observation event, each participant will receive a reminder email with a confirmation of location, time, and check-in procedures. Also included in this email will be a link to a short YouTube video explaining what participants can expect to take place during the study and the meal we are asking them to prepare with some visuals on raw and finished meals (i.e., expectation video). The treatment group will also receive a link via email prior to the study and asked to watch the USDA YouTube video “The Importance of Cooking to a Safe Internal Temperature and How to Use a Food Thermometer”¹ which will serve as the test intervention. To ensure exposure to the intervention, participants in the treatment and control groups will be provided iPads upon entering the observation waiting area and will be asked to view the expectation video. The treatment group will also be asked to view the thermometer safety videos intervention.

We will provide participants with the ingredients and recipes needed to prepare the specific meal/dishes. For the initial study, participants will prepare ground turkey burgers and a ready-to-eat salad. 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 inform them about the real purpose of the study after the study was complete (DeDonder et al., 2009).

Before the observation and food preparation, the turkey patties will be inoculated with the harmless tracer organism bacteriophage MS2 to trace cross-contamination events. We selected MS2 because it (1) is completely harmless to humans because it only infects its bacterial host; (2) has a long history of use as a microbiological indicator; (3) is easy to culture, enumerate, and detect by RT-qPCR; and (4) unlike bacterial surrogates, requires no additional environmental health and safety documentation, such as a biological use authorization approval, for its use in North Carolina State University (NCSU) test kitchens.

¹ <https://www.youtube.com/watch?v=-2KkV2yFiN0>

Under observation, participants will be asked to prepare the ground turkey burgers and a ready-to-eat salad. After receiving the appropriately assigned messaging, participants will receive instruction to prepare the recipes in the order they would do so at home

We will begin recording of 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 prior to 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 kitchen surfaces, utensils, food containers, appliance handles, kitchen towels, cutting boards, any devices touched, and the ready-to-eat dish (at least 15 sites in total). The swabs will be plated at an NCSU laboratory to determine presence and concentration of the tracer. The presence of these tracers 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 in order to ensure that any pathogen samples collected were from the participants' behaviors.

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 and to collect information on behaviors that we were unable to observe (e.g., storage of leftovers or thawing) and conduct a content analysis of participant responses. Collecting qualitative data will allow the project team to connect the knowledge, attitude, and perceived behavior with actual observed practices allowing for a more targeted intervention development. 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.