

Food Safety Consumer Research Project: Meal Preparation Experiment Related to Thermometer Use

Executive Summary May 2018

The Food Safety and Inspection Service (FSIS) of the U.S. Department of Agriculture (USDA) contracted with RTI International and its subcontractor North Carolina State University (NCSU) to conduct meal preparation studies to evaluate consumer food handling behaviors in a test kitchen. The research team is conducting five separate iterations of the meal preparation study to address a specific consumer behavior and to determine the effectiveness of a behavior change intervention. The meal preparation studies are part of a larger 5-year annual study that also includes focus groups (two iterations) and web surveys (two iterations). This report describes the results of the first iteration of the meal preparation study that examined consumers' use of food thermometers when cooking ground turkey patties.

The study was conducted in six test kitchen facilities located in the metro Raleigh–Durham area of North Carolina and Smithfield, North Carolina, a rural location. Before preparing the meal, a randomized treatment group watched the 3-minute USDA food safety video "[The Importance of Cooking to a Safe Internal Temperature and How to Use a Food Thermometer.](#)" In each test kitchen, six cameras recorded participants' actions at various locations throughout the kitchen and recorded the meal preparation from beginning to end. Participants in the control and treatment groups were observed while cooking turkey burgers (spiked with the harmless tracer bacteriophage MS2) and preparing a chef's salad to determine whether they used a thermometer on the turkey products and whether they adhered to other food safety behaviors throughout the meal preparation. Following meal preparation and cleaning, the study team collected microbiological samples from surfaces and lettuce and analyzed the samples for prevalence and level of MS2. Participants participated in a post-observation interview to collect information on their usual food preparation practices and possible predictors of behavior change. A total of 383 people participated in the study (201 control, 182 treatment). The results for the control group, which describes consumer behavior without direct exposure to the video, and the treatment group are presented and described below.

Key Findings

- Viewing the USDA video on **thermometer use** immediately before food preparation encouraged participants to follow USDA-recommended use of a food thermometer for checking doneness of raw poultry.
- Reported food thermometer ownership (61 to 63%) was similar to results reported in the 2016 FDA Food Safety Survey, in which 67% of consumers reported owning a thermometer (see Figure 1).

- Participants who viewed the video (i.e., treatment group) were twice as likely to use a thermometer to check the doneness of the turkey patties compared with those who were not exposed to the video (i.e., control group) (75 vs. 34%) (see Figure 1).

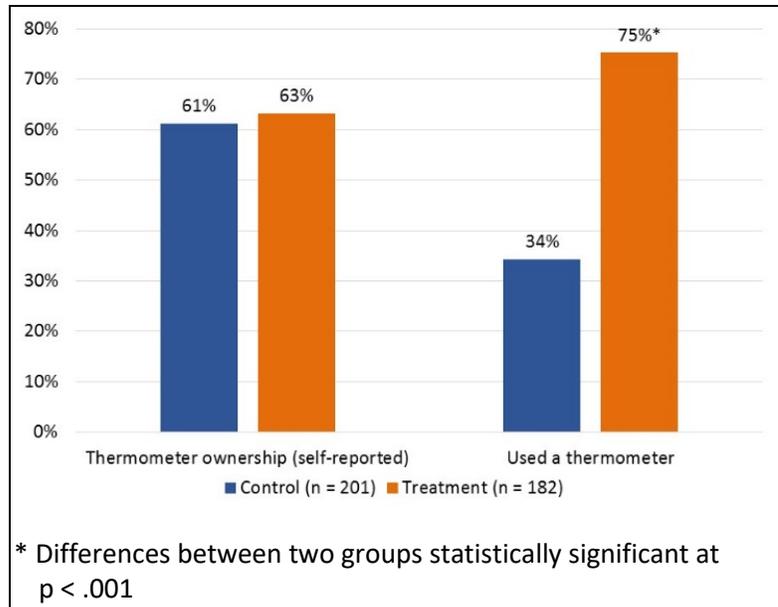


Figure 1. Thermometer Ownership (Self-reported) and Use

- Participants in the treatment group were twice as likely to place the thermometer in the correct location (i.e., the side of the patty to reach the center and coldest spot) compared with the control group (52 vs. 23% of attempts for thermometer placement) (see Figure 2).

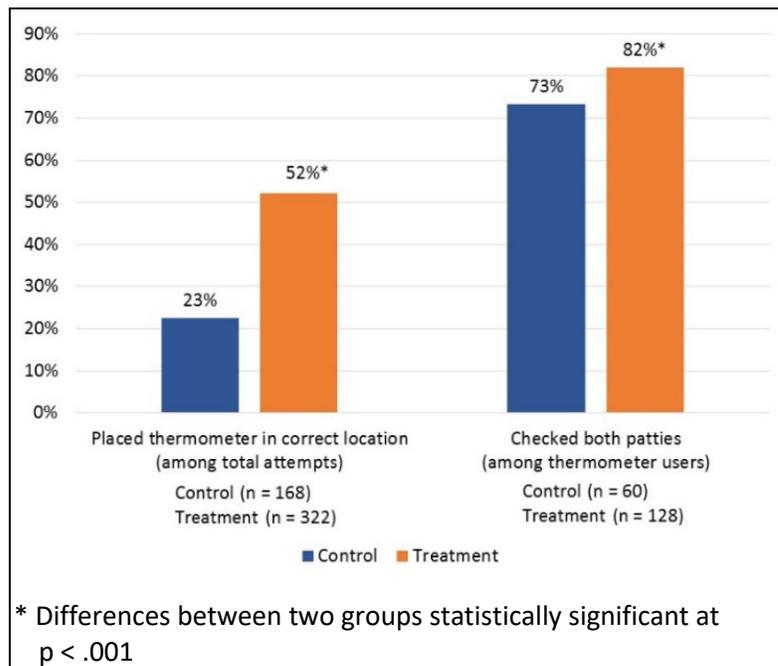


Figure 2. Correctly Used Thermometer

- Participants in the treatment group were more likely than participants in the control group to cook the patties to at least 165°F based on the initial thermometer reading (73 vs. 54%).

- Use of other indicators of doneness was common among control group participants; most relied on only touch (the firmness or texture of the burger) or color and touch.

- In the post-observation interviews, 66% of treatment-group participants stated that watching the video influenced their cooking behavior in the kitchen; of these participants, 61% reported using a thermometer as a result of watching the video.

- **Proper handwashing**, which was not addressed in the video watched by the treatment group, needs improvement. For the treatment group, there were 1,054 cases in which a handwashing event was needed to decrease the risk of cross-contamination (e.g., before meal preparation

and after handling raw product). For these cases, participants attempted to wash their hands about one-third (33%) of the time. Results were similar for control group participants, in which participants attempted to wash their hands 31% of the time when required (see Figure 3).

- Among attempted handwashing events, very few included all steps necessary to be considered an adequate handwashing event (defined by the [Centers for Disease Control and Prevention’s recommended steps](#)); 2% for the treatment group and less than 1% for the control group (see Figure 3).

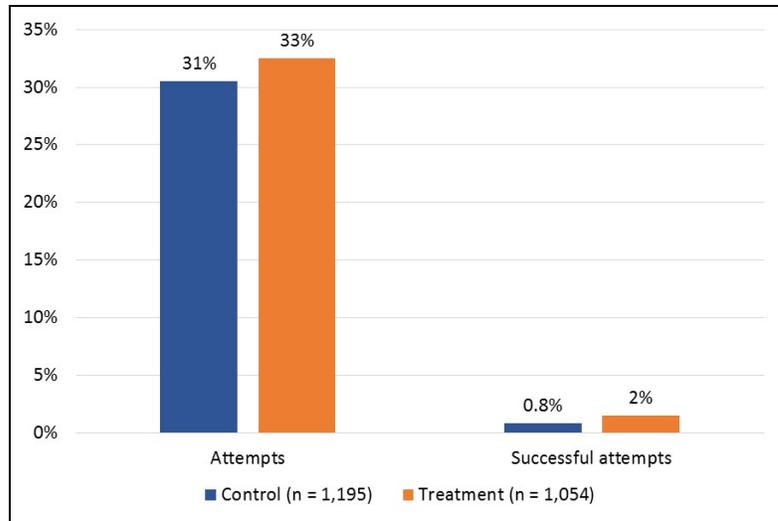


Figure 3. Handwashing Attempts among Required Events

- The most common reason for unsuccessful handwashing was not rubbing hands with soap for at least 20 seconds (76% in the control group and 83% in the treatment group), followed by not wetting hands with water (40% in the control group and 44% in the treatment group). There were no significant differences between the treatment and control groups (see Figure 4).

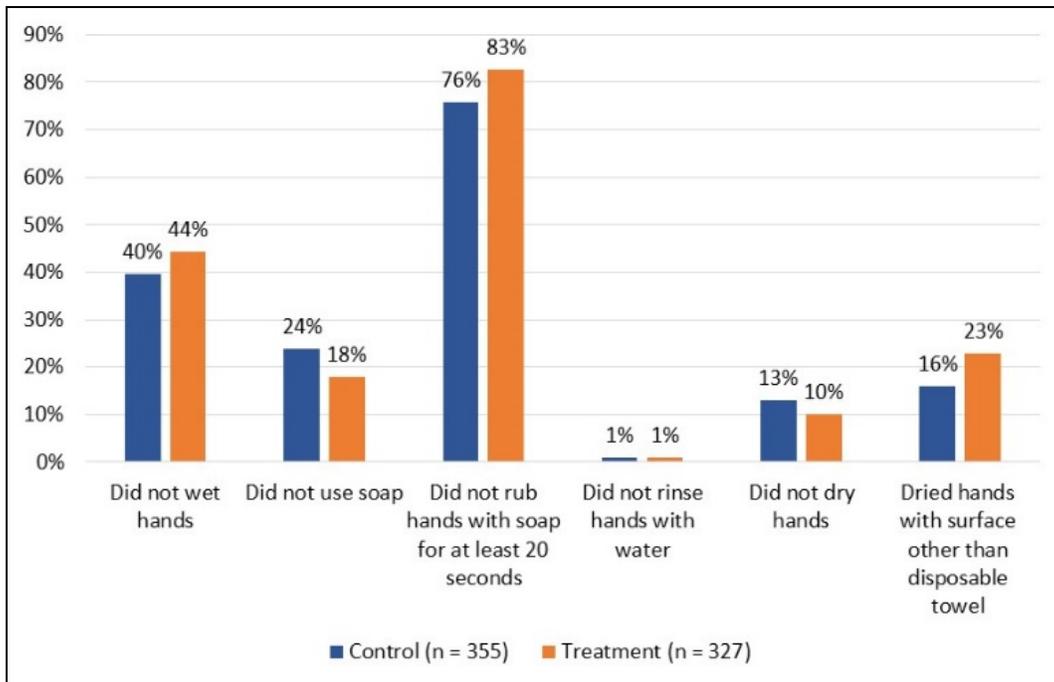


Figure 4. Reasons for Unsuccessful Handwashing Attempts

- Approximately 48% of control group participants contaminated spice containers (e.g., salt and pepper shakers) they touched during the preparation of the preformed turkey burgers, and 5% contaminated the lettuce used to prepare the salad, a ready-to-eat food (see Figure 5). This rate

of contamination of the salad indicates that cross-contamination was not necessarily frequent but did occur with some regularity, which could be a significant area of concern when extrapolated nationally. Results for the treatment group (not shown) were similar.

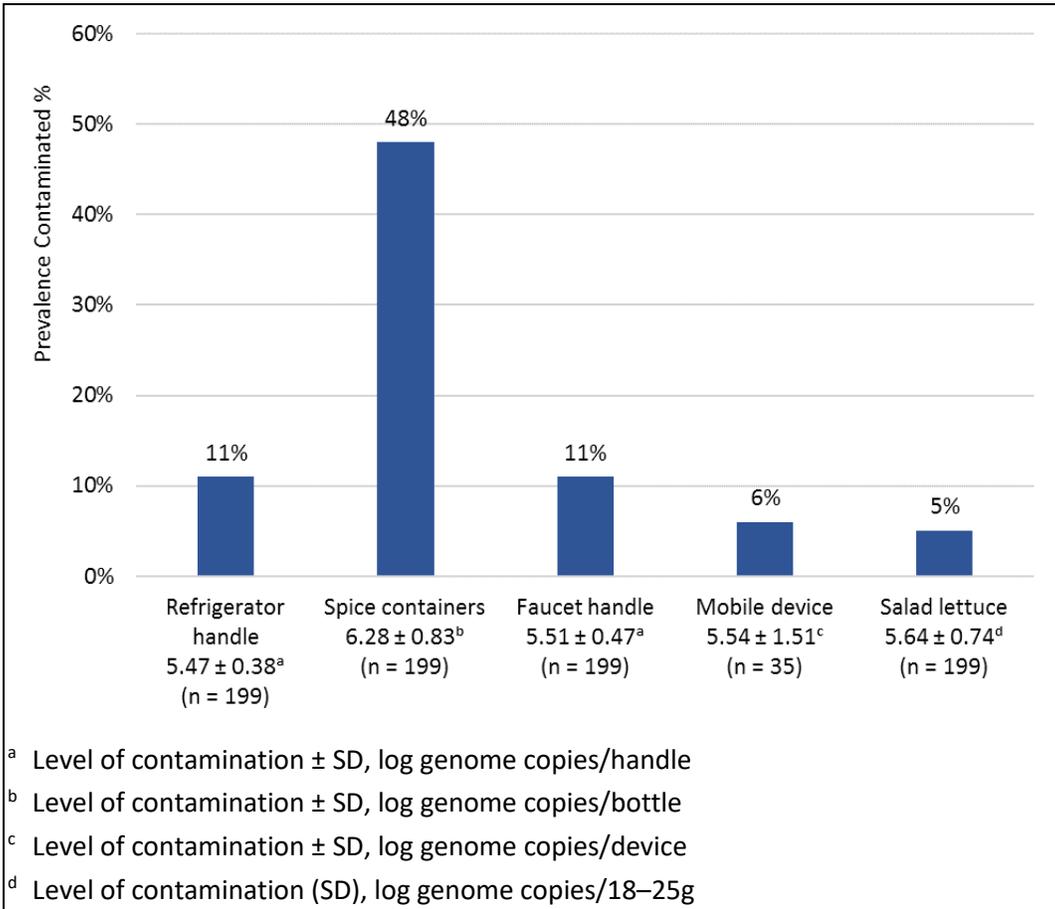


Figure 5. Prevalence of MS2 Contamination for Four Kitchen Locations and Salad Lettuce (Control Group Participants)