

EHS-Net Microwave Study Protocol

Research question

Is there any justification for conducting an in-depth study on potential associations between microwave oven usage in food preparation establishments and foodborne illness?

Background

The use of microwave ovens inherently leads to unevenly cooked foods. Microwave cooking of prepared but not ready-to-eat products by consumers has been suspected as a risk factor in several foodborne disease outbreaks. The extent of usage and type of usage of microwave ovens in restaurants and other types of food preparation establishments is unknown.

Objectives

The aim of this study is to determine if a larger study to assess associations between microwave oven usage in food establishments and foodborne illness is warranted by completing the following objectives:

1. Characterize the prevalence of microwave oven usage in different types of food establishments.
2. Characterize the types of foods heated or cooked in microwave ovens at different types of food establishments.
3. Characterize microwaving protocols, if present, in different types of food establishments.
4. Characterize the types of microwave ovens used in different types of food establishments.

Methods

Sampling – A stratified convenience sample of food establishments in Minnesota, Rhode Island, and Tennessee (?) will be enrolled. In each state at least fifty fast food restaurants, fifty sit-down restaurants, and fifty other types of establishments* will be enrolled by environmental inspectors during routine inspections. For chain establishments, attempts will be made to limit enrollment to only one location per state.

Data collection – Inspectors will administer the study questionnaire to establishment managers.

Data entry – Participating states will enter completed questionnaires directly into a central EHS-Net database

Data analysis – For each category of food establishment dichotomous microwave usage variables will be summarized using proportions with 95% confidence intervals and nominal usage variables will be summarized using frequencies. Usage variables will be compared across food establishment types using chi-square statistics.

Timeline

May-July 2008: Collect data

August 2008: Analyze data and determine if conducting a larger study is warranted.

* Other establishments include restaurants within a grocery store/supermarket, churches, school food service, nursing homes, correctional facilities, camps, grocery stores/supermarkets, caterers, hotels/motels, hospitals, daycare centers, and workplace cafeterias.

EHS-Net Microwave Study Instructions

Questions **1-3**, **5b(2)**, **5c(2)**, and **11-13** should be answered based on the investigator's **observations**. The rest of the questions should be answered based on the establishment manager's responses.

For Question **3**:

Prep Serve – An establishment where all food items are prepared and served without a kill step. Some food on the menu that is commercially prepared ready-to-eat food that may be heated for service.

Cook Serve – An establishment where at least one food item is prepared for same day service and involves a kill step. The menu may include prep serve items or have some food on the menu that is commercially prepared and heated for service.

Complex – An establishment where at least one food item requires a kill step and holding beyond same day service or a kill step and some combination of holding, cooling, re-heating, and freezing. The menu may include any combination of prep serve, cook serve, and complex food items.

Questions **5b** and **5c** refer to **ready-to-eat foods**, foods that establishment managers state require warming in microwaves prior to serving for palatability, not for safety. The manager feels that when warming these items no specific food temperature must be reached for safety reasons.

If the manager responded **yes** to question **5b** or **5c**, questions **5b(2)** or **5c(2)** require the investigator to **observe and review** foods warmed in microwaves which the manager feels only need to be warmed or heated for palatability not for food-safety reasons. These types of foods are considered ready-to-eat. For these questions, use your expertise to determine if any of these foods actually are **not** ready-to-eat. You may make this determination based on the packaging of the product or knowledge that the item contains raw ingredients.

Question **5d** refers to a different situation in which previously cooked foods that have been cooled need to be reheated to a specific temperature as required by **safety regulations**. This scenario is often referred to as “hot holding.”

Questions **5e**, **5f**, and **5g** refer to microwave cooking of foods that contain **raw ingredients** when put into the microwave. For question **5g**, indicate if meat, poultry or eggs are frozen when put into the microwave for cooking by checking the box labeled frozen next to each space for specific items.

Questions **7**, **8**, and **9** only need to be asked if the manager responded **yes** to **5d**, **or 5e**, **or 5f**, **or 5g**.

For question **6a**, the response “Always” means that every single time an item is cooked or heated for hot holding in a microwave oven, the final temperature is checked with a food thermometer.

For questions **10 – 13** (the microwave grid), complete a separate row for each microwave in the establishment. If there are several microwaves of the exact same type and usage you can fill out one row and clearly mark on the left column how many microwaves of this type and usage are present. Except for question 10, which may need to be answered by the manager, these questions should be answered based primarily on the investigator's **observations**.

For question **11**, mark if the wattage was reported by manager or observed by inspector.

For question **13**, mark NSF if a NSF (National Sanitation Foundation) certification can be found on the microwave, mark Model name if the observed model name suggests a commercial-grade microwave, such as “Commercial-Grade” or “Heavy-Duty” and then write the model name.

EHS-Net Microwave Study Data Collection Instrument

Establishment Information

1. Date the interview was conducted: _____(mm)/_____(dd)/_____(yyyy)
2. Facility Type:
- | | |
|---|--|
| <input type="checkbox"/> Fast food restaurant (customers pay before eating) | <input type="checkbox"/> Grocery store/supermarket |
| <input type="checkbox"/> Sit down restaurant (customers pay after eating) | <input type="checkbox"/> Convenience store |
| <input type="checkbox"/> Restaurant within a grocery store/supermarket | <input type="checkbox"/> Caterer |
| <input type="checkbox"/> Church | <input type="checkbox"/> Hotel/motel |
| <input type="checkbox"/> School foodservice | <input type="checkbox"/> Hospital |
| <input type="checkbox"/> Nursing home | <input type="checkbox"/> Daycare center |
| <input type="checkbox"/> Correctional facility | <input type="checkbox"/> Workplace Cafeteria |
| <input type="checkbox"/> Camp | <input type="checkbox"/> Other (List: _____) |
3. Establishment Type: Prep Serve Cook Serve Complex

General Questions

4. Does your establishment use a microwave for any purpose related to food served to the public?
 Yes No Unknown
If No or Unknown, then end of interview
- a) Please list the number of microwaves in the establishment _____
- b) Who operates the microwave(s)? *(Select all that apply)*
 Only employees Only customers Both employees and customers
If Only customers, then end of interview
5. What is it used for? *(Select all that apply)*
- a) To thaw frozen foods?
 1) Please list the types of foods that are thawed: _____

- b) To warm up food for palatability to no specific temperature because it has previously been fully cooked in your establishment by some means other than a microwave?
 1) Please list the types of foods that are warmed: _____

- 2) **(Observation)** Are any of the products listed in 5b1 **NOT** ready-to-eat before microwaving?
 Yes No Unknown
- c) To warm up commercially-produced products to no specific temperature that enter your establishment ready to eat?
 1) Please list the types of these ready to eat products: _____

- 2) **(Observation)** Are any of the products listed in 5c1 **NOT** ready-to-eat before microwaving?
 Yes No Unknown

- d) To heat previously cooked foods to a mandated temperature for hot holding?
 - 1) Please list the types of foods heated to specific temperature for hot holding: _____

- e) To cook items that have been prepared in your establishment?
 - 1) Please list the types internally-prepared items: _____

- f) To cook commercially-produced products that enter your establishment **not** ready to eat?
 - 1) Please list the types of these **not** ready to eat products: _____

- g) To cook raw meat, poultry, or eggs?
 - 1) Please describe the type of meat or eggs and indicate if each item is frozen when put in microwave:
 _____ frozen _____ frozen _____ frozen
 _____ frozen _____ frozen _____ frozen

If manager responded yes to 5d, or 5e, or 5f, or 5g, then ask questions 6 through 8, otherwise skip to question 9.

- 6. Is the internal temperature of items cooked or heated for hot holding in a microwave checked after microwaving?
 - Yes No Unknown

If Yes,

 - a) How frequently is the final temperature checked?
 - Always >50% of the time <50% of the time Never
 - b) Is the temperature checked at more than one internal location? Yes No Unknown

- 7. How do employees know how long to cook an item in a microwave? *(Select all that apply)*
 - Until the item looks done
 - From testing performed in your establishment (i.e., there are defined guidelines)
 - From food product manufacturer guidelines or instructions
 - Other sources, *(please list: _____)*
 - Unknown

- 8. Is there a standard amount of time that items are suppose to stand after microwaving and before serving to customers?
 - Yes No Unknown

- 9. Are employees trained on how to cook specific foods in the microwave? Yes No Unknown

MICROWAVE GRID

| # | 10. Operators of microwave | 11. Watts | 12. Manufacturer | 13. Commercial Grade |
|---|---|--|------------------|--|
| 1 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 2 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 3 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 4 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 5 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |

Supplemental Form for Additional Microwaves

| # | 10. Operators of microwave | 11. Watts | 12. Manufacturer | 13. Commercial Grade |
|----|---|--|------------------|--|
| 6 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 7 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 8 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 9 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 10 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 11 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 12 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 13 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 14 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 15 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 16 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 17 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 18 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 19 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |
| 20 | <input type="checkbox"/> employees <input type="checkbox"/> customers <input type="checkbox"/> both | _____W <input type="checkbox"/> reported <input type="checkbox"/> observed | | <input type="checkbox"/> NSF <input type="checkbox"/> Model name _____ |