

Food Safety Labels and Education for Meals-on-Wheels Participants

JULIE A. ALBRECHT,^{1*} SARAH E. PURCELL² and ABBEY MUNYON¹

¹Dept. of Nutrition and Health Sciences, University of Nebraska-Lincoln, Lincoln, NE 68583-0807, USA;

²University of Nebraska – Lincoln Extension in Otoe County, 180 Chestnut, P.O. Box 160, Syracuse, NE 68446, USA

ABSTRACT

Delivered meals for Meals-on-Wheels (MOW) recipients usually do not have food handling/safety labels that provide information on proper storage and later use of uneaten foods. Six food safety labels and five food safety handouts were developed for seniors and cooks to analyze during five focus groups conducted at senior centers where MOW meals are prepared. After data analysis, one label was developed and the food safety handouts were revised for testing with MOW recipients. Interviews were conducted with MOW recipients to determine their effectiveness. Forty-three seniors and nine cooks participated in focus groups. Responses to sample labels included: keep it simple, use large black print, concerns about how to date the label and the reheating statement. Comments about the educational materials included: liked large print, liked colored picture, and keep statements simple. Of the 47 MOW recipients interviewed, 94% stated that they read the label on their delivered meals, whereas 91% read the educational materials. Only 19% stated the correct refrigeration temperature, but all felt that their refrigerators worked properly. Only 72% knew how long to properly store leftovers. Our study demonstrated that a food safety label for MOW home-delivered meals was needed to remind participants how to safely store uneaten foods.

INTRODUCTION

Meals-on-Wheels (MOW) recipients may be more at risk for foodborne illness than healthy elderly adults. Higher rates of foodborne illness occur in younger individuals, but older adults (60 years and older) are more likely to have more severe complications associated with these illnesses (6). Susceptibility to a foodborne illness is related to the health status of the older adult (6). Poor nutrition and decreased food consumption, combined with decreased immune system function, contribute to older adults' lowered ability to fight foodborne pathogens (6). Coulston et al. (7) documented that the MOW population is at risk for poor nutritional status, which can increase their risk of foodborne illness. In addition, MOW recipients commonly save food from the delivered meal to eat later (1, 2, 8). Improper food storage of saved items can contribute to increased risk of foodborne illness for MOW recipients (1, 2, 8).

MOW meals are usually delivered by volunteers, and the resulting time lapse can contribute to increased growth of microorganisms if the food was contaminated and allowed to be in the temperature danger zone too long. The average meal was consumed 1.22 hours after delivery to the home, and the average

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*Author for correspondence: Phone: 402.472.8884; Fax: 402.472.1587
E-mail: jalbrecht1@unl.edu

TABLE 1. Characteristics of focus group participants and senior center cooks pertaining to meal consumption

	Percentage of participants (n)
Senior focus group participants (n = 43)	
Females	72.1 (31)
Males	27.9 (12)
How many meals do you usually eat at the senior center?	
No meals per week	18.6 (8)
1 meal per week	7.0 (3)
2 meals per week	7.0 (3)
3 meals per week	7.0 (3)
4 meals per week	7.0 (3)
5 meals per week	51.1 (22)
Missing	2.3 (1)
What types of foods have you taken home from a restaurant?	
Meats and Poultry	58.1 (25)
Bread	18.6 (8)
Vegetables	32.6 (14)
Salads	20.9 (9)
Casserole/hot dish	23.3 (10)
Fruit	14.0 (6)
Dessert	32.6 (14)
Senior center cooks (n = 9)	
Females	100.0 (9)
Meals prepared per day	
Average	66
Range	35–300
Meals delivered per day	
Average	80
Range	8–300

¹Percentages total more than 100% because participants could check more than one response.

time from packing at the preparation site to delivery was 1.95 hours, for a total of 3.17 hours, from on-site preparation to off-site consumption (2).

Seniors stated that foodborne illness was not likely to happen to them (15), an attitude that may lead to a false sense of safety. Boone et al. (4) reported that mature adults (over 65) generally had knowledge of safe food handling behaviors but did not translate this knowledge to practices such as refrigerating food promptly. Educators have many channels to reach seniors, and they need to help seniors understand the relationship between inappropriate practices and the

risk to their health (9). Roseman and Hayek (16) reported positive changes in food safety behavior of seniors and home-delivered meal recipients after these individuals had received food safety education.

Delivered meals usually do not have food handling/safety labels that provide information on proper storage and later use of uneaten foods. Little food safety education is provided for MOW recipients. Almanza et al. (2), after conducting a survey, recommended that home-delivered meal recipients should be informed that it is best to eat the meals immedi-

ately, or refrigerate and then reheat when ready to consume the meal. A color-coded sticker system was suggested by Mathieu (12) to be used to signify different days of the week for home-delivered meals. Roseman (15) recommended that delivery drivers encourage MOW recipients to eat their meal immediately or make sure that it is refrigerated upon delivery. In addition, home-delivered meal providers could implement strategies to encourage safe food handling practices in the home by changing food container types and providing storage information on containers (15).

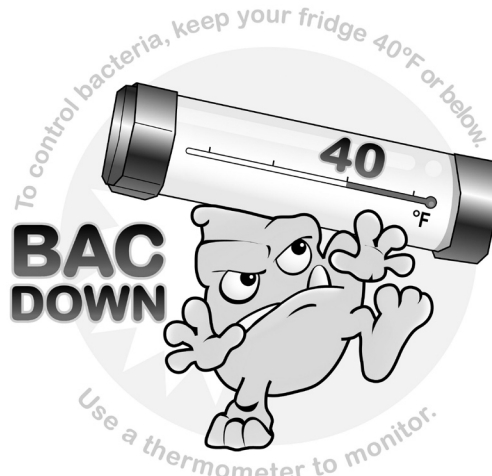
FIGURE 1. Food safety label developed based on focus group results and used to test with MOW recipients

Eat Immediately

Or

**Refrigerate leftovers
within 2 hours**

Use by _____



Many commercial products contain storage labels; Lando and Fein (11) found that storage statements need to be easily found and understood by the consumer. Roe et al. (14) stated that focus group participants preferred labels with food safety information that emphasized the positive. Almanza et al. (2) also recommended that MOW clients would benefit from literature or training on proper handling of home-delivered meals. Mathieu et al. (12) also suggested that home-delivered meal providers use simple signs, checklists, and pictures to highlight the four most important concepts of food safety: washing hands often, keeping foods separate, cooking to proper temperatures, and refrigerating foods. Albrecht and Larvick et al. (1) recommended that when foods from delivered-meals were kept to eat later, proper storage and reheating directions may be needed.

Because of the need for an informative food safety label and food safety education, the objectives of this project were to develop user-friendly food safety labels for home-delivered meals and to develop user-friendly food safety education materials for MOW recipients.

MATERIALS AND METHODS

Instrument development

Five food safety labels (plus one commercial label, DayDots #10282–

01–11) was used, and five food safety handouts were developed for the seniors and cooks to react to during the five focus group sessions. The labels (Avery 5164; 3 1/2 × 4 in) developed by the researchers contained various statements about eating instructions, refrigeration, handling leftovers, and a blank line for the date, which was to be filled in by the agency preparing the food. The BacDown™ (18) logo was used on the five developed labels. The font used was Arial Black 14 point. The five food safety educational half-page handouts (Clean, Cook, Separate, Chill, and Fresh Fruit and Vegetables) were developed based on the FightBAC!® (18) messages. The font on the handouts was Arial Black 14 point. After content analysis of the focus group data, one label was developed and the food safety handouts were revised for testing with MOW recipients.

To collect data on food handling practices and meal consumption characteristics, surveys were developed for the seniors and cooks to complete at the end of the focus group session.

An instrument was developed for the interviewer who visited the MOW recipients in their homes. This instrument was used to collect data on MOW participation, practices associated with the home-delivered meals, two knowledge questions based on information presented on the label or the food safety handouts, and reactions to the label and food safety handouts.

Subject recruitment

After IRB approval was received from the University of Nebraska-Lincoln, senior citizens and cooks at five senior centers in Southeast Nebraska (five rural communities, population less than 10,000) were recruited for the focus groups. Senior centers who prepare home-delivered meals for the MOW program and on-site meals were selected for this study. Some of the seniors who eat at senior centers occasionally are MOW recipients because of health. Fliers were used to recruit seniors and cooks from these five centers. MOW participants were recruited from the same five areas where the seniors were recruited and from one MOW site in an urban community (population greater than 250,000). Prior to the home visit, a flier that explained the research project was delivered with the meals and invited MOW recipients to participate. A reminder letter was delivered one day prior to the home visit to inform the participant of the visit by the interviewer.

Focus groups

Five focus groups were conducted with cooks and seniors who ate at centers where meals were also prepared for MOW recipients. Each label was placed on a Styrofoam container used for meals that are delivered to MOW recipients. Seniors and cooks were asked to provide comments for each of the labels. Information was recorded. The five food safety educational handouts were provided to these participants, who were asked to provide comments on these handouts. Feedback was recorded. At the end of the focus group session, the participants were asked to complete the demographic survey. For participation, each person received a food safety kit (small plastic cutting board, refrigerator thermometer, food thermometer, and a magnet with proper cooking temperatures).

MOW interviews

For five consecutive days, the revised label (Fig. 1) was attached to the home-delivered meal. The five agencies that prepared the meals for delivery were instructed to write in the “Use by (date).” This date that they wrote on

TABLE 2. Focus group results for the six test food safety labels

Label Content	Focus Group Comments
Reheat before eating leftovers Eat within 2 hours Refrigerate leftovers and use by (day of week) (date)	Too much information/too wordy Information ok Don't want days of week on it Like large print Omit "Eat within 2 hours"
(Avery Label, 5164)	
Reheat before eating leftovers Eat or refrigerate immediately If not eaten, throw out after (date)	Need date delivered Need training on microwave, because containers are Styrofoam Styrofoam Too much information/too wordy Need more space for date Write day of week instead of number
(Avery Label, 5164)	
Received Use by: (DayDots #10282-01-11)	Not easy to read Print too small Red color hard to read Not enough information Too simple Not enough information Date ok
Eat within 2 hours OR Refrigerate leftovers and use by (date)	Liked this Label 2nd best Suggested "Eat immediately or within 2 hours" Need day of week Easy to read
(Avery Label, 5164)	
Eat immediately OR Refrigerate leftovers within 2 hours	Add date Easy to read Liked this one Need more information, maybe reheat instructions Information not clear
(Avery Label, 5164)	
Refrigerate leftovers Use by (date)	Liked this one Keep it simple Add "Eat immediately or refrigerate" Very basic Easy to read Not enough information Need reheating instructions
(Avery Label, 5164)	

the label was to be two days after the delivery date. One of the five food safety handouts was delivered with the meal each day that the label was used. All MOW recipients received the labeled meals and five educational handouts.

The following week, an interview was conducted with MOW recipients who volunteered to be interviewed, to determine the effectiveness of the label and handouts, using the interview form. Three trained interviewers conducted

the interview in each MOW participant's home. An interview form was developed, and interviewers were given guidance on providing prompt questions if the participant did not understand the question.

FIGURE 2. Alternative food safety label developed using the “Be Food Safe” chill graphic

Eat Immediately

Or

**Refrigerate leftovers
within 2 hours**

Use by _____



Data analysis

Focus group data was analyzed using content analysis. Quantitative data from the surveys were entered into SAS (17) and analyzed for means.

RESULTS AND DISCUSSION

Focus groups

Forty-three seniors and nine cooks participated in the five focus groups (Table 1). Over half of the seniors (51.1%) ate five meals a week at a senior center. Results from the focus group testing of the six labels are listed in Table 2. Responses to all the labels, in general, included: keep it simple, use large print and black ink, and include some type of date. Concerns about what date to put on the label was the focus of much discussion. Should the date be the date received/delivered to the MOW recipient or the date the food should be discarded? For the revised label (Fig. 1), a “use by (date)” was selected. The reheating statement elicited many concerns, such as: (1) whether the statement should be on the label (2) the need to emphasize that Styrofoam delivery containers are not suitable as reheating containers in either a microwave or conventional oven (3) the need for additional directions for reheating the food in a microwave or oven,

and (4) whether a temperature should be given for reheating. Because of these concerns and the request to keep the label simple, a reheating statement was not included on the revised label (Fig. 1). Additional information was suggested for inclusion on the label, such as “remember to take medications”, which may be requested by family members of the MOW recipient. We determined that this information cluttered the label, and it was not included on the revised label.

Comments about the educational handouts included statements that the participants liked large print, colored pictures, and simple statements. Our results were similar to the findings of Gettings and Kiernan (9) that reported that seniors preferred the larger print size and less print. Interestingly, discussion focused on the educational content of the handouts, as the focus group participants easily understood the food safety messages.

MOW interviews

Forty-seven MOW recipients (32 rural and 15 urban) participated in the home interviews one week following the use of the labels on the delivered meals and handouts. Table 3 shows meal consumption characteristics for these recipients. Approximately one-third (36.2%)

stated that they did not usually eat all the delivered food at lunch, although when asked about the previous week (this would be the week when the labels were used), over half (53.2%) stated that they did not eat all the food delivered for lunch. This conflicts with the responses to our next question, to which 75% of the MOW recipients responded that they saved food to eat later. The foods that are most likely to be kept for later consumption are meats and poultry, fruit, and casseroles/hot dishes. The foods that the seniors in the focus group (Table 1) reported taking home from a restaurant were meats and poultry, vegetables, and desserts. Meats and poultry leftovers are the common leftover foods among both groups and need proper refrigeration. Responses obtained by the interviewers indicate that participants may not always save or eat these leftovers, as some stated that they gave the meat to a pet. Participants stated that they saved bread to make sandwiches for a future meal, saved food to eat for the evening meal, and shared food with another family member or friend. Some participants who indicated they did not eat the food due to lack of appetite, small appetite, dislike of food or difficulty in eating saved the food for some other use. Similar concerns were listed by other researchers (3). People who were raised during the Great Depression generally do not waste anything (12).

Prior to the knowledge questions, MOW participants were asked how long they keep leftovers, such as meats and poultry. The time ranged between one-half day to one week. Albrecht and Larvick (1) found that the average temperature of 74% of the refrigerators was above the recommended 40°F for those who stored meat and poultry items for later use. The long storage time combined with improper refrigerator temperatures increases the risk of food-borne illness for this population.

Of the 47 MOW recipients who were interviewed after one week, 94% stated that they read the label on their delivered meals. Only 19% of the participants stated that the correct refrigeration temperature was 40°F (information provided in the FightBAC!® logo on the label) and an additional 12.8% indicated that a temperature of 35°F was the correct refrigeration temperature (Table 4). All participants stated that their refrigerators worked very well

TABLE 3. Characteristics of Meals-on-Wheels participants pertaining to meal consumption

	Percentage of participants (n)
Meals-on-Wheels participants (n = 47)	
Females	80.9 (38)
Males	19.1 (9)
Length of time receiving Meals-on-Wheels	
Less than 1 year	27.7 (13)
1 to 5 years	51.1 (24)
6 to 10 years	17.0 (8)
More than 10 years	4.2 (2)
Do you usually eat all the food delivered?	
Yes	61.7 (29)
No	36.2 (17)
Missing	2.1 (1)
Last week, did you eat all the food delivered at lunch?	
Yes	36.2 (17)
No	53.2 (25)
Missing	10.6 (5)
Did you save some food to eat later?	
Yes	74.5 (35)
No	23.4 (11)
Missing	2.1 (1)
Types of foods that are kept:¹	
Meats and poultry	44.7 (21)
Bread	17.0 (8)
Vegetables	17.0 (8)
Salads	6.4 (3)
Potatoes, rice, pasta	8.5 (4)
Casserole/hot dish	19.2 (9)
Fruit	34.0 (16)
Dessert	17.0 (8)
Milk	10.6 (5)
Do you share your food with anyone?	
Yes	17.0 (8)
No	83.0 (39)

¹Percentages total more than 100% because participants could check more than one response

TABLE 4. Knowledge questions of seniors and MOW participants

	Senior Participants (n = 43)	MOW Participants (n = 47)
How long should you keep leftovers in your refrigerator?		
1 day only	4.7 (2)	12.8 (6)
1–2 days	34.8 (15)	59.6 (28)
3–4 days	46.5 (20)	21.3 (10)
5–6 days	4.7 (2)	0.0 (0)
More than 6 days	0.0 (0)	2.1 (1)
Don't know	9.3 (4)	2.1 (1)
Missing	0.0 (0)	2.1 (1)
At what temperature should food in your refrigerator be kept?		
50°F	0.0 (0)	0.0 (0)
45°F	7.0 (3)	2.1 (1)
40°F	46.5 (20)	19.1 (9)
35°F	18.6 (8)	12.8 (6)
32°F	7.0 (3)	12.8 (6)
I don't know	20.9 (9)	53.2 (25)

or well; they apparently worked too well in some cases, because the temperature of some was so cold that items placed in them would freeze. In a previous study, Albrecht and Larvick et al. (1) found that MOW recipients reported that their refrigerators worked well, but the average refrigerator temperature recorded over a one week period was above the recommended temperature of 40°F for 53% of the MOW recipients surveyed.

The FightBAC!® logo on the label (Fig. 1) is a very colorful and busy graphic that includes a thermometer with a 40°F reading. This busy graphic possibly made it confusing for the MOW recipient to grasp this temperature message. In addition, when the graphic was used on this label, the written text on the graphic was difficult to read. Therefore, this component of the label was not effective. Since the FightBAC!® temperature logo was not effective on the label, the “Be Food Safe” (19) chill graphic (Fig. 2) was used in place of the FightBAC!® logo and tested with another group (data not shown). No differences were found when

this second group was asked the same question. In the focus groups, the participants stated that they liked the colorful graphics, but color and graphics mainly appealed to the overall appearance of the education piece rather than serving as a method of conveying information.

However, the rest of the label was effective. When interviewers asked the MOW participants to tell what the label (Fig. 1) was about, responses included: to refrigerate within 2 hours, eat right away or put in the refrigerator, and length of time to keep food in the refrigerator. Lando and Fein et al. (11) stated that people who read the food safety label had no trouble in making storage decisions, although reading labels requires literacy and motivation. The large print on the label was appreciated by our audience (Table 2). Johnson et al. (10) reported that 45% of the elderly people in their study had difficulty reading food labels, including the “use by” and “sell by” dates on commercially packaged food. They recommended that a larger, clearer label could contribute to food storage safety

if the label was in a readable format for the audience. Reasons given for their difficulty in reading the label was that the print was too small and cramped. In another study, Brandt et al. (5) stated that the food label could be used as an educational tool to convey food safety messages critical to the product.

During the week prior to the interview, all MOW participants received one of the educational handouts on each of the five days. Of those who agreed to be interviewed, 91% stated that they read the educational handouts. The interviewers asked the MOW participants to share one thing they had learned from these educational handouts. Although several participants (19%) stated that they had already known all the information, several others (17%) stated that the information was a good reminder/refresher, and many gave specific examples of knowledge learned. Handwashing comments were given by 25% of the participants; proper temperature control (hot and cold) comments were given by 36%; and cross-contamination

comments were given by 17%. Thirty-eight percent of the participants gave a statement about food storage. From the responses to the knowledge question asked of the participants, it appears that 72% knew how long to store leftovers properly (information given in one of the educational handouts), although from the practice question (Table 4) some of the participants are not putting this information into practice. From these data, it appears that the educational handouts were an effective tool for educating and reinforcing food safety knowledge. Educational material is available: "To Your Health! Food Safety for Seniors" (21) and "Food Safety for Older Adults" (20) but this information may be too extensive or complex for some MOW recipients. In our study, seven MOW participants (15%) stated that they could not remember receiving the educational handouts, and two MOW participants stated that they could not read very well. Moran (13) reported that dementia and less severe cognitive impairments among MOW recipients complicate the reliability of dietary intake data. It is possible that these conditions may have been a factor in the lack of responses or "don't know" responses from our MOW participants.

Our study demonstrated that a food safety label on home-delivered meals was needed to remind MOW participants how to store uneaten foods safely. Educational handouts that are easy to read are needed occasionally as a reminder of safe food handling practices.

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