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# Promoting Food Safety Awareness for Older Adults by Using Online Education Modules

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**Keywords**
older adults, food safety, online education, social marketing theory (SMT)

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## Introduction

Adults aged 65 and over are susceptible to and at greater risk for food-borne illness than other adults (Lund & O'Brien, 2011; Smith, 1998). Behravesh et al. (2011) reported that most deaths from food-borne illness (58%) occur in adults aged 65 and over. Similarly, the Centers for Disease Control and Prevention (CDC) reported that in 2012, adults aged 60 and over had consistently higher hospitalization and mortality rates than other age groups for all the major food pathogens tracked (Centers for Disease Control and Prevention, 2014).

Older adults may not be aware of their higher food safety risk (Cates et al., 2009; Gettings & Kiernan, 2001). Cates et al. (2009) found that 41% of older adult respondents to a survey of food safety knowledge and behaviors disagreed that they were at higher risk for food-borne disease due to age. In a study of food safety–related trends and perceptions, Fein, Lando, Levy, Teisl, and Noblet (2011) found that adults age 65 and over had a lower perception of food safety–related risk than adults aged 18–29. Additionally, the food preparation practices (e.g., cooking, handling,

storage) of older adults may be placing them at risk of food-borne illness (Gettings & Kiernan, 2001). The lowered awareness of food-borne illness risk and unsafe food handling practices of older adults warrants the creation of Extension-delivered, theory-based food safety education programming, particularly because public health interventions have successfully targeted this population (Martin, Tamblyn, Ahmed, & Tannenbaum, 2013; McClelland, Jayaratne, & Bird, 2013; Wohlgenant, Godwin, Cates, & Stone, 2015).

## Social Marketing Theory

One theory used in the development of public health interventions targeting behavior change is social marketing theory (SMT). In practice, SMT makes use of marketing strategies, tools, and theory to influence behavior change (Lee & Kotler, 2011; Neiger, Thackeray, Barnes, & McKenzie, 2003). Lefebvre and Rochlin (1997) identify the steps of SMT: planning, choosing content and delivery method(s), developing and testing tools, implementing, assessing, and revising. The planning step involves collecting information about the needs and preferences of the target population and using this information to customize both the content of the intervention and the method(s) of delivery (Kreuter, Strecher, & Glassman, 1999; Lee & Kotler, 2011; Parks & Moody, 1986). Francis, Martin, and Taylor (2011) found that tailoring an online nutrition education program to the target audience's needs and preferences led to perceptions of the program as appealing and relevant.

## Online Education

Today's older adults are using technology, which offers educational opportunities. Online educational tools can increase self-efficacy (confidence to perform a certain behavior) and lead to behavior change (Campbell, Koszewski, Behrends, King, & Stanek-Krogstrand, 2009). Furthermore, online Extension-delivered programs have been shown to increase food safety knowledge and familiarity (Francis, 2014).

When developing education programs for older adults, online opportunities typically are not explored due to misperceptions about older adults' use of technology. Flynn, Smith, and Freese (2006) reported that older adults actively seek health information online; in fact, Smith (2014) reported a recent increase, from 53% to 59%, in Internet usage by adults aged 65 and older. Additionally, older adults are willing to use technology-based food safety educational materials (Kosa, Cates, Godwin, Ball, & Harrison, 2011). These findings present a unique opportunity for Extension to provide older adults with online food safety education. The goal of the project discussed here was to develop and evaluate online SMT-based food safety education modules targeting the food safety education needs of older adults.

# Methods

## Needs Assessment

Older adults attending local congregate meal sites ($n$ = 29) and residing in retirement communities ($n$ = 58) completed a 10-question food safety quiz (University of Hawaii Cooperative Extension

Service, 2006) to identify areas for food safety education. This quiz asked about the participants' frequency of completing certain food safety behaviors (Table 1). Quiz responses were tabulated using descriptive statistics. Those with higher frequencies of "No" or "Sometimes" responses (35% or higher) were identified as "areas of need," and subsequent food safety education modules were developed.

## Development and Evaluation of Modules

The results from the needs assessment indicated a major knowledge gap related to safe thawing practices, with 64% of participants answering "No" or "Sometimes" to the relevant question (Table 1). In response, three 5- to 8-min online modules were developed, addressing temperature control of foods: "Thaw Safely!" (safe thawing practices), "It's All About the Temperature!" (thermometer use), and "Freeze Smart!" (freezing foods).

**Table 1.**

Needs Assessment Results

| Food Safety Quiz Question | Number | Percentage (%)[a] |
|---|---|---|
| **When grocery shopping, I pick up refrigerated and frozen foods just before checking out.[b]** | | |
| Yes | 55 | 63.2 |
| No/Sometimes | 31 | 35.6 |
| No response | 1 | 1.1 |
| **I check "sell-by" or "use-by" dates on packages when shopping or eating.** | | |
| Yes | 51 | 58.6 |
| No/Sometimes | 36 | 41.4 |
| **When I bring my groceries home, I refrigerate cold foods immediately.[b]** | | |
| Yes | 86 | 98.9 |
| No/Sometimes | 1 | 1.1 |
| **I wash my hands before I prepare food.** | | |
| Yes | 74 | 85.1 |
| No/Sometimes | 13 | 14.9 |
| **I keep raw meat or poultry juice away from other foods by using separate cutting** | | |

| | | |
|---|---|---|
| **boards.** | | |
| Yes | 60 | 69.0 |
| No/Sometimes | 27 | 31.0 |
| **I wash cutting boards that have touched raw meat or poultry between uses.** | | |
| Yes | 80 | 92.0 |
| No/Sometimes | 6 | 6.9 |
| No response | 1 | 1.1 |
| **I always thaw meat in the refrigerator.[b]** | | |
| Yes | 30 | 34.5 |
| No/Sometimes | 56 | 64.4 |
| No response | 1 | 1.1 |
| **I refrigerate my leftovers immediately.[b]** | | |
| Yes | 73 | 83.9 |
| No/Sometimes | 13 | 14.9 |
| No response | 1 | 1.1 |
| **Spoiled leftover food does not always smell, taste, or look bad, so when I'm in doubt, I throw it out.** | | |
| Yes | 74 | 85.1 |
| No/Sometimes | 12 | 13.8 |
| No response | 1 | 1.1 |
| **I keep kitchen towels and sponges clean.** | | |
| Yes | 74 | 85.1 |
| No/Sometimes | 11 | 12.6 |
| No response | 2 | 2.3 |

[a]Percentages do not always add up to 100 due to rounding.
[b]Topic relates to food temperature.

Each mini-module highlights the key recommendations for temperature-related behaviors and will be posted on the older adult–focused Extension website, Mid Life and Beyond

(http://www.extension.iastate.edu/humansciences/midlife-and-beyond). Each mini-module includes hyperlinks to additional online resources. The mini-modules were created using PowerPoint with voice-over recordings in Adobe Presenter (Francis, 2014; Francis et al., 2011).

Mini-module evaluations were conducted at one of the retirement communities that had participated in the needs assessment. Participants watched the online modules in a group setting and completed evaluation post-pre surveys. Survey results were entered in the online survey system Qualtrics, where they were analyzed using descriptive statistics.

# Results

## Demographics

Eighty-seven older adults (57 females, 27 males, 3 no response), aged 64 to 92 years (81.3 years average), completed the needs assessment. The online module evaluations were completed by residents at one of the needs assessment retirement communities, primarily females, aged 73 to 92 years (81.4 years average; Table 2).

## Post-Pre Evaluation

All participants reported an increase in familiarity after viewing the modules for each of the topics addressed (Table 2). Additionally, the majority reported being "very likely" to apply the advice mentioned during the module (Table 2).

**Table 2.**

Participant Evaluation Post-Pre Survey

| Post-Pre Survey Question | It's All About the Temperature! (*n* = 15) | Freeze Smart! (*n* = 15) | Thaw Safely! (*n* = 16) |
|---|---|---|---|
| **Gender** | | | |
| Male | 3 | 3 | 3 |
| Female | 12 | 12 | 13 |
| **Prefamiliarity with mini-module topic** | | | |
| Not familiar | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| Somewhat familiar | 9 (60.0%) | 6 (40.0%) | 11 (68.8%) |
| Very familiar | 6 (40.0%) | 9 (60.0%) | 5 (31.2%) |
| **Postfamiliarity with mini-module topic** | | | |
| Not familiar | 0 (0.0%) | 0 (0.0%) | 1 (6.2%) |

| | | | |
|---|---|---|---|
| Somewhat familiar | 3 (20.0%) | 3 (20.0%) | 4 (25.0%) |
| Very familiar | 12 (80.0%) | 12 (80.0%) | 11 (68.8%) |
| **Likelihood of applying some advice mentioned in the lesson** | | | |
| Not likely | 1 (6.7%) | 0 (0.0%) | 0 (0.0%) |
| Somewhat likely | 2 (13.3%) | 3 (20.0%) | 0 (0.0%) |
| Very likely | 12 (80.0%) | 12 (80.0%) | 16 (100.0%) |

## Summary

The online food safety education mini-modules were well-received by participants and were effective in promoting awareness of recommended food safety practices for older adults. These findings support the development of additional online food safety education opportunities for older adults. On the basis of the needs assessment data collected, future topics might include food packaging dates and purchasing of refrigerated and frozen foods.

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