

# Preventing Listeriosis in Selected High Risk Populations: Is the Message Reaching At-Risk Audiences?



Jenna Lenhart<sup>1</sup>, Patricia Kendall<sup>1</sup>, Mary Schroeder<sup>1</sup>, Jessica Doorn<sup>3</sup>, Lydia Medeiros<sup>3</sup>, and John Sofos<sup>2</sup>

<sup>1</sup>Dept. Food Science & Human Nutrition and <sup>2</sup>Dept. Animal Sciences, Colorado State University, Fort Collins, CO

<sup>3</sup>Dept. Human Nutrition, The Ohio State University, Columbus, OH



## Abstract

Seniors and pregnant women are at increased risk of listeriosis due to suppressed or compromised immune systems. Education about *Listeria monocytogenes* and proper storage methods for high-risk foods is essential to protect their health. We conducted 11 focus groups with senior-aged women and women of child-bearing age in Colorado and Ohio to assess consumer awareness of *Listeria*, storage practices of ready-to-eat meat products, use of package date labels and food safety education needs. Participants completed a survey addressing knowledge of *Listeria* and food safety behaviors. Questionnaire results suggested that knowledge regarding *Listeria* is lacking; only 33% of senior and 45% of young women reported awareness of the bacteria. While both age groups participated in risky food safety behaviors, young women were more likely than senior women to consume foods associated with *L. monocytogenes* ( $p < .05$ ). Focus group results suggested that both age groups noticed date labels on packages but varied highly in their interpretation of the statements. Storage times for opened and unopened RTE products varied and were often well over FDA recommended storage times. Participants mentioned the need for further information about *Listeria* and its control. These results suggest that increased awareness of *Listeria* is needed among high-risk populations. Educational tools at point-of-purchase settings and where seniors and pregnant women congregate are suggested. Recommendations should be made to manufacturers to standardize date labeling for ready-to-eat meat and poultry products and provide consumers with information on how to use date labels.

## Introduction

Pregnant women and the elderly are the two population groups most vulnerable to listeriosis. Pregnant women are 14 times more likely to be infected with *L. monocytogenes* than the non-pregnant healthy population. While the pregnant woman may or may not show symptoms of infection, the fetus can be adversely affected if the pathogen crosses the placental border (1). The elderly is also at increased risk due to decreased immune response, chronic disease, and increased use of various medications such as antacids and histamine blockers (2).

*L. monocytogenes* is able to survive and grow at refrigerator temperatures and survive high salt concentrations, a trait uncommon to most other foodborne pathogens (2). As a result, foods that are "ready-to-eat" (RTE), like deli and luncheon meats, soft cheeses made with unpasteurized milk and cold hot dogs, have been associated with outbreaks of listeriosis (1,3,4).

Deli meats and non-reheated frankfurters have been identified to have the highest per annum risk for causing human listeriosis in the U.S. (5). To reduce this risk, USDA-FSIS instituted additional regulations aimed at reducing *L. monocytogenes* contamination through enhanced sanitation measures, post-lethality treatments, and the use of additives that suppress the growth of the bacteria. USDA-FSIS has recommended that safety labels be added to RTE meat packages to advise consumers of actions taken to minimize the growth of *L. monocytogenes*. Manufacturing companies have expressed concern that such labels may not be well understood or received by consumers.

Research is needed on how best to inform consumers who are at potentially higher risk of listeriosis about the pathogen and how to minimize their risk through product selection, handling, preparation and storage practices.

## Objectives

1. To assess awareness of *L. monocytogenes* and use of risky food consumption and storage practices in selected high-risk populations.
2. To assess consumer perceptions regarding the usefulness of *Listeria* control messages at point-of-purchase and at other places where high-risk consumers congregate.

## Methods

Eleven focus groups were conducted with senior-aged women ( $n=43$ ) and women of child-bearing age ( $n=42$ ) in Colorado and Ohio. A pre-focus group survey assessed participant knowledge of *Listeria monocytogenes* and food handling and consumption behaviors associated with foodborne illness. Commonly used package date-labeling statements and potential "Listerial control" statements were shown to participants to elicit their opinions and interpretations of each statement. Food safety information needs, particularly for RTE products, was assessed.

## Package Label Prototypes



## Results

### Sample Population

	Senior Women	Young Women
Number	42	43
Age	93% > 65 yrs	98% between 19-45 yrs
Education	63% ≥ some college	81 ≥ some college
Ethnicity	88% Caucasian	71% Caucasian 14% Hispanic/Latino

### Knowledge of *Listeria monocytogenes* & Control Factors

	Senior Women	Young Women
Heard of <i>L. monocytogenes</i> (Lm)	33%	45%
Knew pregnant women at risk for Lm	23%	62%
Knew fetuses at risk for Lm	9%	45%
Knew elderly at risk for Lm	53%	45%
Knew Lm could grow at refrigerator temperatures	26%	38%
Knew heating a Lm control factor	9%	45%

### Consumption Rates for Risky Foods

Risky Food Item	Senior Women	Young Women
Raw Oysters	7%	17%
Cold Deli or Luncheon Meats	77%	98%
Sushi or Sashimi	7%	45%
Raw Milk	5%	5%
Cold Hot Dogs	13%	21%
Raw Milk Soft Cheeses	41%	48%
Smoked Fish	27%	43%

### Package Date Labels:

Preferred "Use By" labels over "Sell By" and "Best if Used By" for RTE meat and poultry products. Most participants would freeze or eat the product by the date listed on the package or discard if not consumed.

### "Listerial Control" Safety Labels:

"*Sprayed with a solution of sodium lactate to prevent the growth of L. monocytogenes*" and "*Contains sodium diacetate and sodium lactate to prevent growth of Listeria*" – Generally negatively received due to technical words and drawing attention to added sodium. Participants were unsure what "*L. monocytogenes*" referred to.

"*For best quality, purchase and use by the date shown on the package. Once opened, use within 7 days.*" – Most well received statement among all participants due to clarity and little room for misinterpretation.

"*If pregnant or immune compromised, heat before consuming to reduce the risk of foodborne illness*" – Most felt this was a good warning if they were part of one of these categories. However, many said would not purchase a product with this label if pregnant or immune compromised.

### Education Needs:

**Young Women:** Interested in how listeriosis can affect the fetus and their pregnancy and more information on how to prevent the illness. These women sought out food safety information on the internet, in magazines, newspapers, and wanted point-of-purchase information.

**Senior Women:** Interested in how to appropriately heat and store luncheon meats and how to reheat luncheon meats in a microwave properly. These women desired point-of-purchase information, food safety classes at senior centers and general food safety information in magazines and newspapers.

## Conclusions

Current knowledge of listeriosis is limited and risky food safety behaviors are commonly practiced by selected at-risk populations making advances in food safety education imperative. "Listerial control" package labeling and education on how to interpret various date labeling statements on RTE meat and poultry products may be beneficial and help with reducing the incidence of listeriosis. Reaching at-risk audiences should be done through educational materials in the media as well as where pregnant women and the elderly congregate.

## Acknowledgments

This work was supported by a grant from the National Integrated Food Safety Initiative (Special Emphasis Grant No. 2005-51110-03278) of the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture.

## References

1. International Life Sciences Institute. 2005. Achieving continuous improvement in reductions in foodborne listeriosis – a risk-based approach. *J Food Protect.* 68:1932-94.
2. Schuchat, A., B. Swaminathan, and C. V. Broome. 1991. Epidemiology of human listeriosis. *Clin Microbiol Rev.* 4:169-83.
3. Mead, P. S., et al. 2006. Nationwide outbreak of listeriosis due to contaminated meat. *Epidemiol Infect.* 134:744-51.
4. Yang, H., et al. 2006. Consumer Phase Risk Assessment for *Listeria monocytogenes* in Deli Meats. *Risk Analysis.* 26:89-103.
5. USDA-CFSAN, USDA-FSIS and CDC. 2003. Quantitative assessment of the relative risk to public health from foodborne *Listeria monocytogenes* among selected food categories of ready-to-eat foods.
6. USDA-FSIS. 2003. Control of *Listeria monocytogenes* in ready-to-eat meat and poultry products; final rule. Code of Federal Regulations. 9CFR 430.4. Federal Register, vol. 68, No. 109.