Risk Behaviors of Target Audiences

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Washington State University
# Sensitive Populations in the U.S.

<table>
<thead>
<tr>
<th>Population</th>
<th>Individuals</th>
<th>% pop.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancies</td>
<td>6.0 mil</td>
<td>2.1%</td>
</tr>
<tr>
<td>Neonates</td>
<td>4.0 mil</td>
<td>1.4%</td>
</tr>
<tr>
<td>Elderly (&gt;65)</td>
<td>35 mil</td>
<td>12.5%</td>
</tr>
<tr>
<td>Nursing Care Residents</td>
<td>1.6 mil</td>
<td>0.6%</td>
</tr>
<tr>
<td>Cancer patients (non-hosp.)</td>
<td>8.9 mil</td>
<td>3.2%</td>
</tr>
<tr>
<td>Organ transplant patients</td>
<td>110,270</td>
<td>0.04%</td>
</tr>
<tr>
<td>AIDS patients</td>
<td>223,000</td>
<td>0.08%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>55.8 mil</strong></td>
<td><strong>19.9%</strong></td>
</tr>
</tbody>
</table>

Risk Behaviors of Target Audiences: Pregnant Women and Seniors

Sheryl C. Cates
Senior Research Policy Analyst
RTI International
Pregnant Women
Avoid eating soft cheeses, cold smoked fish, & cold deli salads (*Lm*)

Avoid eating hot dogs & deli meats that have not been reheated to steaming hot or 165°F (*Lm*)

Use cheese & yogurt made from pasteurized milk (*Salmonella* species & *Lm*)

Avoid eating foods containing raw eggs & cook eggs until firm (*SE*)

Do not clean cat litter boxes (*Toxoplasma gondii*)

Do not handle pets when preparing foods (*Toxoplasma gondii*)

Do not eat shark, swordfish, king mackerel, or tilefish (methylmercury) (EPA/FDA)

Kendall et al., 2003, *JADA*. 
## Consumption of At-risk Foods During Pregnancy

<table>
<thead>
<tr>
<th>Food</th>
<th>% of Focus Group Participants (n = 69)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold deli meats served without reheating</td>
<td>65</td>
</tr>
<tr>
<td>Alfalfa or other raw sprouts</td>
<td>56</td>
</tr>
<tr>
<td>Soft cheeses</td>
<td>42</td>
</tr>
<tr>
<td>Homemade raw cookie dough</td>
<td>40</td>
</tr>
<tr>
<td>Eggs with runny yolks</td>
<td>36</td>
</tr>
<tr>
<td>Smoked fish served cold without reheating</td>
<td>26</td>
</tr>
<tr>
<td>Raw fish, such as ceviche or sushi</td>
<td>15</td>
</tr>
<tr>
<td>Rare or medium-rare burgers</td>
<td>12</td>
</tr>
<tr>
<td>Raw (unpasteurized) milk</td>
<td>9</td>
</tr>
</tbody>
</table>

Pregnant Women – Barriers to Adoption

- Lack of knowledge
  - Pregnancy increases risk
  - Specific recommendations during pregnancy
- Belief that ready-to-eat (RTE) foods are cooked and do not require reheating
- Personal preferences
- Loss of convenience foods
- Lack of control over food preparation when eating at restaurants
## Heard about Recommendation During Pregnancy

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>% of Respondents (n = 249)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eliminate or limit caffeine intake</td>
<td>93</td>
</tr>
<tr>
<td>Do not smoke</td>
<td>91</td>
</tr>
<tr>
<td>Do not drink alcoholic beverages</td>
<td>90</td>
</tr>
<tr>
<td>Do not eat raw or undercooked meat</td>
<td>83</td>
</tr>
<tr>
<td>Do not eat fish that can contain high levels of mercury</td>
<td>78</td>
</tr>
<tr>
<td>Do not handle cat waste and litter boxes</td>
<td>77</td>
</tr>
<tr>
<td>Avoid soft cheeses made from unpasteurized milk</td>
<td>56</td>
</tr>
<tr>
<td>Reheat deli meats until steaming hot</td>
<td>47</td>
</tr>
</tbody>
</table>

Pregnant Women – Motivators to Adoption

- Desire to protect health of fetus
- Changes are only temporary
- Need more information
  - Why pregnant women are at risk
  - Specific foods to avoid during pregnancy
  - Why RTE foods need to be reheated
- Receive information from credible sources
Pregnant Women – Implications for Practice

- Emphasize risk to fetus and possible outcomes
- Provide detailed information on specific recommendations
- Disseminate information via OB or other health care provider
  - Written educational materials in information packet received at first prenatal visit
  - One-on-one basis
- Also disseminate information through prenatal care information sources
Avoid eating raw or undercooked seafood (*Vibrio* species)

Avoid eating raw sprouts (*E. coli O157:H7*)

Avoid eating soft cheeses, cold smoked fish, & cold deli salads (*Lm*)

Avoid hot dogs & deli meats that have not been reheated to steaming hot or 165°F (*Lm*)

Use cheese & yogurt made from pasteurized milk (*Salmonella* species & *Lm*)

Avoid eating foods containing raw eggs & cook eggs until firm (*SE*)

Properly cook shellfish & fish (Noroviruses)

Drink only pasteurized milk & juices (*E. coli O157:H7* & other pathogens)

Wash utensils & surfaces after handling raw meat, poultry, seafood (*Salmonella* species & other pathogens)

Thoroughly rinse fresh fruits & vegetables before eating (*E. coli O157:H7*)

Kendall et al., 2003, *JADA*. 
Seniors’ Consumption of At-risk Foods

- Eggs with Runny Yolks: 37%
- Raw Homemade Cookie Dough: 26%
- Raw Alfalfa or Other Sprouts: 26%

Seniors’ Refrigeration and Storage Practices for RTE Foods

- 85% do not have a refrigerator thermometer
- 19% have their refrigerators at >40°F
- Store some RTE foods for longer than recommended time
  - Soft cheeses 69%
  - Deli meats 42%
  - Deli salads 29%

Seniors –
Barriers to Adoption

- Lack of knowledge of recommended practices
- Belief that older adults, as a group, are more susceptible, but do not view themselves at increased risk
- Belief that seniors have safer practices compared to younger adults
- Lack of concern about contracting listeriosis
- Have not had foodborne illness in past
- Tradition—”I’ve always done it that way”
- Personal preferences
Seniors’ Likelihood of Reheating Deli Meats

- Unnecessary, inconvenient, and impractical
- Negatively alter taste, texture, and color

Cates et al., forthcoming, *Food Protection Trends*.
Seniors – Motivators to Adoption

- Need more information
  - Why older adults are at risk
  - Why RTE foods need to be reheated
- Perceive themselves to be personally at risk
- Desire to take care of themselves and avoid illness
- Receive information from trusted and credible sources
Seniors – Implications for Practice

- Communicate that all older adults are at risk
- Use qualitative and quantitative methods to convey risk
- Integrate food safety information with other healthcare information
- Use concise, easy-to-understand written materials
- Disseminate information via
  - AARP
  - Government sources
  - Retirement communities, senior centers, churches
Risk Behaviors of Target Audiences: Cancer, Bone Marrow Transplants, and Solid Organ Transplants

Lydia Medeiros, Ph.D., R.D.
Associate Professor
The Ohio State University
When communicating risk of foodborne illness…

Who are the end users of greatest need?

Highest risk associated with anomalies of cell mediated immune system

- People on chemotherapy
- People with bone marrow transplants
- People with solid organ transplants
- People with HIV/AIDS
Overall Message Learned

Aware of their immune suppression, but lack information to help them feel in control

Major Concerns

“I want to know which things are true and which are not, which things would apply if your [neutrophil] count is down.”

“The cheese…is that a blood count factor, or is that an all-the-time kind of thing?”
Bone Marrow Transplant

Overall Message Learned

Intensely managed patients in controlled environment

Major Concern

“... you know that since I’ve had the disease, I think we’ve gotten a complete education on how to prepare the food, what to do....”
Solid Organ Transplant

Overall Message Learned

Avoid dietary restrictions unless absolutely necessary

Major Concerns

- Had many dietary restrictions, due to illness
- Overall health returned by transplant
- Unwilling to continue restrictions unless absolutely necessary
- Will make changes if it affects their health
HIV/AIDS

Overall Message Learned

“If I enjoy the food I’m going to eat it. I’m on this earth once.”

Major Concerns

No appetite

“Starving”

Loss of financial resources to buy/select food

“I eat what has appeal or available.”
Informational Needs Results

Threats

- Misinformation
- Disbelief of risk
- Lack of information
- Self-guilt
- Lack of trust
Informational Needs Results

**Motivators**

- Chance of illness/death
- Research-based information
- Whether recommendation aligns with habitual behavior
- Clear/easy to implement advice
- Information from trusted/credible sources
Informational Needs Results

**Barriers**

- Personal preferences/ loss of food quality
- Whether recommendation aligns with habitual behavior
- Lack of knowledge/understanding
- Time/inconvenience
- Disbelief of risk
Informational Needs Results

**Barriers - continued**

- Cost
- Availability of safe products
- Overwhelmed by their disease
- Lack of trust
- Too limiting/already have limited diet
- Physical disabilities
Informational Needs Results

Cues to Action

- Specific information regarding high-risk foods
- Credible source of information
- Easy to access information
- Specific information regarding timing of concern
- Explain risks/consequences to patient
- Easy to implement information
When is *need* for the message the greatest?

At the point of greatest physiological susceptibility to infection
Solid Tumor Cancer

- Susceptibility greatest when neutropenic associated with myelosuppressive therapy

- Susceptibility occurs 1-2 weeks following cytotoxic agent administration – circulating PMN <1000 cells/μL

- Susceptibility similar to general population when neutropenia corrected, if other complicating condition absent
Bone Marrow Transplant

- Greatest susceptibility – 2 - 4 wks before engraftment until 2 - 4 wks after engraftment

- Susceptibility diminished when absolute neutrophil count > 500/mm$^3$

- Susceptibility continues for 6 - 18 mo post transplant until CD4/CD8 ratio normalized

- Without complicating conditions, no longer susceptible once t-cell ratio normalized
Solid Organ Transplant

- Potential for susceptibility lifelong because of long-term immunosuppressive therapy
- Greatest risk for *Listeria monocytogenes* – 1 mo post transplant
- Continued susceptibility if absolute neutrophil count < 500/ mm$^3$
HIV/AIDS

- Potential for susceptibility lifelong
- Progressive susceptibility
- Asymptomatic – Opportunistic infection rare unless CD4 count <200 cells/mm³
- Symptomatic – CD4 count <200 cells/mm³, total lymphocyte count <14%
Implications for Practice

The preferred delivery format is:

- Written brochures/ pamphlets/ fact sheets
- Videos in clinics/treatment facilities

Information should be provided:

- At first visit to oncologist/specialist
Implications for Practice

- Food safety information should be accurate, credible, efficacious, and related to the patient.
- Should contain sufficient information for individual to make the message operational.
- No vague terms open to individual interpretation.
- Health providers should provide information.
Design and Evaluation of Food Safety Education Materials for At-Risk Audiences

Pat Kendall, Ph.D., R.D.
Professor and Extension Specialist
Colorado State University

Knowledge to Go Places
Design and Evaluation of Food Safety Education Materials for At-Risk Audiences

- **Project Team**
  - Lydia Medeiros, Ohio State University
  - Val Hillers, Washington State University
  - Pat Kendall, Colorado State University

- **Three High Risk Populations**
  - Pregnant Women
  - Persons infected with HIV
  - Persons with Cancer, Organ or Bone Marrow Transplants

- Support for work provided through a grant from the National Integrated Food Safety Initiative (NIFSI agreement 2001-51110-11364) and the National Research Initiative (NRI agreement 2002-35201-11700) of the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture
Five Step Development Process

- Define issues
- Develop initial food safety recommendations
- Assess target audience's willingness to follow recommendations, motivators and barriers
- Develop educational materials; fine-tune message
- Assess acceptability of educational materials developed for target audience

Borra et al., JADA, 2001
Theoretical Framework: Health Belief Model

- Set of beliefs contribute to motivation to engage in a health-related behavior (Chapman et al., 1995)

- Three principal components:
  - Perceived threat
    - Perceived susceptibility
    - Perceived severity
  - Outcome expectations
    - Perceived Benefits/Motivators
    - Perceived Barriers
  - Efficacy expectations
    - Cues to Action
    - Self-Efficacy
Use of Health Belief Model in Developing Materials on Food Safety during Pregnancy

Perceived threat
- *Perceived susceptibility* - Pregnant women must believe at greater risk of foodborne illness (FBI)
- *Perceived severity* - Must believe a FBI during pregnancy can result in severe consequences

Outcome expectations
- *Perceived benefits* - Following recommendations will help prevent FBI and result in a healthy baby
- *Perceived barriers* - Following rec’s may involve making changes in food handling behaviors or temporarily giving up foods they enjoy

Efficacy expectations
- *Cues to action* - Include practical tips and “how-to” information regarding safe food handling
- *Self-efficacy* - After reading the materials, women confident can follow the recommendations and prevent FBI
Material Prototypes for Materials for Pregnant Women

- Numerous prototypes developed using Microsoft Word
- Five prototypes selected for further development and evaluation. Each used different approach in addressing food safety concerns and varied in content and format features:
  - Length
  - Complexity of information
  - Format
  - Writing style
Prototype #1:
“Pregnancy and Foodborne Illness: You and Your Baby Could Be at Risk”

- “Pathogen approach”
  - Detailed information regarding specific pathogens including statistics, outbreaks, symptoms and complications

- Lengthy

- In-depth, technical information

- Question and answer style

- Booklet format

- Readability = 10th grade
  (SMOG Readability Formula; McLaughlin, 1969)
Prototype #2: “Baby on Board”

- “Food Safety and Nutrition” approach
  - Combined food safety recommendations with general nutrition information, including the Food Guide Pyramid
- Moderate in length
- Simple information
- Narrative style
- Booklet format
- Readability = 9th grade
Prototype #3: “Dining Out and About”

- “Dining Out” approach
  - Provided practical application of the recommendations in a dining away from home setting
- Moderate in length
- Moderate complexity
- Bulleted lists
- Trifold booklet
- Readability = 9th grade
Prototype #4: “Safe Shopping”

- “Shopping” approach
  - Gave practical applications of the recommendations such as safe foods to look for in grocery stores and supermarkets

- Moderate in length

- Moderate complexity

- Narrative style and bulleted lists

- One-page handout

- Readability = 10th grade
Prototype #5: “Keep Your Baby Safe During Pregnancy” magnet

- “Magnet” approach
  - Categorized risky foods in an “Instead of…Choose” table
- Short in length
- Simple information
- “Instead of…Choose” table
- Magnet
- Readability = 7th grade

![Diagram of magnet with food safety information]
Materials Development and Evaluation Process

Materials Development

Formative Evaluation - Phase I

- Expert Panel Review
- Key Informant Interviews

Formative Evaluation - Phase II

- Background Questionnaire
- Cognitive Response Forms
- Materials Reaction Forms
- Focus Group Discussion
Focus Group Results with Pregnant Women

- All groups (5/5) preferred the “Pregnancy and Foodborne Illness” booklet because it contained the most information.
- “Safe Shopping” handout well received by 3/5 groups due to its practicality and usefulness.
- “Dining Out” booklet OK, but limited information.
- “Baby on Board” booklet least liked by participants because not as informative (4/5) and information too basic (2/5).
- Magnet was considered a good reminder card (5/5).
Confidence in Preventing Foodborne Illness

- **Focus Group Results with Pregnant Women:**
  - All groups felt more confident and expressed willingness to follow recommendations.
  - Many mentioned they would have liked to receive this information earlier in their pregnancy.
  - “I wish I would have known this earlier, a long time ago.”

- **Results were similar for other target audiences**
Materials for Pregnant Women

Pregnancy and Foodborne Illness

Pregnant Women: Keep You and Your Baby Safe from Foodborne Illness

Did you know...!
- During pregnancy, changes in hormones cause a woman’s immune system to be lower, so she is harder to fight off infections.
- The 6.1 million women who are pregnant each year in the U.S. are at increased risk for some types of foodborne illness.
- Some foodborne illnesses can cause a woman to have a miscarriage or stillbirth.

What does this mean?
This means that pregnant women are MORE likely to get a foodborne illness than other healthy adults.
Some pathogens, such as Listeria monocytogenes and Toxoplasma gondii, can pass from the mother to her unborn baby and cause serious effects such as miscarriage, stillbirth or health problems for the baby after birth, including eye and/or brain damage.
Symptoms can be mild or severe and may include:
- Diarrhea
- Nausea/vomiting
- Muscle aches
- Stomach ache

Because signs and symptoms of a foodborne illness can look like symptoms common in pregnancy, you should follow these safe food tips to keep your baby safe.
If you suspect you have a foodborne illness, see your doctor right away!
Materials for HIV Infected Persons

- Take Control
- Eating Away from Home & Traveling
Preventing Foodborne Disease - Patient Group

Pathogen Approach

Refrigerated, RTE Foods - Listeria
Availability of Educational Materials

- Copies are available as PDF copies at:
  
  http://hec.osu.edu/highriskfoodsafety/resources.htm

  OR

  http://www.colostate.edu/Orgs/safefood/foodsafty/menuhr.html
Summary of Materials Evaluation

- Participants preferred materials with in-depth, practical information
- Participants more willing to follow recommendations if supported with detailed explanation
- Health Belief Model - useful tool for message communication to high risk populations regarding foodborne illness
- Systematic development and evaluation process – ensured that specific needs of target audiences met
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Questions