

# Food Safety for the Immune-Suppressed/Compromised: A Multimedia Approach

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# Other Project Team Members

## Research Associates

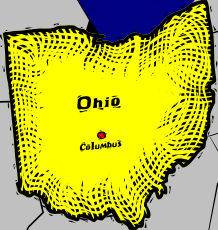
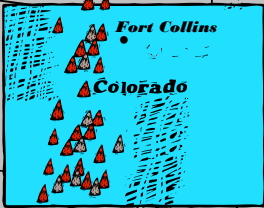
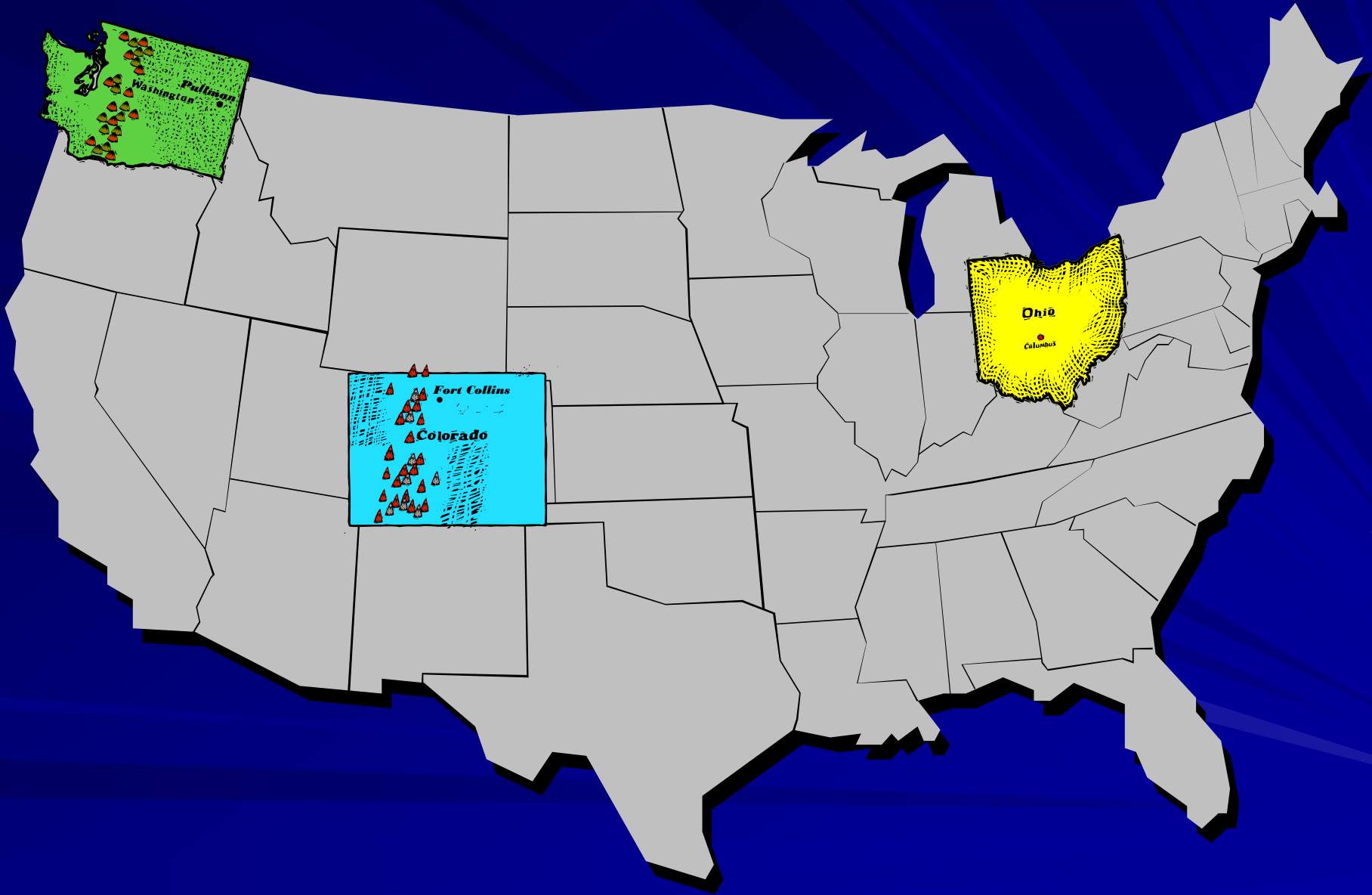
- Mary Schroeder – CSU
- Gang Chen – OSU
- Verna Bergmann – WSU

## Web Designers

- Steve DiMascola – OSU
- Eva Bradshaw – OSU

## Graduate Students

- Prudence Athearn - CSU
- Shelly Morales - CSU
- Emily Hoffman - WSU
- Jennifer Dean - CSU
- Carrie Hoblet - OSU
- Stephanie Wallner - CSU



# Which Comes First: The Project Need or the Team?

- Request from USDA-FNS to Lydia Medeiros to develop a white paper on the state of food safety education for the Food Stamp Nutrition Education Program
- Lydia's Team – 4 Extension Food Safety Specialists:
  - Lydia Medeiros, PhD, RD, Ohio State University
  - Val Hillers, PhD, RD, Washington State University
  - Pat Kendall, PhD, RD, Colorado State University
  - April Mason, PhD, Purdue University
- Products:
  - *Medeiros, Hillers, Kendall, Mason. 2001. Food safety education: What should we be teaching to consumers? J. Nutrition Education. 33:108-113.*
  - *Medeiros, Hillers, Kendall, and Mason. 2001. Evaluation of food safety education for consumers. J. Nutrition Education. 33:S27-34.*

# Key Points from White Papers and Identified Research Needs

- Some people at greater risk of becoming ill from foodborne pathogens or developing serious complications from foodborne illness.
- Food safety education is most effective when targeted toward changing those behaviors in a given audience most likely to result in foodborne illness.
  - Which behaviors are most important in reducing risk of foodborne illness?
  - Which behaviors are associated with the different pathogens?
  - What behaviors are most important for specific high-risk groups?

# First Integrated Research Project: Development and Validation of Instruments to Evaluate Food Safety Education

## ■ Team:

- Lydia Medeiros, PI; Val Hillers & Pat Kendall, co-PIs
- Gang Chen, Verna Bergmann, Mary Schroeder, Research Associates
- Kelly Sinclair and Anne Elsbernd, Graduate Students

- Also received complimentary CSREES grant: Program Indicators and a Web-based Reporting System for the FSQ Initiative

# Development and Validation of Instruments to Evaluate Food Safety Education

- Used Web-based Delphi procedure to develop consensus among food safety experts on most important consumer behaviors to reduce risks of foodborne illness.
  - 29 key food-handling behaviors identified and rank-ordered within 5 pathogen control factors.
  - Product: *Medeiros, Kendall, Hillers, Chen, DiMascola. 2001. Identification and classification of consumer food handling behaviors for food safety education. J. Amer. Dietetic Assoc. 101:1326-1332*

# Development and Validation of Instruments to Evaluate Food Safety Education

- Experts also rated behaviors for importance among 4 high-risk groups and among 13 pathogens.

- Products:

- *Kendall, Medeiros, Hillers, Chen, DiMascola. 2003. Food handling behaviors of special importance to pregnant women, infants and young children, the elderly and immune-compromised persons. J. American Dietetic Association. 103:1647-1649.*
- *Hillers, Medeiros, Kendall, Chen, DiMascola. 2003. Consumer food handling behaviors associated with prevention of 13 foodborne illnesses. J. Food Protection. 66:1893-1899.*



# Development and Validation of Instruments to Evaluate Food Safety Education

- Developed and validated knowledge, attitude and behavior questions addressing the identified behaviors.
- Products:
  - *Kendall, Elsbernd, Sinclair, Schroeder, Chen, Bergmann, Hillers, Medeiros. 2004. Observation versus self-report: validation of a consumer food behavior questionnaire. J Food Protection. 67:2578-2586.*
  - *Medeiros, Hillers, Chen, Bergmann, Kendall, Schroeder. 2004. Design and development of food safety knowledge and attitude scales for consumer food safety education. J. Amer. Dietetic Assoc. 104:1671-1677.*

# Current Integrated Research Project

- Outgrowth of felt need to better understand high-risk audiences and to develop educational materials for these audiences and their health care providers
- Team:
  - Pat Kendall, PI; Lydia Medeiros & Val Hillers, Co-PIs
  - Mary Schroeder, Gang Chen, Verna Bergmann, Research Associates
  - Steve DiMascola and Eva Bradshaw, Web Developers
  - Prudence Athearn, Shelly Morales, Emily Hoffman, Jennifer Dean, Carrie Hoblet, Stephanie Wallner, Graduate Students

# Food Safety for the Immune-Suppressed/ Compromised: A Multimedia Approach

## ■ Project goals:

1. Better understand beliefs, motivators and barriers that affect adoption of safe food handling practices among 3 high-risk populations: pregnant women, persons with cancer or organ transplants, persons infected with HIV
2. Understand food safety attitudes and beliefs of health care professionals that work with these high risk audiences;
3. Use this knowledge in developing and evaluating:
  - Consumer/patient education materials for each high-risk audience
  - Multi-media distance education course for graduate students
  - Modular web-cast for professionals on food safety for high risk populations
4. Make web-cast and education materials available via the web

# Complimentary NRI Project: Design and Evaluation of Food Safety Education for High Risk Audiences

## ■ Project goals:

1. Conduct focus groups with 3 high-risk groups (pregnant women, persons with cancer or organ transplants, persons infected with HIV) to better understand their food safety attitudes
2. Develop prototypes of educational materials targeted to each of the high risk groups
3. Evaluate prototypes with members of the targeted audiences in small group settings and revise materials as needed

# Integration of Project across Research, Education and Outreach Components

## ■ Research

- Needs assessment of target audiences
- Needs assessment of food safety attitudes and beliefs of health care professionals
- Evaluation of educational materials and continuing education course

## ■ Education

- Multi-media distance educ. course for grad students
- Web-cast for professionals and interested consumers

## ■ Outreach

- Consumer/patient education materials for each high-risk audience targeted;
- Web-cast & education materials available via web

# Integration of Project across 3 States

## ■ Research

- Each state focused on one target audience and their health care providers
  - CSU – Pregnant women
  - OSU – Patients on chemotherapy or with organ transplants
  - WSU – HIV/AIDS patients

## ■ Education

- Distance education course for graduate students – Joint project between 3 states
- Web-cast for professionals – OSU lead state for web development; all states provided content

## ■ Outreach

- Each state responsible for consumer/patient education materials for their target audience
- Web-cast available via OSU website
- Educational materials available from each state's website

# Project Timeline

## ■ Year 1

- Needs Assessment of target audiences and their health care providers

## ■ Year 2

- Development of educational materials for target audiences
- Distant education course for graduate students

## ■ Year 3

- Evaluation of educational materials and revisions
- Development and pilot testing of web cast for professionals
- Make educational materials available from each state's website

# Team Building/Maintaining the Collaboration

- Yearly project team meetings
- Mini team meetings at conferences
- Regularly scheduled conference calls
- Regular e-mail correspondence; work on papers



# Project Management/ Reporting

- Each state had own budget
- Regular team meetings, conference calls kept us on track
- Reporting done through CRIS reports, papers published

# Project Accomplishments and Impacts

- Research
- Education
- Outreach

# Understanding the Target Audience (Stakeholder Input)

- Conducted focus groups with target audience (5-6 in key state, 1-2 in each of other states)
  - Identified beliefs, motivators and barriers to following specific food safety recommendations
  - Identified information needs
- For each target audience, conducted 10-12 interviews with health care providers

# Theoretical Framework

## Health Belief Model

- Based on the idea that a set of beliefs contribute to people's motivation to engage in a health-related behavior (Chapman et al., 1995)
  - Threats
  - Motivators
  - Barriers
  - Cues to Action

# Motivators

## Focus Group Results

- Chance of illness/death (threat)
- Information from trusted/credible sources
- Research-based information
- Whether recommendations align with habitual behavior
- Clear/easy to implement advice

# Barriers

## Focus Group Results

- Personal preferences/ loss of quality food
- Too limiting/ already have limited diet
- Lack of knowledge/ understanding
- Time/inconvenience
- Limited availability of safe products
- Poor labeling on products
- Disbelief of risk/ lack of trust

# Cues to Action

## Focus Group Results

- Explain risks/ consequences
- Statistics on foodborne illnesses
- Specific information regarding high-risk foods
- Credible sources of information
- Easy to implement information

# Development of Educational Materials

- Sets developed for pregnant women, HIV infected persons, Cancer patients, Bone & Organ transplant patients
  - Each state took lead for their targeted audience; other states reviewed, provided feedback
  - Used Health Belief Model as theoretical format; Included food safety guidelines developed for each target audience; Incorporated focus group results
- Evaluated each set of materials with a 2nd series of focus groups in each state



# Educational Materials Design Characteristics

- Layout
  - General appearance or design
  - Adequate white space
- Readability
  - Well-organized and presented in a clear, concise manner
  - Legibility
  - Ease of reading
- Illustrations

# Availability of Educational Materials

- Copies are available as PDF copies at:

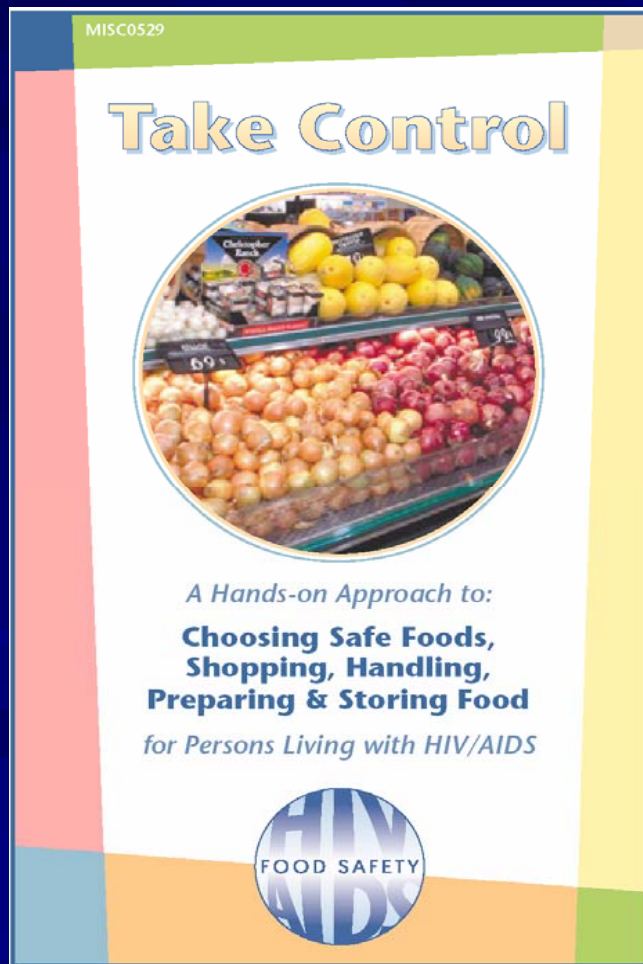
[hec.osu.edu/highriskfoodsafety/resources.htm](http://hec.osu.edu/highriskfoodsafety/resources.htm)

# Summary of Materials Evaluation

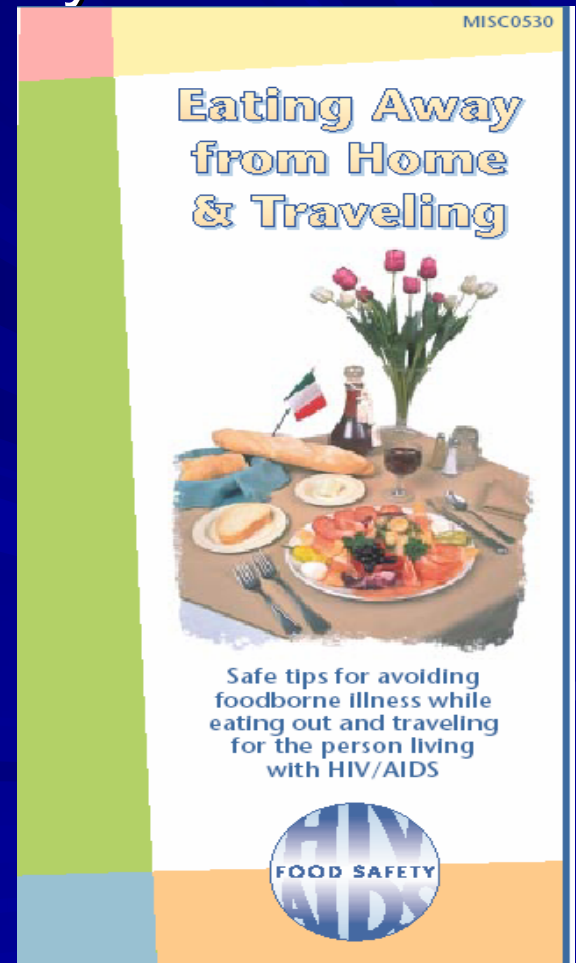
- Participants preferred materials with in-depth, practical information
- Participants were more willing to follow recommendations if they were supported by a detailed explanation
- A systematic development and evaluation process is an effective strategy to ensure content accuracy and that messages are tailored to needs of the target audience
- The Health Belief Model is a useful tool for materials designed for high risk populations

# Materials for HIV Infected Persons

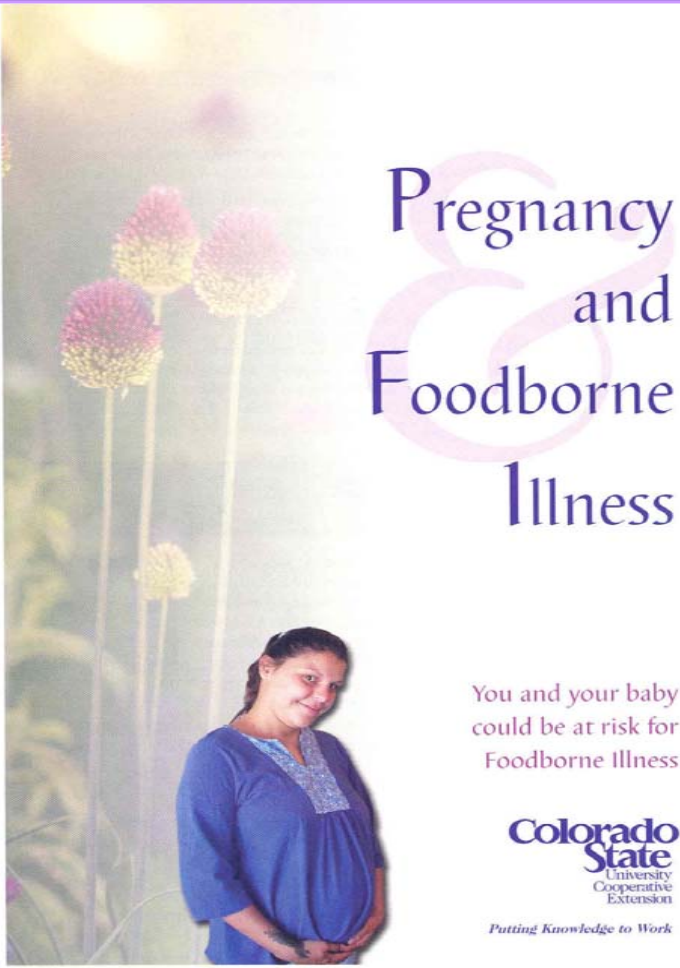
## ■ Take Control



## ■ Eating Away from Home & Traveling



# Materials for Pregnant Women



## Pregnancy and Foodborne Illness

You and your baby could be at risk for Foodborne Illness

**Colorado State University**  
Cooperative Extension

*Putting Knowledge to Work*

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

**A guide to safe and healthy shopping, cooking and dining during pregnancy.**

**Did you know...?**

- ▶ During pregnancy, changes in hormones cause a woman's immune system to be lower, so that it is harder to fight off infections.
- ▶ The 6.5 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
- ▶ Headache
- ▶ Fever
- ▶ Chills

**(You may feel like you have a mild flu)**

Because signs 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!**

“Pregnancy and Foodborne Illness: You and Your Baby Could Be At Risk”

# Materials for Cancer/Transplant Patients

## How Do You Get Foodborne Disease?



### A Guide for Cancer and Transplant Patients and Their Care Givers

Did you know you have a greater risk of getting a Foodborne Disease when your immune system is weak?

#### Why Are You at High Risk?

You are at **High Risk** for infections throughout your treatments or any time you are on a medicine that may make your immune system weaker. Since your immune system is not able to fight harmful pathogens, you have a high risk for foodborne diseases. It is important to know about the different "germs" (pathogens) that cause foodborne disease. Foodborne disease can be fatal for cancer patients, bone marrow transplant patients and organ transplant patients.

#### What is a Foodborne Disease?

A foodborne disease is any disease that comes from a food you eat.

#### What are Pathogens?

Pathogens are organisms (such as bacteria and viruses) that cause disease.

#### How Will I Know if I Get a Foodborne Disease?

Foodborne disease may give you:

- Diarrhea
- Nausea/vomiting
- Stomach ache
- Headache
- Fever
- Chills

If you suspect you have a foodborne illness, see your doctor right away!

#### Why are Some Foods Riskier Than Others?

Where the food comes from, how it's processed, and how it's stored and prepared, all affect the risk that foods will contain pathogens. Uncooked animal products including raw milk, meat, eggs, fish, poultry, seafood, and raw fruits and vegetables are high-risk foods. This pamphlet will give you more information on what you can do to reduce your risk of getting foodborne disease.

#### Which "germs" are harmful to cancer and transplant patients?

Some pathogens are more harmful than others. These include:



- *Listeria monocytogenes* (lis-te-ri-a mon-o-cy-to-gen-es)
- *E. coli O157* (e. co-li oh-1-5-7)
- *Salmonella* (sal-mo-nel-la)
- *Cryptosporidium parvum* (crip-to-spo-ri-di-um par-vum)
- *Campylobacter* (camp-i-bac-ter)

## Foodborne Disease and Organ Transplant Patients

A Guide for Organ Transplant Patients and Care Givers on How to Prevent Foodborne Diseases



Anyone whose immune system is not fully working is at higher risk for becoming sick from foodborne disease. This includes organ transplant patients.

#### Why Are You at Higher Risk?

Your risk for infection is greater in the months after your organ transplant. Once you are on maintenance levels with your medications, your risk is lessened. But, since you are taking medications that affect your immune system for life, you will also need to be cautious about infections for the rest of your life.

Since your immune system is suppressed by your medications, harmful pathogens in your food (bacteria, viruses and parasites) may cause foodborne illnesses. If you do get a foodborne illness, call your doctor right away. Don't wait until your next visit. The symptoms of foodborne disease range from nausea, vomiting, and diarrhea to fever and rarely, but sometimes death.

Continue reading this pamphlet to learn how to keep your food safe. Remember, your safety and health are very important. You do not want to do anything that may cause you to get a foodborne illness. If you still have questions, ask your doctor, dietitian or primary health care provider.



Use this brochure when your risk for infection is high  
 ✓ when shopping  
 ✓ cooking food in your home  
 ✓ when dining out

## A Guide for Cancer and Transplant Patients on How to Control LISTERIA MONOCYTOGENES

### REFRIGERATED READY-TO-EAT FOODS

*Listeria monocytogenes* is a bacteria that causes a foodborne disease called *Listeriosis*. It may grow in some foods in the refrigerator. Cooking destroys the bacteria.

Ready-to-eat food can be eaten without cooking, like deli salads, cheese, and hot dogs. Some ready-to-eat foods do not have to be refrigerated, like crackers.

*Listeria monocytogenes* can be in refrigerated ready-to-eat foods. It can cause *Listeriosis* in people who are taking chemotherapy or who have had a bone marrow or organ transplant. Ready to eat food, like crackers, are not risky.

Risky foods require special care when you handle them. Sometimes, they may need to be avoided altogether.

Eating "risky" food is not worth the risk!

Each year, there are about 2,500 cases of *Listeriosis* in the United States. Some people will die from the disease.

While your best bet against *Listeriosis* is not to eat a risky food, this may be easier said than done.

Read on for some tips to help guard your safety when you do eat these foods.

#### Refrigerated Ready-to-Eat Foods

- | Meats             | Fresh patties and other meat spreads   |
|-------------------|--|
|                   | • Commercially packaged or deli lunch meats  |
|                   | • Unheated hot dogs  |
| Fish and Seafood  | Smoked fish  |
|                   | • Refrigerated cooked or smoked seafood and fish                                   |
| Dairy Foods       | Soft cheeses made with raw milk  |
|                   | • Raw or unpasteurized milk  |
| Deli-style Salads | Any type made with risky ingredients —like seafood, either home-made or commercial |
| Vegetables        | Unwashed, raw vegetables (especially lettuce or cabbage)                           |
|                   | • Raw seed sprouts   |

*Listeria monocytogenes* can be in refrigerated ready-to-eat foods. It can cause foodborne illness in people are taking chemotherapy or have had a bone marrow or organ transplant

#### Safe Refrigerator Storage

Product	Storage Instructions
Fresh Prepared by the Grocery or At Home (like deli salads)	<ul style="list-style-type: none"> <li>• Store in refrigerator</li> <li>• Be sure refrigerator temperature is 35°F-40°F</li> <li>• Discard 4 days after preparation if the food can't be frozen or cooked to steaming hot</li> </ul>
Commercially Packaged (like lunch meat or hot dogs)	<ul style="list-style-type: none"> <li>• Freeze or store in refrigerator</li> <li>• Be sure refrigerator temperature is 35°F-40°F</li> <li>• Discard 4 days after opening if the food can't be frozen or cooked to steaming hot</li> </ul>

# Education of Graduate Students on Food Safety for High Risk Populations

- 2-credit graduate level distance education course for graduate students
  - Held Fall, 2003
  - 3-hr class held once/week for 10 weeks
  - Simultaneous video-conferencing in 3 states (sometimes with 4<sup>th</sup> site) across 4 time zones

# Results of Graduate Level Course

- 32 students enrolled
  - 11 from OSU; 10 from WSU; 11 from CSU
  - Majoring in nutrition, food science, medicine, public health
- Students mastered content, were very satisfied with organization of course, and somewhat satisfied with quality of audio and video transmission
- All students participated in class and/or on-line discussions



# Education of Professionals on Food Safety for High Risk Populations

- Online continuing education course designed to communicate current food safety information
- Target audience: food safety educators, nutrition educators, nurses
- Approved for 6 continuing education units from American Dietetic Association, Ohio Nurses Association and Amer. Assoc. Family and Consumer Sciences

# Education of Professionals on Food Safety for High Risk Populations

Course content: six online modules

1 – Introduction/Overview of FBI

2 – Immunology

3 – Pregnancy

4 – HIV Infection

5 – Cancer and Bone Marrow/Organ Transplant

6 – Lifecycle (Infants, children, elderly)

# Course Content

- PowerPoint slides for each module
- Audio for each slide
  - Length of each module: 50-60 minutes
- Supplemental materials
  - List of terms
  - Additional information about foodborne pathogens
  - Reference lists
- Additional details at:  
<http://hec.osu.edu/highriskfoodsafety/>

# Pilot Test Results

- Participants in the continuing education class on *Food Safety for High Risk Populations* were self-motivated and interested in the topics
  - Most (92%) who logged in completed the entire course
- Scores significantly improved ( $p < 0.001$ ) following content delivery
- Indicated that web-based education is effective in delivering content

# Papers

- Athearn, Kendall, Hillers, Schroeder, Bergmann, Chen, Medeiros. 2004. Awareness and acceptance of current food safety recommendations during pregnancy. *Matern. Child Health J.* 8:149-162.
- Morales, Kendall, Medeiros, Hillers, Schroeder 2004. Health care providers' attitudes toward current food safety recommendations for pregnant women. *Applied Nursing Research* 17:178-186.
- Medeiros, Chen, Kendall, Hillers. 2004. Food safety issues for cancer and organ transplant patients. *Nutrition in Critical Care*, 7: 141-148.
- Hoffman, Bergmann, Shultz, Kendall, Medeiros, Hillers. 2005. Food safety education materials for persons with HIV/AIDS: A multi-stage approach. *J. American Diet Assoc.* In press.
- 3 additional papers in preparation or submitted

# Project Challenges

- Early in adoption curve on use of developing technology
- States at different stages in use of developing technology, especially for distance graduate course
- Working across 4 time zones

# Unexpected Benefits Associated with Integrating Research, Education and/or Extension

- Three heads better than one; able create critical mass
- Research questions and approach better grounded in reality, needs of target audience
- Research results more likely to be applied in real life
- Education and outreach efforts more likely to be grounded in applicable research
- Whole greater than sum of parts

# Unexpected Barriers Associated with Integrating Research, Education and/or Extension

- Time – always takes longer than you anticipate
- Timing – research often needs to proceed education/outreach
- Recognition within and across University systems, especially for within University collaborations



# Essential Factors for Success of our Team

- Mutual Respect
- Trust
- Sharing of work load
- Communication
- Flexibility

# Questions?

