

**Nutrition 545/446/Environmental Health 540  
Food Safety and Health  
Monday and Wednesday 12-1:20 PM  
T733 Health Sciences Building**

<b>Date</b>	<b>Topic</b>	<b>Instructor</b>
January 3.	Introduction: Concepts of food safety, establishing the problems and susceptibilities within the food chain.	Rosenfeld
January 8.	Food borne pathogens and outbreaks	Meschke
January 10.	Food borne pathogens and outbreaks continued: seafood and shell fish, mercury and toxins	Meschke
January 15.	Martin Luther King Day Holiday	
January 17.	Investigating a food outbreak	Melius
January 22.	Food safety regulations: the role of The FDA.	Rice
January 24.	Organic food, chemical contamination	Rosenfeld
January 29.	Risk Perception	Faustman
January 31.	One health, zoonotic infections and food safety	Rabinowitz
February 5.	Antibiotic resistance	Roberts

<b>February 7.</b>	<b>Dietary supplements</b>	<b>Rosenfeld</b>
<b>February 12.</b>	<b>Midterm Exam</b>	
<b>February 14.</b>	<b>CDC and FDA.</b>	<b>Pappaioanou</b>
<b>February 19</b>	<b>President's Day Holiday</b>	
<b>February 21.</b>	<b>Restaurant and food service inspections, food safety in the home</b>	<b>Easterberg</b>
<b>February 26.</b>	<b>Genetically modified foods</b>	<b>Rosenfeld</b>
<b>February 28</b>	<b>Legal consequences of food outbreaks</b>	<b>Marler</b>
<b>March 5.</b>	<b>Over-nutrition:obesity</b>	<b>Rosenfeld</b>
<b>March 7.</b>	<b>Class Debate and Discussion Are we safer now than ever before?</b>	<b>Rosenfeld</b>

## Course Objectives:

At the conclusion of this course the student will be able to:

- Identify the problem areas and susceptibilities within the food chain.
- Demonstrate an application of basic knowledge and skills regarding food safety, globalization of the food supply, sustainable agriculture, and biotechnology.
- Identify policy issues related to the food supply.
- Identify the major risk factors and health related consequences for food borne illness in the United States.
- Discuss the processes and investigations used for ensuring a safe food supply.
- Identify and discuss recent food borne illness outbreaks.
- Describe the responsibilities, interactions, and limitations of international, federal and local agencies responsible for food safety.
- Describe the criteria used for approval as USDA Organic.
- Identify the chemical contaminants of food.
- Discuss the issues of food safety from the perspective of the food industry.
- Discuss the legal consequences of the distribution and sale of unsafe food.
- Describe the causes of antibiotic resistance associated with the food supply.
- Discuss the concept of “One Health”.
- Analyze the issues surrounding biodiversity and biotechnology.
- Review the scientific foundation and safety of genetically modified organisms.
- Analyze issues in the use of locally grown foods.
- Discuss the issues related to over-nutrition, food marketing, and obesity.
- Discuss the perception and analysis of risk of unsafe food.
- Discuss the issues related to the safety of dietary supplements.
- Describe preparedness activities related to biosecurity.
- Describe the food safety requirements for restaurants and food services.
- Identify the issues related to optimum food safety in the home.

## Course Grading:

Grades for **undergraduates** will be based on 5 assignments. 1. Students will submit to Canvas prior to each lecture, a 1 paragraph summary of the assigned reading for that class (10%). 2. Students will submit to Canvas by February 12, their review of fact sheets on food safety issues composed by the graduate students (10%). 3. Students will complete an in-class multiple choice midterm exam on February 12 (45%). 4. Students will write a paper (max 15 pages double spaced, due March 7) that researches any current issue related to food safety

(30%). 5. Following the final class debate/discussion, on whether we're safer now than at any time in the past, students will submit within 1 week a summary of the debate/discussion (max 5 pages, 5% of grade).

Grades for **graduate students** will be based on 5 assignments. 1. Graduate students will submit to Canvas prior to each lecture, a 1 paragraph summary of the assigned reading for that class (10%). 2. Graduate students will submit to Canvas on February 7, a 1-2 page fact sheet on a food safety related topic chosen from a list provided at the beginning of the course (15%). Graduate students can work in pairs if they choose to complete the fact sheets. The undergraduate students will review and comment on the fact sheets. 3. Graduate students will complete an in-class multiple choice midterm exam on February 12 (40%). 4. Graduate students will write a paper (max 20 pages double spaced, due March 9) focused on any issue related to food safety (20%). 5. Graduate students will also participate as team members in a class debate on the last day of class (March 7). Teams (randomly assigned at the beginning of class) will work together to research all of the issues pertaining to the question "are we safer now than ever before", and will present a 20 minute powerpoint presentation in support of their side of the issue (15%). After each side has presented, there will be a full class discussion of the issues.

### Academic Integrity

Students at the University of Washington (UW) are expected to maintain the highest standards of academic conduct, professional honesty, and personal integrity. The UW School of Public Health (SPH) is committed to upholding standards of academic integrity consistent with the academic and professional communities of which it is a part. Plagiarism, cheating, and other misconduct are serious violations of the University of Washington **Student Conduct Code** (WAC 478-120). We expect you to know and follow the university's policies on cheating and plagiarism, and the **SPH Academic Integrity Policy**. Any suspected cases of academic misconduct will be handled according to University of Washington regulations. For more information, see the University of Washington **Community Standards and Student Conduct** website.

UW Student Conduct Code (WAC 478-120)

<http://www.washington.edu/cssc/student-conduct-overview/student-code-of-conduct/>

SPH Academic Integrity policy

<http://sph.washington.edu/students/academicintegrity/>

Community Standards and Student Conduct

<http://www.washington.edu/cssc/>

## **Access and Accommodation**

(<http://depts.washington.edu/uwdrs/faculty-resources/syllabus-statement/>):

"Disability Resources for Students (DRS) offers resources and coordinates reasonable accommodations for students with disabilities. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. If you have not yet established services through DRS, but have a temporary or permanent disability that requires accommodations (this can include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 or uwdrs@uw.edu or disability.uw.edu"

## **Classroom Climate:**

The UW School of Public Health seeks to ensure all students are fully included in each course. We strive to create an environment that reflects community and mutual caring. We encourage students with concerns about classroom climate to talk to your instructor, your advisor, a member of the departmental or SPH Diversity Committee and/or the program director.

**Required and Recommended Readings (weekly required readings are highlighted with an asterisk \* and are available on the course website):**

### **Concepts of food safety, establishing the problem(s), susceptibilities within the food chain**

Institute of Medicine: *Addressing Foodborne Threats to Health*" Web Summary. 2006

\* DeWaal, CS and Plunkett, DW. Building a Modern Food Safety System. CSPI White Paper 2009

### **Food borne pathogens and outbreaks, seafood and shell fish, mercury and toxins, investigating an outbreak.**

Mead PS, et al.; Food-Related Illness and Death in the United States, Emerging Infectious Diseases Vol. 5; CDC, Atlanta, Georgia, USA, 1999

\*Scallan, E. et al., Foodborne Illness Acquired in the United States—Unspecified Agents. Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 17, No. 1, January 2011

\*Scallan, E., et al., Foodborne Illness Acquired in the United States—Major Pathogens. *Emerging Infectious Diseases* • www.cdc.gov/eid • Vol. 17, No. 1, January 2011

\*Rietberg, K et al., Outbreak of *Listeria monocytogenes* infections linked to a pasteurized ice cream product served to hospitalized patients. *Epidemiol Infect.* 2016 Oct;144(13):2728-31.

Todd, E.C.D. Challenges to global surveillance of disease patterns  
*Marine Pollution Bulletin* 53 (2006) 569–578

Preliminary FoodNet Data on the Incidence of Infection with Pathogens Transmitted Commonly Through Food --- 10 States, 2008. *MMWR* April 10, 2009 / 58(13);333-337

\*Cavallaro, E. et al. *Salmonella* Typhimurium Infections Associated with Peanut Products. *N Engl J Med* 2011;365:601-10.

Germany's E-Coli Nightmare. *Food Quality* Aug/Sept 2011

\*Adeel A Butt, A.A. et al., Infections related to the ingestion of seafood Part I: viral and bacterial infections. *Lancet Infect Dis* 2004; 4: 201–12

Jeffery, B. et al., Amnesic shellfish poison. *Food and Chemical Toxicology* 42 (2004) 545–557

\*Ginsberg, G L, Toal, BF. Quantitative approach for incorporating methylmercury risks and omega-3 fatty acid benefits in developing species-specific fish consumption advice. *Environ Health Perspect* 117:267–275 (2009).

FDA (1) What You Need to Know About Mercury in Fish and Shellfish 2004

FDA (2) Mercury Levels in Commercial Fish and Shellfish 2006

Mozaffarian, D., Rimm, E.B. Fish intake, contaminants, and human health; evaluating the risks and benefits. *JAMA* 2006;296:1885-1899.

### **Food safety regulations: the roles of federal, state, and international agencies**

<http://www.fda.gov/Food/FoodSafety/FSMA/default.htm>

S 510 Food Safety Modernization Act 2009 Summary

\*Taylor, M.R.. Will the Food Safety Modernization Act Help Prevent Outbreaks of Foodborne Illness? N Engl J Med 2011

\*Agres, T. Meeting the Requirements of FSMA in 2016. Food Quality & Safety - <http://www.foodqualityandsafety.com/article/meeting-the-requirements-of-fsma-in-2016/>

FDA: Food Protection Plan. Nov 2007

CDC: Overview of CDC food safety activities and programs

### **Organic food, chemical contamination of food**

Lu C, Barr DB, Pearson MA, Waller LA. Dietary intake and its contribution to longitudinal organophosphorus pesticide exposure in urban/suburban children. *Environ Health Perspect.* 2008 Apr;116(4):537-42.

\*Forman J, Silverstein J; Committee on Nutrition; Council on Environmental Health; American Academy of Pediatrics. Organic foods: health and environmental advantages and disadvantages. *Pediatrics.* 2012 Nov;130(5):e1406-15.

Magkos, F., et al., Organic Food: Buying More Safety or Just Peace of Mind? A Critical Review of the literature. *Critical Reviews in Food Science and Nutrition*; 2006; 46: 23-56

Ryan B. Ingestion Exposure. Ch. 13 in: Ott, Steinemann and Wallace, *Exposure Analysis*, Taylor and Francis, 2007.

National Research Council, Executive Summary, *Pesticides in the Diets of Infants and Children*, National Academy Press, 1993.

\**Cynthia L. Curl, Richard A. Fenske, Kai Elgethun* Organophosphorus Pesticide Exposure of Urban and Suburban Preschool Children with Organic and Conventional Diets *Environ Health Perspect* 111:377–382 (2003).

### **Food safety preparedness: Perspective from the food industry**

Golan E. et al.: Industry studies: Private-sector traceability systems balance private costs and benefits. IN: *Traceability in the U.S. Food Supply*. USDA Economic Research Service. AER-830. 2004

USDA: Guidebook for preparation of a HACCP

Ensuring Safe Food: A HACCP Based Plan. Ohio State University  
Extension Bulletin

Moss M: Food companies are placing the onus for safety on consumers.  
NYT May 15, 2009.

### **Hormones and antibiotics: antibiotic resistance, contamination of foods**

\*Marshall, B.M. and Levy, S.B. Food Animals and Antimicrobials:  
Impacts on Human Health CLINICAL MICROBIOLOGY REVIEWS, Oct.  
2011, p. 718–733 Vol. 24, No. 4

\*MARK BITTMAN. The F.D.A.'s Not-Really-Such-Good-News  
New York Times Published: December 17, 2013

Marilyn C. Roberts. The Evolution of Antibiotic-Resistant Microbes in Foods  
and Host Ecosystems In: From Food-Borne Microbes: Shaping the Host  
Ecosystem, Editors: Lee-Ann Jaykus, Hua H. Wang, Larry S. Schlesinger,  
ASMPress:

David G. White and Patrick F. McDermott. Antimicrobial Resistance in Food-  
Borne Pathogens In: From Food-Borne Microbes: Shaping the Host  
Ecosystem, Editors: Lee-Ann Jaykus, Hua H. Wang, Larry S. Schlesinger,  
ASMPress:

### **Dietary Supplements**

\*FDA May Have Opportunities to Expand Its Use of Reported Health  
Problems to Oversee Products: Report to Congressional Requesters  
March 2013 GAO-13-244 United States Government Accountability Office

\*Pieter A. Cohen, M.D. Hazards of Hindsight: Monitoring the Safety of  
Nutritional Supplements N Eng J Med 370;14, 1277-1280.

*ANAHAD O'CONNOR* Why Dangerous Supplements Linger on Store  
Shelves. New York Times April 30, 2014



Dietary Supplements Red Flags – What You Need to Know to Stay Safe and Avoid Fraud. Human Performance Resource Center

### **Risk perception and analysis**

\*Coronado GD, Vigoren EM, Thompson B, Griffith WC, Faustman EM: Organophosphate Pesticide Exposure and Work in Pome Fruit: Evidence for the Take-Home Pesticide Pathway. *Environ Health Perspect* 114:999–1006 (2006).

### **One health, globalization, sustainable agriculture, local food networks, slow foods**

\*Doug Gurian-Sherman. (2008) The Untold Costs of Confined Animal Feeding Operations. Union of Concerned Scientists

HEALTHY LAND, HEALTHY PEOPLE: BUILDING A BETTER UNDERSTANDING OF SUSTAINABLE FOOD SYSTEMS FOR FOOD AND NUTRITION PROFESSIONALS: A PRIMER ON SUSTAINABLE FOOD SYSTEMS AND EMERGING ROLES FOR FOOD AND NUTRITION PROFESSIONALS. American Dietetic Association Sustainable Food System Task Force. March 16, 2007

Pimentel, D., Hepperly, P., Hanson, J., Douds, D., Seidel, R. Environmental, energetic, and economic comparisons of organic and conventional farming systems. *BioScience* 55(7); 573-582 (2005).

Pimentel, D., Harvey, C., Resosudarmo, P., Sinclair, K., Kurz, D., McNair, M., Crist, S., Shpritz, L., Fitton, L., Saffouri, R., Blair, R. Environmental and Economic Costs of Soil Erosion and Conservation Benefits. *Science* 267, 1117-1123 (1995).

Martinez, Steve, et al. Local Food Systems: Concepts, Impacts, and Issues, ERR 97, U.S. Department of Agriculture, Economic Research Service, May 2010

Bittman, M. Sustainable Farming, Can We Feed the World? NYT Editorial 2010

De Schutter, O. On the right to food. Report to the UN General Assembly submitted by the Special Rapporteur. Dec. 20, 2010

Pollan M. "No Bar Code", Excerpt from: *The Omnivore's Dilemma*. 2006

Coley D, et al., Local food, food miles and carbon emissions: a comparison of farm shop and mass distribution approaches. *Food Policy* 2009;34:150-55.

Organic Agriculture: USDA Economic Research Service Briefing Room

Mayo Clinic: Organic foods: are they safer? more nutritious?

Kimball, AM. "The Global Express" In: *Risky Trade: Infectious Disease in the Era of Global Trade*. Ashgate Publishing Co. Burlington VT. 2006.; Chapter 1:

WHO: Understanding The Codex Alimentarius, 3rd Ed. 2006 WHO/FAO

Brooks N, et al.: U.S. Food Import Patterns, 1998-2007 / FAU-125. USDA, ERS 2008.

GAO: Agencies need to address gaps in enforcement and collaboration to enhance safety of imported food. Sep 2009. *GAO-09-873*.

## **Restaurant and food service inspections, food safety in the home**

Public Health Seattle & King County (PHSKC) Food Inspection Program:  
Restaurant Inspections on Line.

PHSKC Restaurant Inspection Form

Henson S. et al., Consumer assessment of the safety of restaurants: the role of inspection notices and other information cues. *J Food Safety* 2006; 26:275-301.

<http://www.foodsafety.gov/>  
Safe Minimum Cooking Temperatures  
Meat and Poultry Roasting Chart  
Storage Times for the Refrigerator and Freezer  
Fresh Eggs: Playing It Safe  
Egg Storage Chart  
The Dangers of Raw Milk  
Fresh Produce Safety  
Two Simple Steps to Juice Safety

## Sprouts: What You Should Know

Dawson P, et al.: Residence time and food contact time effects on transfer of *Salmonella Typhimurium* from tile, wood and carpet: testing the five-second rule. *Journal of Applied Microbiology* 2007;102:945-53.

Trevino J, et al.: Effect of biting before dipping (double-dipping) chips on the bacterial population of the dipping solution. *J Food Safety* 2009;29:37-48

## **Bioterrorism and food safety**

WHO: Terrorist Threats to Food: Guidance for Establishing and Strengthening Prevention and Response Systems. *Food Safety Issue* May 2008

FDA: AN OVERVIEW OF THE CARVER PLUS SHOCK METHOD FOR FOOD SECTOR VULNERABILITY ASSESSMENTS

Bossi, P. et al., Bioterrorism: management of major biological agents. *Cell. Mol. Life Sci.* 63 (2006) 2196–2212

G.S. Pearson. Public perception and risk communication in regard to bioterrorism against animals and plants. *Rev. Sci. Tech. Off. Int. Epiz.* 2006, 25 (1), 71-82

Lubroth, J. International cooperation and preparedness in responding to accidental or deliberate biological disasters: lessons and future directions *Rev. Sci. Tech. Off. Int. Epiz.* 2006, 25 (1), 361-374

## **Genetically modified foods.**

\*Suzie Key, Julian K-C Ma, Pascal MW Drake. Genetically modified plants and human health. *J R Soc Med* 2008; 101: 290–298.

\*Center for Ecogenetics & Environmental Health. Fast facts about genetically modified organisms. University of Washington, 2013.

\*DAVID CYRANOSKI. Super-muscly pigs created by small genetic tweak. *NATURE*, Vol 523: 13-14, 2015

Brooks G: ISAAA. GM Crops: The First Ten Years - Global Socio-Economic and Environmental Impacts. Brief No. 36-2006, Full report.

Johns, T., and Eyzaguirre, P.B. Biofortification, biodiversity and diet: A search for complementary applications against poverty and malnutrition. *Food Policy* 2007;32:1-24.

Pelletier DL. FDA's regulation of genetically engineered foods: Scientific, legal and political dimensions. *Food Policy* 2006; 31:570-91.

Tabashnik et al., Insect resistance to Bt crops: evidence versus theory. *Nature Biotech* 2008;26:199-202.

FAO Focus: Weighing the GMO Argument: Against

The Hidden Health Hazards of Genetically Engineered Foods  
Food Safety Review. THE CENTER FOR FOOD SAFETY

Smithson, S, "Eat, Drink, and Be Wary": Genetically modified animals could make it to your plate with minimal testing and no public input. *Grist Magazine*, July 30, 2003

Doug Gurian-Sherman. Failure to Yield: Evaluating the Performance of Genetically Engineered Crops. Union of Concerned Scientists. 2009

### **Over-nutrition: food marketing, supersizing, obesity**

\*Moss, Michael. The Extraordinary Science of Addictive Junk Food. February 20, 2013 *New York Times Magazine*

Samuel Klein, Benoit Lamarche, Francisco Lopez-Jimenez, Goutham Rao, Marc-Andre Cornier, Jean-Pierre Després, Nichola Davis, Daurice A. Grossniklaus, Marie-Pierre St-Onge, Amytis Towfighi and Paul Poirier. Assessing Adiposity: A Scientific Statement From the American Heart Association *Circulation* 2011, 124:1996-2019

Cynthia L. Ogden, Margaret D. Carroll, Brian K. Kit, and Katherine M. Flegal, Prevalence of Obesity in the United States, 2009–2010. *NCHS Data Brief No. 82* January 2012

Cynthia L. Ogden, Molly M. Lamb, Margaret D. Carroll, and Katherine M. Flegal, Obesity and Socioeconomic Status in Adults: United States, 2005–2008. *NCHS Data Brief No. 50* December 2010

Undurti N. Das. Obesity: Genes, brain, gut, and environment. *Nutrition* 26 (2010) 459–473.

Drewnowski, A., and Specter, SE. Poverty and obesity: the role of energy density and energy costs. *Am J Clin Nutr* 2004;79:6–16.

\*Drewnowski, A. The cost of US foods as related to their nutritive value. *Am J Clin Nutr* 2010; 92(5):1181-8

### **Legal consequences of food outbreaks**

<http://www.marlerclark.com/>

\*Stearns, D. Intentional Contamination: The Legal Risks and Responsibilities. *Journal of Environmental Health*. January/February 2008