Nutrition 545/446/Environmental Health 540
Food Safety and Health
Monday and Wednesday 12-1:20 PM
T473 Health Sciences Building

Date	Topic	Instructor
January 5.	Introduction: Concepts of food safety, establishing the problems and susceptibilities within the food chain.	Rosenfeld
January 7.	Food borne pathogens and outbreaks	Meschke
January 12.	Food borne pathogens and outbreaks continued: seafood and shell fish, mercury and toxins	Meschke
January 14.	Food safety regulations: the roles of federal and state agencies.	Breen
January 19.	Martin Luther King Day Holiday	
January 21.	Food safety preparedness: Perspective from the food industry,	Lum (SPA)
January 26.	Antibiotic resistance	Roberts
January 28.	Organic food, chemical contamination	Rosenfeld
February 2.	One Health, Zoonotic Infections and Food Safety	Rabinowitz

February 4.	**Risk Perception**	**Faustman**
February 9.	**Midterm Exam**	
February 11.	**Genetically modified foods**	**Rosenfeld**
February 16.	**President's Day Holiday**	
February 18.	**Class Debate and Discussion - GMOs**	**Rosenfeld**
February 23.	**Restaurant and food service inspections, food safety in the home**	**Easterberg**
February 25.	**Bioterrorism and food safety**	**Meschke**
March 2.	**Over-nutrition:obesity Video: Supersize Me**	**Rosenfeld**
March 4.	**Legal consequences of food outbreaks**	**Marler**
March 9.	**Dietary Supplements**	**Averill**
March 11.	**Class Debate and Discussion Are we safer now than ever before?**	**Rosenfeld**

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 needed 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.
- 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.
- Identify the chemical contaminants of food.

- Analyze and compare international and national distribution of food and standards for food safety.
- Identify the trends in agricultural trade.
- Describe the influence of globalization on dietary factors in developed and developing countries.
- Analyze the issues surrounding biodiversity and biotechnology.

- Review the scientific foundation of genetically modified organisms in agriculture.
- Describe the political and social factors impacting the implementation of biotechnology in agriculture.
- Identify scientific and social issues impacting consumer perceptions of biotechnology in the US and international markets regarding labeling.
- 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.

- Describe preparedness activities related to biosecurity.
- Analyze the current structure of federal agencies involved with Homeland Security and food safety.
- 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 4 assignments (95%) and on attendance and participation in class discussions (5%). Each undergraduate student will complete an in-class open book midterm exam (40%) and write a paper (max 20 pages double spaced, due at the end of classes) that researches any current issue related to food safety (45%). Following the 2 class debates/discussions, one on genetically modified foods and the other 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% each). Grades for **graduate students** will be based on 4 assignments (90%) and on attendance and participation in class discussions (10%). Each graduate student will complete an in-class open book midterm exam (30%) and will write a paper (max 20 pages double spaced, due on February 18) that researches the history and details of any food outbreak or life threatening chemical contamination of food that has occurred worldwide in the past (15%). A second paper of the same length (due at the end of classes) should focus on any issue related to food safety other than specific food outbreaks or chemical contaminations (15%). Graduate students will also participate as team members in two class debates (30%, 5% for each summary paper and 10% each for debate presentations). Teams (randomly assigned at the beginning of class) will work together to research all of the issues pertaining to the topic of the debate and will present a 20 minute powerpoint presentation in support of their side of the issue. 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/

"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"

Recommended Readings:

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

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

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

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

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

FDA: Food Protection Plan. Nov 2007

CDC: Overview of CDC food safety activities and programs

GAO: Federal Food Safety and Security System. Fundamental Restructuring is Needed to Address Fragmentation and Overlap. GAO-04-588T, March 2004
GAO: Federal Oversight of Food Safety High-Risk Designation Can Bring Needed Attention To Fragmented System. GAO-07-449T, Feb 08 2007. - Highlights
GAO: Federal Oversight of Food Safety: High-Risk Designation Can Bring Needed Attention to Limitations in the Government's Food Recall Programs, GAO-07-785T Apr 24 2007 - Highlights
GAO: Federal Oversight of Food Safety: FDA's Food Protection Plan Proposes Positive First Steps, but Capacity to Carry them out is Critical. GAO-08-435T, Jan 29 2008. - Highlights
GAO: Federal Oversight of Food Safety: FDA Has Provided Few Details on the Resources and Strategies Needed to Implement its Food Protection Plan. GAO-08-909T, Oct 09 2008. - Highlights
GAO: Food Safety: Improvements Needed in FDA Oversight of Fresh Produce, GAO-08-1047 Sep 26 2008 – Highlights

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

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:

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.

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).

Globalization, sustainable agriculture, local food networks, slow foods

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

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

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.*

Genetically modified foods.

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

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

Over-nutrition: food marketing, supersizing, obesity

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

Dietary Supplements

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