



## South Central Public Health Partnership

### TRAINING PROFESSIONALS TO PROTECT THE PUBLIC

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### Fundamentals of Health Risk Assessment in Public Health

**Instructor:** Amy E. Vinturella, M.S., Sc.D.

This course provides a survey of the theory and practice of human health risk assessment. The basic components of risk assessment are explained and real-life applications of each component and of risk assessment as a whole are discussed. In addition, special topics and issues related to risk assessment are covered, including basic toxicology, ecological risk assessment, uncertainty analysis, and risk communication. This course is intended for anyone who manages and interprets human health risk assessments. The topics covered in this course include:

#### Learning Objectives

##### Module 1: Introduction to Risk

- Define risk

##### Module 2: Introduction to Risk Assessment

- Differentiate between risk assessment, risk management, and risk communication

##### Module 3: The Four Components of Risk Assessment

- List and explain the four components of risk assessment
- Demonstrate how the four components relate to risk management
- Discuss the differences and similarities between the IARC and the EPA weight-of-evidence classification systems for carcinogens
- Differentiate between dose and environmental concentration
- List possible sources of toxicity data
- Explain the difference between the cancer and non-cancer dose-response models
- Define *reference dose* and explain how it is calculated and used in risk assessments
- List the main criteria for a standard chronic cancer rodent bioassay
- Define cancer potency factor and explain how it is calculated and used in risk assessments
- List four key variables in exposure assessment
- Explain the three main ways to estimate exposure
- Discuss assumptions, limitations, special issues, concerns with current risk assessment framework

##### Module 4: Regulatory Toxicology

- Discuss the attributes of toxic effects
- Specify potential toxicities for a given target system in the body

##### Module 5: Risk Assessment for Hazardous Waste Sites (CERCLA, Superfund)

- List and explain the stages of a hazardous waste site risk assessment
- Define and give examples of *ARARs*
- Define and give examples of *TBCs*

##### Module 6: Risk Assessment and Drinking Water (Safe Drinking Water Act, MCLs)

- Explain the difference between an MCL and an MCLG
- Discuss the criteria used to develop MCLGs for chemical contaminants

#### Module 7: Risk Assessment of Chemical Mixtures

- Explain the decision-making process of chemical mixtures risk assessment, including the treatment of whole mixtures vs. mixture components
- Define *dose addition* and *response addition* and give examples of when one or the other is used

#### Module 8: Ecological Risk Assessment

- Outline the regulatory basis for ERAs
- Describe characteristics of ecological study units and how contaminants might affect those characteristics

#### Module 9: Risk Communication

- Discuss reasons that effective risk communication is important
- Explain how public perceptions of risk can present barriers to risk communication
- Discuss the pros and cons of qualitative and quantitative risk communication strategies
- Understand the role of the media in the dissemination of health information to the public

#### Module 10: Uncertainty Analysis

- Differentiate between uncertainty and variability
- Compare and contrast a point estimate, an interval estimate and a probabilistic distribution
- Describe methods used for qualitative and quantitative uncertainty analysis
- Explain how a sensitivity analysis and a Monte Carlo simulation are performed, and compare and contrast the results from the two calculations

#### Competencies

- Describe communication role(s) in emergency response:-Within the agency using established communication systems; with the media; with the general public; personal (with family, neighbors)
- Recognize unusual events that might indicate an emergency and describe appropriate action
- Apply creative problem solving and flexible thinking to unusual challenges within his/her functional responsibilities and evaluate effectiveness of all actions taken

\* *Bioterrorism and Emergency Readiness*

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