

Accessible version can be found here:

<https://www.cdc.gov/nceh/hsb/elearning/toi/Mod1/>

Toxicological Outbreak Investigation Course

Module One:

Course Introduction and Overview



Course Purpose

- Train public health staff to recognize and respond to an outbreak caused by a toxic agent
- Provide a refresher on outbreak investigation

Toxic Agents



A toxic agent is any substance that arises from outside of the human body that can cause harm to humans.

There are millions of toxic agents in the world.

Toxic agents can be found in many different sources, including the food you eat, the water you drink, and where you work.



Toxic Agents



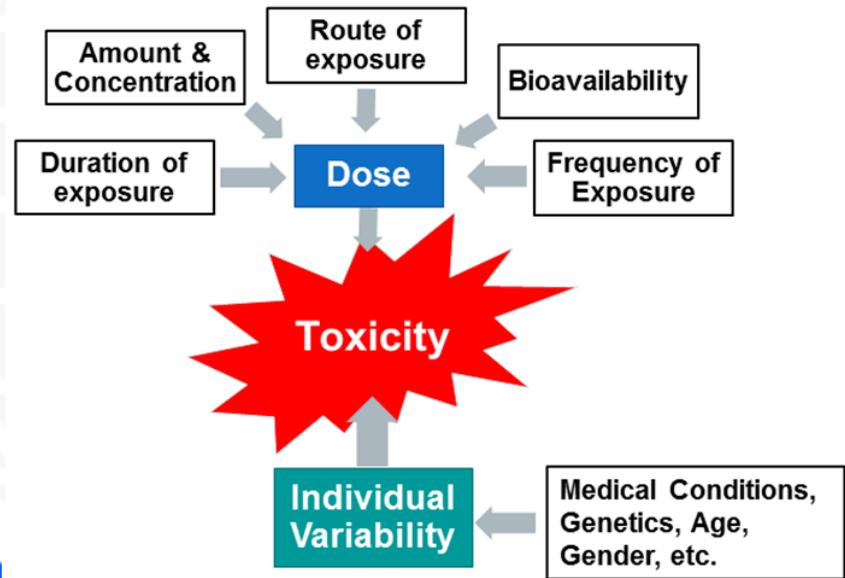
What are some toxic agents that have caused outbreaks that you know of and have responded to?

Course Modules

Module	Title
1	Course Introduction and Overview
2	Toxicological Principles
3	Toxicological Laboratory Principles
4	Analyzing and Interpreting Laboratory Results
5	Steps of a Toxicological Outbreak Investigation
6	Case Study

Module 2: Toxicological Principles

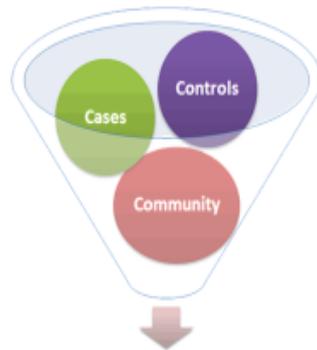
Factors Affecting Toxicity



- Length: 60 minutes
- Content:
 - Characteristics of toxicological outbreaks
 - Routes of exposure
 - Factors affecting toxicity
 - Dose-response
 - Half-life

Module 3: Toxicological Laboratory Principles

Laboratory Data: Comparison Samples



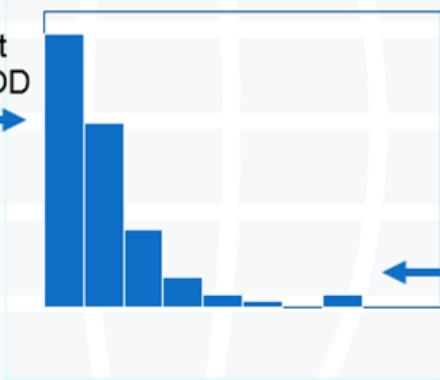
- Collect comparison samples to determine if the levels found in cases are higher than people who did not get sick
- Comparison samples are collected from different groups:
 - Controls
 - Cases
 - Community

- Length: 60 minutes
- Content:
 - When to collect samples
 - Guidelines for collecting, transporting, and storing samples
 - Record keeping
 - Interpreting results

Module 4: Analyzing and Interpreting Laboratory Results

Log-Normal Distribution

Many people with levels that are low or <LOD



Small number of people with levels that are very high

- Length: 60 minutes
- Content:
 - Handling values below limit of detection (LOD)
 - Analyzing data that are not normally distributed
 - Interpreting results

Module 5: Steps of a Toxicological Outbreak Investigation



- Length: 90 minutes
- Content:
 - Review and practice steps of an outbreak investigation
 - Modify tools based on scenario

Module 6: Case Study

Laboratory Results

Type of Sample	Carbofuran (µg/kg)	Diazinon (µg/kg)
Mud #1	<LOD	<LOD
Mud #2	<LOD	<LOD
Mud #3	<LOD	<LOD
Mud #4	<LOD	<LOD
Soil #1	68	<LOD
Soil #2	0.8	<LOD
Soil #3	417	<LOD
Soil #4	0.3	<LOD

- Length: 60 minutes
- Content:
 - Apply steps of an outbreak investigation to a toxicological outbreak



Tool Kit

Electronic, modifiable templates of commonly used forms

Symptoms

When did you first feel sick? Date: _____ Time: _____ (24-hour clock)

Specify a time period for "XX" that makes sense based on your investigation. If appropriate, create answer choices for the questions below. Or, they can remain as open-ended questions.

Symptom	Did you have (symptom below) during XX time period?	If yes, date of onset	If yes, time of onset	If yes, has the symptom resolved? 1 = No 2 = Yes 3 = Do not know	If no
Symptom 1					
Symptom 2					
Symptom 3					
Symptom 4					

Case/Control Status

Does this person meet the case definition?
It may be helpful to insert the case definition here, for easy reference during the interview. Might be phrased as questions to determine if the person met each component of the case definition, or could be completed by supervisor reviewing the form.

Yes
 No
 Do not know

If this person does not meet the case definition, are they matched to a particular case (i.e., are they a control in a matched case-control study)?

No
 Yes If yes, matched case name/ID# _____

How was the case/control identified?
For example, potential answer options could include the following: hospital record, surveillance system, physician, etc. Could have separate options for cases and controls.

Option 1
 Option 2
 Option 3
 Do not know

Demographics

Sex: Male Female If female, are you pregnant? No Yes, # of weeks pregnant _____ Don't know
 Do not know

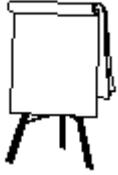
Height: _____ (unit of measurement, m, cm, etc.) Age: _____ (years)
Weight: _____ (unit of measurement, kg, etc.)

Toxidromes

Table 1. Classic Toxidromes^{4, 9, 10}

Toxidrome	Signs and Symptoms	Potential Toxic Agent
Cholinergic crisis	Salivation, diarrhea, lacrimation, bronchorrhea, diaphoresis, urination Miosis, fasciculations	Nicotine Organophosphate insecticides Carbamate insecticides Medicinal carbamates (e.g., physostigmine)
Anticholinergic	Weakness, ataxia, hypotension Tachycardia, hyperreflexia, hyperthermia, dry mucous membranes, urinary retention, seizures	Belladonna alkaloids Jimson Weed/Datura Brigmannia Diphenhydramine
Alcohol withdrawal	Tremor, tachycardia, hypertension, hyperthermia, dry mucous membranes, seizures	Peyote Psilocybin mushrooms LSD PCP Lysergic acid containing plants: morning glory, Hawaiian woodrose
Adrenergic	Hyperthermia, tachycardia, hypertension, hyperreflexia, hyperloquacity	(ephedrine)

- Qualitative Epidemiological Questions
- Sample Line List
- Sample Log
- Sample Medical Record Abstraction Form
- Sample Questionnaire
- Toxidrome Chart



Module Conclusion



What questions do you have about the information presented in this module?