

Chemical Agents of Opportunity for Terrorism:  
The Medical and Psychological Consequences of TICs (Toxic Industrial Chemicals) and TIMs  
(Toxic Industrial Materials)

## COURSE OBJECTIVES

The American College of Medical Toxicology (ACMT) in conjunction with the Agency for Toxic Substances and Disease Registry (ATSDR) are pleased to offer a 1-day course on: *Chemical Agents of Opportunity for Terrorism: The Medical and Psychological Consequences of TICs (Toxic Industrial Chemicals) and TIMs (Toxic Industrial Materials)*. This course will provide awareness-level training on a variety of toxic syndromes likely to be encountered following exposures to TICs and TIMs and other chemical agents of opportunity. The course will focus on the medical and psychological issues pertaining to TICs, TIMs as well as other important non-volatile chemical exposures.

In recent years, there has been growing concern that many of the most likely threats of chemical terrorism involve so-called “agents of opportunity.” Both common and unusual industrial agents may pose a considerable threat as potential terrorist weapons. While an understanding of the traditional military chemical weapons (e.g. nerve agents) remains essential, an appreciation of the myriad of other potential toxic chemicals readily available in our society is crucial if we are to optimally prepare, identify and defend against chemical threats. This course will utilize a symptom-based clinical approach to describe the medical impact of various chemical poisons. We will provide a framework to enhance recognition of the common health effects of apparently disparate chemical toxins, describe the risk to various healthcare workers, and introduce clinical and public health management strategies. The traditional military warfare chemical agents will not be covered in these lectures because information on these agents is readily accessible through a number of other forums such as the Internet.

By attending this one day course, the participant will be able to:

- Understand the concept of chemical agents of opportunity, TICs and TIMs and appreciate the basis for increased public health preparedness
- Identify chemical agents of opportunity that could be used by terrorists
- Discuss the past use of these chemicals in mass exposure situations
- Describe the major health effects of TICs, TIMs and other important non-volatile chemical agents that could be used by terrorists
- Identify the primary modalities available to treat victims of such chemical exposures
- Understand the psychological impact of mass chemical exposures

## TARGET AUDIENCE

The information presented will be of interest to public health officials, emergency response coordinators, FOSCs, environmental health scientists, toxicologists, occupational/environmental and emergency physicians, veterinarians, laboratorians, engineers, industrial hygienists and others involved with chemical terrorism preparedness and response.

## COURSE FACULTY

The faculty members are all board certified and fellowship trained physician medical toxicologists who are members of the American College of Medical Toxicology (ACMT) and currently serve as consultants to ATSDR. They have extensive experience directly caring for patients suffering from the ill-effects of chemical agents and poisons. ACMT is the major professional organization of physicians specializing in medical toxicology in the United States. In 1999 ACMT entered into a 5-year cooperative agreement with ATSDR under the auspices of Program Announcement 99081: Program to Build Capacity to Conduct Environmental Health Promotion Activities. This agreement was designed, in part, to enhance educational outreach to health care professionals on issues pertaining to environmental toxicology. Recognizing the urgent need to improve the capacity of health professionals and public health officials to respond knowledgeably and effectively to chemical terrorism and related mass chemical exposure, the ACMT – ATSDR partnership has considerably expanded during the past year. A national network now links medical toxicologists across the country with the 10 ATSDR regional offices. As part of this growing partnership, ACMT has organized this intensive one-day training course on the medical response to chemical terrorism and mass chemical exposure incidents.

Lewis Nelson, M.D.  
Medical Toxicology Fellowship Director  
New York University School of Medicine

Joseph Rella, MD  
Program Director, Emergency Medicine Residency  
UMDNJ-New Jersey Medical School

Richard Shih, MD  
Program Director, Emergency Medicine Residency  
Morristown Memorial Hospital

Curtis Snook, M.D.  
National Decontamination Team  
Environmental Protection Agency

## **GENERAL PROGRAM AGENDA**

**(Actual course topics may change)**

### Chemical Agents of Opportunity for Terrorism: The Medical and Psychological Consequences of TICs (Toxic Industrial Chemicals) and TIMs (Toxic Industrial Materials)

- 8:15 - 9:00 AM      Toxic Warfare: Looking Beyond Conventional Chemical Weapons  
Lewis Nelson, M.D.
- While the threat of conventional chemical warfare has received much attention, and is the subject of tight control measures and a program of planned chemical destruction, less interest has been paid to other chemical agents that have great potential to wreak havoc on the civilian sector and produce mass casualties. This talk will provide an overview of toxic warfare, TICs and TIMs, and key lessons from history.
- 9:00 – 9:45 AM      The Psychological Impact of Mass Chemical Exposures  
Curtis Snook, M.D.
- It is often difficult to differentiate psychological harm caused by chemical or biological terrorism from other illnesses. Previous events demonstrate that large numbers of patients with psychological distress will impact the emergency response and potentially overwhelm the health care system. Strategies must be developed to diminish fear and hopefully decrease subsequent mass psychogenic illness that is likely to occur following a mass chemical exposure.
- 9:45 – 10:00 AM      Break
- 10:00 – 10:45 AM      Terrorism by Fear and Uncertainty: Delayed Toxic Syndromes  
Curtis Snook, M.D.
- Previous experience in medical toxicology provides notable examples in which malice or mishap has resulted in widely publicized episodes of group or mass poisoning whose presentation was delayed. The toxicity of metals such as thallium and the organomercurials, and of halogenated hydrocarbons such as dioxins and PCBs, will be discussed with particular reference to how poisoning with these agents presents and why delay in symptom onset complicates response to potential incidents of toxic terrorism.
- 10:45 – 11:30 AM      Why Are Cyanide and Fumigants So Worrisome  
Richard Shih, M.D.
- Of the numerous poisons that impair mitochondrial function, cyanide is probably the most likely to be used in a chemical terrorism event, given its availability and the ease with which hydrogen cyanide gas can be generated. Cyanide and fumigants such as methyl bromide, sulfuryl fluoride, chloropicrin and the phosphides are among the most toxic TICs. This lecture will provide an overview of mechanism of action, metabolism, clinical presentation and medical management, including antidote utilization.
- 11:30 – 1:00 PM      Lunch Break
- 1:00 – 1:45 PM      Toxic Gases in your Community  
Joseph Rella, M.D.

Chemical compounds are produced in massive quantities as part of America's industrial complex. Many of these compounds are amenable to use as large scale terrorist weapons. This talk will address a number of chemicals, such as phosgene, chlorine, and anhydrous ammonia, which might be disseminated as inhalational threats. Their pathophysiology, treatment, and potential sources in the community and in the transportation system will be discussed.

1:45 – 2:30 AM

The Clinical Neurotoxicology of Chemical Terrorism  
Lewis Nelson, MD

The awesome complexity of the central nervous system makes it particularly vulnerable to poisons. This lecture will provide insight into the expected clinical effects of potential terroristic poisons by highlighting three distinct brain syndromes: psychedelia (hallucinations), sedation (coma) and seizures (convulsions).

2:30 – 2:45 PM

Break

2:45 – 3:30 PM

Recognizing Current Vulnerabilities: Threats to Food and Water Supplies  
Richard Shih, M.D.

This presentation will discuss the vulnerability of the food and water supply as a vehicle for chemical terrorism. Recent mass poisonings involving nicotine in food and contamination of the municipal water supply will be discussed.

3:30 – 4:15 PM

Ionizing Radiation as a Terrorist Threat  
Joseph Rella, M.D.

This talk will discuss radiation threats, including a discussion of the different clinical effects of the various forms of radiation. The medical consequences of dirty bombs and other radiation exposures will be explored.