# USAMRDC USAMRICD

## U.S. ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE

**MISSION**

Discover and develop medical products and knowledge solutions against chemical and biochemical threats through research, education and training, and consultation.

## BACKGROUND

As the Nation's center of excellence for medical chemical defense, the U.S. Army Medical Research Institute of Chemical Defense is the nation's leading science and technology laboratory for medical chemical countermeasures research and development. The USAMRICD conducts research and training to enable the Warfighter and to strengthen the defense of our Nation by rendering chemical and biochemical threats medically harmless.

With sophisticated laboratories located at Aberdeen Proving Ground, Maryland, the USAMRICD manages a diversified portfolio of medical chemical and biochemical threat agent research projects for the Department of Defense and other federal agencies.

The USAMRICD focuses its research on medical countermeasures for nerve agents, vesicants (e.g., sulfur mustard), metabolic poisons (e.g., cyanide), pulmonary toxicants (e.g., phosgene), toxic industrial chemicals, toxins of biological origin, and pharmaceutical-based agents, as well as on approaches to mitigate the effects of exposure by removing or detoxifying chemical threats. The institute also develops, validates, and implements analytical methods to verify human chemical-threat exposures. Additionally, the USAMRICD, as part of its mission, provides training and education to instruct medical professionals, first responders, and operators from federal and non-governmental agencies in the medical management of chemical casualties on the battlefield and in civil disaster events involving weapons of mass destruction. The USAMRICD also provides consultation to military and civilian authorities in the prevention, preparation, response, recovery, and mitigation of disaster response to mass chemical casualties.

The training and education portion of the institute's mission is executed by the Chemical Casualty Care Division (CCCD), which is the lead agency for the DoD and the Department of Homeland Security postgraduate education and training in chemical casualty care for U.S. and international civilians and responders from government and non-government agencies.


**USAMRDC Public Affairs Office**
810 Schreider Street, Suite 100 | Fort Detrick, MD 21702-5000 | 301.619.7549 | https://mrmc.amedd.army.mil


## KEY THEMES AND MESSAGES

USAMRICD is the Nation's center of excellence for medical chemical defense, conducting research into the mechanisms of action of CWAs and toxins and developing medical countermeasures to these threats.

USAMRICD is the only medical research lab to maintain a unique facility for the storage, use, and distribution of chemical surety material.

USAMRICD trains and educates medical personnel in the medical management of chemical casualties.

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## BACKGROUND

The CCCD education and training courses arose from the need to treat and manage chemical agent and biological agent casualties, address the practical challenges of hospital preparedness and respond to the full spectrum of chemical, biological, radiological, nuclear, and explosive (CBRNE) agents. The CCCD consults with the executive branch of the U.S. Government, Homeland Security, Centers for Disease Control and Prevention (CDC), National Institutes of Health (NIH), and state and local authorities in all phases (prevention, preparation, response, recovery, and mitigation) of disaster response relating to mass chemical casualties in both the military and civilian sectors. The CCCD also provides 24-hour, 7 days a week reach-back capability to answer questions related to the management of chemical casualties.

Through its research, training and education, and consultation, the USAMRICD provides Joint Force Commanders with a greater ability to counteract CBRNE threats by providing trained, capable, and equipped lethal Warfighters who can maneuver, fight, and seize CBRNE-affected areas. Medical capabilities will mitigate the death of injured Soldiers allowing them to be rehabilitated and return to the fight.

## QUESTIONS & ANSWERS

**Why are chemical agents a threat to our military?**
Chemical warfare agents (CWAs) are extremely toxic compounds that are relatively inexpensive as well as, in some cases, easy to produce. These characteristics make them a feasible weapon of choice for terrorist organizations and rogue states that are not signatories to the 1993 Chemical Weapons Convention. Examples of the use of chemical weapons against groups and individuals abound in recent history to include the use of the vesicant sulfur mustard in the Middle East (1991-2018), the 2017 assassination of Kim Jong Nam with the nerve agent VX in Kuala Lumpur, the use of 4th generation nerve agents in the United Kingdom in 2018, and the use of sarin nerve agent and chlorine in Syria as recently as 2019.

**Who funds USAMRICD's research program?**
Currently, the USAMRICD's research is funded by the DoD's Chemical and Biological Defense Program, through the Defense Threat Reduction Agency. The USAMRICD also receives funding for medical chemical defense research and development from the National Institute of Allergy and Infectious Diseases, National Institutes of Health (NIAID/NIH), through an Interagency Agreement.

**What's on the horizon for the USAMRICD?**
The institute recently established a Good Laboratory Practice (GLP) advanced development capability and successfully completed a pilot of the program, evaluating a candidate countermeasure from Eagle Pharmaceuticals against the brain damage that results from seizures induced by exposure to nerve agents.

**How does the USAMRICD impact return-to-duty rates?**
The USAMRICD specializes in creating countermeasures for chemical and biochemical weapons that are in use. Countermeasures are developed with the intent to assist the Warfighter in quick mitigation in the event of a CBRNE exposure. Additionally, the purpose of USAMRICD's training mission is to fully prepare health care professionals to recognize and treat chemical and biological exposure, potentially increasing return-to-duty rates.


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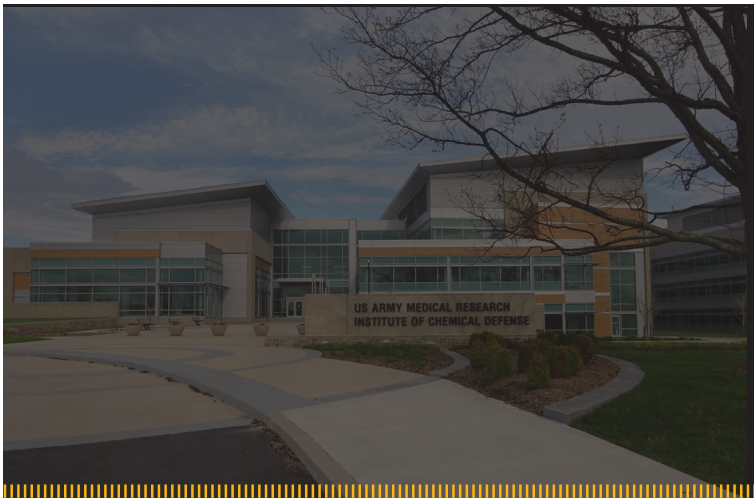


## KEY THEMES AND MESSAGES

USAMRICD provides subject matter expertise in developing defense and national policy in proper crisis management.

USAMRICD assets include DoD's only fully accredited high complexity clinical laboratory for diagnostic testing on human samples to confirm exposure to chemical threat agents.

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## QUESTIONS & ANSWERS

**What operational training opportunities does the USAMRICD provide?**

Through the CCCD, the USAMRICD offers the following training courses:

- ***Medical Management of Chemical and Biological Casualties (MCBC)*** (40+ Course Credits). The MCBC is focused on medical staff and professionals who will be caring for chemical and biological casualties
- ***Field Management of Chemical and Biological Casualties (FCBC)*** (32+ Course Credits). The FCBC is focused on medical personnel in the field who will care for casualties outside of a health care facility.
- ***Hospital Management of Chemical, Biological, Radiological, Nuclear, and Explosive Incidents (HM-CBRNE)*** (35+ Course Credits). HM-CBRNE was created for health care professionals who would be responding to a civilian mass casualty incident.
- ***Customized Off-Site Courses:*** World-wide

A 2001 report from the U.S. Government Accounting Office cited the FCBC and MCBC courses as the gold standard for the military and civilians.

Additionally, the USAMRICD's CCCD generates or contributes to a variety of informational and instructional training materials to include the following:

- ***Field Management of Chemical Casualties Quick Reference Guide***
- ***Various CDs/DVDs Augment Learning***
- ***Medical Management of Chemical Casualties Handbook*** (Revised 2014)
- ***Field Management of Chemical Casualties Handbook*** (Revised 2016)
- ***Textbook of Military Medicine: Medical Aspects of Chemical Warfare***

**What are some of the USAMRICD's unique research capabilities and facilities?**

The USAMRICD's fully accredited high complexity clinical laboratory is unique within the DoD, allowing the USAMRICD to provide clinical laboratory services for Joint Force healthcare providers to confirm nerve and blister agent exposure. As a result confirmatory results can be entered into the Warfighter's permanent health record.

To train medical professionals in battlefield, homeland defense, and natural-disaster scenarios, the USAMRICD's assets include the Wide Angle Virtual Environment (WAVE) center, a large-scale simulator that incorporates three-dimensional images, viewed with lightweight stereoscopic glasses, projected on five vertical screens to immerse viewers in a virtual setting. The WAVE is one of only four in the DoD and the only one with classified capability.

USAMRICD is the only medical research lab to maintain a unique facility for the storage, use, and distribution of chemical surety material.

The USAMRICD has the facilities and expertise for developing advanced research models for the Food and Drug Administration approval of medical countermeasures.

**How do civilian medicine and military medicine benefit from one another in this research area?**

Terrorism is a growing threat. Not only does research on countermeasures assist the Warfighter, but it also aids in helping to protect the civilian population from exposure to chemical and biochemical agents. In determining the effectiveness of medical countermeasures in the civilian population for the National Institutes of Health the USAMRICD has expanded its studies to look at how age and gender affect efficacy, since increasing evidence indicates that responses to treatment can differ among persons of different ages and between genders.


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*The USAMRICD conducts research and training to enable the Warfighter and to strengthen the defense of our Nation by rendering chemical and biochemical threats medically*

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## QUESTIONS & ANSWERS

**What are some products that have been developed by the USAMRICD?**

Research at the USAMRICD has resulted in the development of several medical countermeasures to protect the warfighter and civilians. Fielded products include the ***Nerve Agent Antidote Kit***, consisting of atropine and 2-PAM, the ***Convulsant Antidote Nerve Agent (CANA),*** consisting of diazepam to reverse seizures induced by nerve agents, the ***Multichambered Autoinjector***, to expedite delivery of nerve agent treatments, the ***Soman Nerve Agent Pretreatment Pyridostigmine (SNAPP)***, for enhanced protection against the chemical warfare nerve agent soman, the ***Testmate® Cholinesterase Kit,*** to expedite field testing for exposure to nerve agent, and two products, the ***M291 Decontamination Kit*** and ***Skin Exposure Reduction Paste Against Chemical Warfare Agents (SERPACWA)*** Barrier Cream, that counter and prevent, respectively, the topical exposure to nerve and vesicating agents. Products poised for fielding include the following:

***ChemDX*** is a hand-held, low-cost device that will allow the Warfighter to quickly assess a blood sample during the pre-symptomatic window, providing early warning of a suspected chemical warfare agent (CWA) exposure and a possible trigger-to-treat with a medical countermeasure.

***Advanced Anticonvulsant System (AAS)***. The AAS will replace the current CANA and will administer the drug midazolam. Basic science and technology work performed at the USAMRICD showed that midazolam is significantly faster and more potent in stopping nerve agent seizures than the CANA autoinjector and that a more rapid control of seizures minimizes neurological consequences of nerve agent intoxication and enhances survival.

***Improved Nerve Agent Treatment System (INATS).*** An enhanced nerve agent medical countermeasure, INATS consists of MMB-4, an oxime reactivator more effective than 2-PAM, the currently fielded oxime, and scopolamine, a drug that will reduce nerve agent effects in the central nervous system, thereby providing the Warfighter with greater survivability on the modern battlefield.

***Rapid Opioid Countermeasure System (ROCS).*** The USAMRICD completed pivotal research to support the development of a 10 mg naloxone auto-injector to treat opioid intoxication. Through carefully designed studies, carfentanil intoxication was elaborated using sensitive and quantitative metrics that capture functional performance dimensions of militarily relevance.