Chemical Security Analysis Center

Homeland Security
Science and Technology

BACKGROUND

Established in 2006, the Department of Homeland Security (DHS) Science and Technology Directorate (S&T) Chemical Security Analysis Center (CSAC) is the nation's only federal studies, analysis, and knowledge management center for assessing the threats and hazards associated with an accidental or intentional large-scale chemical release event or attack in the United States.

Located on the Edgewood Area of Aberdeen Proving Ground, Maryland, CSAC fosters research collaborations with the U.S. Army Combat Capabilities Development Command Chemical Biological Center; Department of Defense Joint Program Executive Office for Chemical, Biological, Radiological, and Nuclear Defense; the U.S. Army Medical Research Institute for Chemical Defense; and the U.S. Army Public Health Center.

MISSION

CSAC's mission is to assess and address chemical threats to the homeland. CSAC accomplishes its mission by:

- Collecting, consolidating, curating, storing, and sharing **chemical data**
- Generating **meaningful assessments, recommendations, and forecasts** based on vetted data
- Identifying, prioritizing, and addressing data gaps through **high quality chemical research, development, test, and evaluation** (RDT&E)

EXPERTISE

CSAC provides an enduring, science-based threat and hazard analysis capability, with a core focus on six areas of expertise:

- **Risk and Consequence Modeling:** CSAC risk analysis subject matter experts (SMEs) developed the Chemical Consequence and Threat (CCAT) Tool, a comprehensive and integrated platform to analyze all hazards, on the premise that users need a single place to comparatively assess all types of threats. SMEs provide timely hazard analysis, such as potentially vulnerable chemical facilities within a hurricane's impact zones or possible risks to the food supply chain.
- **Chemical Sensors and Detection:** CSAC chemical detection experts conduct analysis and assessment of chemical warfare agents and toxic industrial chemicals for development and deployment of chemical detection and surveillance capabilities. They have assisted U.S. Customs and Border Protection (CBP) with their detection and interdiction efforts, assessments of current opioid detection technologies, and instrumentation. They assess technology solutions for potential as an existing, modifiable, or developmental solution. CSAC's experts, in collaboration with other government agencies, also assist S&T Mission and Capability Support (MCS) in developing new and advanced approaches for chemical detection.
- **Analytical Chemistry:** Seasoned chemists developed a Synthetic Opioid Data Repository for fentanyl and 200 synthetic analogs. Their world-renowned expertise and experience are leveraged to observe trends over time to determine how chemical defense-related areas of concern increase and decrease.
- **Chemical Toxicology:** Toxicology SMEs investigate, analyze, and determine toxicity parameters used to characterize short-term and long-term health effects

from acute lethal and sub-lethal exposures to toxic chemicals, including: chemical warfare agents, toxic industrial chemicals, pharmaceutical-based agents, and emerging threats. CSAC partners with the Army, American College of Toxicology, Centers for Disease Control and Prevention (CDC), National Institute for Occupational Safety and Health (NIOSH), and industry in these efforts.

- Synthetic Chemistry and Reaction Characterization: CSAC developed the Chemical Agent Reactions Database (CARD), containing extensive data sets related to toxic chemical synthesis and properties, including emerging threat compounds. Featuring more than 2,000 chemical reactions, the CARD provides accurate, comprehensive, and actionable data for chemical threat forensics and attribution.

- Non-Traditional Agents and Emerging Chemical Threats: CSAC maintains and operates the U.S. government's largest Non-Traditional Agent (NTA) library, featuring 7,000 data points related to the toxicity, properties, and countermeasures for these toxic chemicals. This library informs CSAC products and capabilities, including the Countermeasure Assessment and Planning Tool (CAPT Web)/CCAT, CARD, 24/7 technical assistance program, and chemical release studies.

CSAC COVID-19 RESPONSE

CSAC works with the United Kingdom (UK) Centre for the Protection of National Infrastructure (CPNI), the UK Department for Transport (DfT), the U.S. Transportation Security Administration (TSA), and the Combatting Terrorism Technical Support Office (CTTSO) to evaluate the impact and efficacy of various options for reopening airlines. CSAC is modeling transmission of SARS CoV-2 (the virus that causes COVID-19) in aircraft to zero in on potential mitigation measures. CSAC will use an airplane model developed jointly with the UK to look at aerosol transmission on aircraft.

IMPACT

CSAC serves the broader Homeland Security Enterprise and its stakeholders by staffing and operating a technical assistance program that provides operational support and subject matter expertise 24/7; by designing and executing laboratory and field tests; and by providing a comprehensive knowledge repository of chemical threat information that is synthesized and continuously updated with data from scientific, intelligence, operational, and private-sector sources.

Through a suite of services and products, CSAC empowers a coalition of relevant DHS components, federal agencies, state and local partners, academia, and private entities with actionable risk assessments, threat characterizations, and scientific insights. CSAC's partners use these analyses to shape their planning and decision-making, strengthening the overall security of the homeland.

- Enhancing Opioid Detection: CSAC has played a leading technical role in an international mail facility analysis with the U.S. CBP in the DHS Synthetic Opioid Detection at Speed (SODAS) program.

- Providing Chemical Facility Risk Analysis During Hurricane Dorian: CSAC played a vital role in the DHS response to hurricane Dorian. The lab provided critical chemical facility information and analysis of toxic chemical hazards and risks for over 2,000 chemical facilities in Southeast U.S., Puerto Rico, and Bahamas.