Testimony of

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On

"Agents of Opportunity: Responding to the Threat of Chemical Terrorism"

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Chairman McSally, Ranking Member Payne, and distinguished members of the Subcommittee, thank you for inviting me to speak with you today. I appreciate the opportunity to testify on the important issue of chemical threats to our nation. The Department of Homeland Security (DHS) Office of Health Affairs' (OHA) Chemical Defense Program works across the Department, with our Federal partners, and with state and local communities to ensure we are prepared for any future threats. I have been honored to run this program for six years, and have worked as an emergency physician and medical toxicologist for more than 25 years. My past experiences in the area of chemical response include working as an emergency medical technician and volunteer firefighter, emergency physician, critical care medical toxicologist, fire department medical advisor, and community emergency response planner. These experiences give me a broad understanding of community preparedness and a strong commitment to help those who respond to chemical emergencies.

Nature of the Threat

This is an important time to focus on chemical defense, as it marks an anniversary of a tragic, large-scale chemical incident. Twenty years ago tomorrow, on March 20, 1995, terrorists attacked the Tokyo, Japan subway by intentionally releasing sarin, a chemical warfare agent. Twelve people were killed and thousands were injured. Just over thirty years ago in December 1984, a large release of a toxic, industrial chemical killed thousands in Bhopal, India. Finally, 10 years ago in January 2005, a freight train derailed in the middle of the night, releasing a large cloud of chlorine gas into the Graniteville, South Carolina community. Nine people died, hundreds were injured and thousands had to be evacuated from the surrounding area.

Poisoning has been used as a weapon for centuries. Battlefield use of chemical warfare agents prominently appeared in World War I, and in the decades following, chemicals were designed and stockpiled solely for use on the battlefield. Although the United States and many countries around the world have since banned chemical weapons and committed to controlling their precursors, these materials continue to be a threat today. Evidence shows sarin has been used in Syria, and the toxic, industrial chemical chlorine allegedly has been used in multiple attacks in Iraq and Syria since 2007. Recipes, dispersion methods and "how to" manuals for chemical

weapons can be found on the internet. Readily accessible chemicals are used in the United States by those committing "chemical suicide," and recently chlorine was deliberately released in a Rosemont, Illinois hotel affecting a group attending a convention.

The threat is not just from chemical warfare agents, but also from toxic industrial chemicals (TICs). These chemicals are often referred to as "Agents of Opportunity." Some of these chemicals, such as cyanide and phosgene, are recognized chemical warfare agents but have important industrial uses. Even some household chemicals can be potential weapons. TICs are a risk because they do not require the necessary technical expertise that a chemical warfare agent would require to synthesize. In fact, they are readily available and can be accessed, often in large quantities. The DHS Chemical Facility Anti-Terrorism Standards (CFATS) program within the National Protection and Programs Directorate (NPPD) along with a variety of voluntary outreach programs are just some of the ways that DHS works with its partners in the chemical industry to reduce risk.

Chemical agents can be used to kill, incapacitate large numbers of people, cause permanent or long-lasting harm, contaminate critical infrastructure and create uncertainty, fear and panic. Even small-scale attacks can have a large and lasting impact. For example, the Tokyo sarin subway attack could be considered a small-scale attack. The attackers targeted confined, crowded subway cars for the release. Twelve people died, about 1,200 people showed signs of poisoning and 5,500 sought medical care. Additionally, almost 250 first responders and hospital staff developed adverse effects from secondary exposure to the victims from the scene. Currently, Tokyo scientists are studying the persistent long-term neurological effects in some victims, and the Chemical Defense Program is supporting the National Institutes of Health in further study of this issue.

How Chemical Incidents are Different from Other Threats

Chemicals cause predictable toxic effects based on the dose, and there are typical actions that can be taken to limit exposure time and decrease concentration as rapidly as possible. For example, moving rapidly away from a vapor cloud or sheltering in place can help decrease concentration and duration of exposure. Similarly, using large amounts of water on your skin after being splashed with a concentrated acid will decrease the chemical's harmful effects. It is important to note that chemicals do not have incubation periods and the harmful effects are not contagious, although for certain agents, contamination on patients' clothing can cause others to become affected. Further, a dose of chemicals is not always lethal—not everyone exposed to a chemical will die. However, those exposed may be affected, potentially seriously, and require treatment attention or suffer long-term deleterious effects.

Chemical incidents have recurring patterns with predictable challenges, and thus a response can be planned. Each incident is unique and chemical terrorism attacks can cause chaos, confusion, and seeming unpredictability. While it is impossible to be prepared for every challenge that may arise during the response, past events have shown us that there are common themes that can be incorporated into emergency response planning.

Although we can plan for chemical threats, an important and dangerous element is time. Chemical incidents often occur abruptly, with many victims falling ill at once. Protective

movements and life-saving treatments—and the key decisions that facilitate these actions— must occur very quickly to make a difference. This rapid response requirement necessitates that communities stabilize incidents on their own, often before specialized resources and federal assets can mobilize.

During the early stages of many chemical events, medical personnel and first responders may find themselves operating ''in the blind,'' having to react immediately to a threat before complete information is available. During this stage, sifting through reports to find the difference between accurate and misleading accounts can be difficult, and key information about the alleged chemical may not yet be known. Responders can suffer injury if they fail to use adequate personal protection for the threat they face. Fear from the public and inaccurate information can overwhelm health systems, and make it difficult to determine the real scale of an incident. Further, specialized groups of experts who are not necessarily part of a typical response plan for other hazards, such as medical toxicologists, poison centers, chemists, and hazardous materials specialists, need to be mobilized to address the incident.

Without accurate information, coordination and guidance, responders are left to improvise, and critical resources may be misdirected, wasted, or even incapacitated. Information sharing and coordination in this early phase are so critical and can be difficult to realize without expert decision-making skills and planning resources. The Federal government, including the OHA Chemical Defense Program plays an important role in supporting state and local preparedness for chemical incidents, so that communities are equipped to respond quickly and appropriately during those first critical minutes. A timeline has been submitted with this testimony illustrating the events as they unfolded during the response to the 1995 Tokyo sarin subway attack, and demonstrates many of these challenges.

DHS Chemical Defense Activities

OHA's Chemical Defense Program seeks to build preparedness for chemical terrorism and accidents at the Federal, state, and local levels with the ultimate goal of protecting the health and safety of the American people. It is a comprehensive program to address Federal, state and local risk awareness, planning and response mechanisms in the event of a chemical incident. OHA provides subject matter expertise on medical toxicology and responder workforce protection related to chemical threats. Most importantly, the program works directly with communities to help integrate threat-based risk assessments and response capabilities, and help communities understand their strengths, limitations, and needs.

Several components and offices within DHS are involved in different elements of chemical defense. For example, the NPPD runs the Chemical Facility Anti-Terrorism Standards program. This program identifies and regulates high-risk chemical facilities to ensure they have measures in place to reduce the security risks associated with these chemicals. NPPD also performs outreach and collaborates with its Federal partners and the chemical industry to reduce risk. The Federal Emergency Management Agency (FEMA) runs the Center for Domestic Preparedness, which develops and delivers training to state, local, and tribal emergency response providers on all hazards, to include chemical threats. FEMA also addresses chemical incidents in its training grants program, Fire Academy, and as part of its response planning efforts. The DHS Science and Technology Directorate's (S&T) Chemical Security Analysis Center (CSAC) identifies and assesses chemical threats and vulnerabilities. Other Federal agencies also take an active role in

chemical defense, and NPPD, the Environmental Protection Agency, and the Occupational Safety and Health Administration work to ensure the safety of chemical facilities per *Executive Order 13650: Improving Chemical Facility Safety and Security*. OHA's Chemical Defense Program works with all of these entities to coordinate and share information.

Our office's medical and technical expertise is a resource for DHS and other Federal agencies. It works closely with several DHS components such as FEMA, U.S. Customs and Border Protection (CBP), NPPD, U.S. Secret Service, Office of Intelligence and Analysis, and S&T to develop and implement chemical defense policies and plans, and provide technical advice. For example, the Chemical Defense Program has assisted in the development of medical management guidelines for treating those smuggling drugs concealed inside of their bodies and workforce protection protocols for exposure to potentially harmful chemicals for CBP, and provided support to FEMA's Center for Domestic Preparedness, National Fire Academy, and training grants programs. The program has also provided technical expertise to the DHS CSAC's Chemical Terrorism Risk Assessment.

In addition, OHA assists communities with their chemical defense preparedness efforts, works closely with national associations to enhance information sharing and provide technical support to communities, and coordinates with its Federal counterparts. We support interagency working groups to develop response tools like specifications for autonomous stationary chemical detectors and guidance for first responders. Recently, we worked with the Department of Health and Human Services Office of the Assistant Secretary for Preparedness and Response to develop guidance on Patient Decontamination in a Mass Chemical Exposure Incident. The guidance, written in coordination with the interagency, compiles evidence-based information that focuses on providing options for responses to events like chemical release and mass casualties. Designed to be flexible and scalable to a community's resources and capabilities, the recommendations can be adapted to each unique community according to hazard and risk assessments. Our office is also assisting the National Library of Medicine on the development of the Chemical Hazards Emergency Medical Management resource as part of their online resources for first responders.

Because of the rapid onset of chemical incidents, the Chemical Defense Program focuses on assisting interagency partners and DHS components in preparing first responders, first receivers and emergency managers for these situations.

Chemical Defense Demonstration Projects

One of the primary ways the OHA Chemical Defense Program currently supports state and local communities is through its demonstration projects. These programs help communities define best practices that will better prepare them for responding to high consequence chemical events. The first multi-year pilot demonstration project was completed in the City of Baltimore in 2014, with the Maryland Transit Administration leading the effort with support from the OHA Chemical Defense Program. During the pilot, OHA developed a structured approach to systematically examine the entire emergency response system in a large-scale chemical accident or intentional release. This process was applied to the Maryland Transit Administration's Johns Hopkins Metro Station to develop tailored risk assessment methodologies, provide workshops for stakeholders and vendors, conduct technology assessments, complete a detailed cognitive task analysis that analyzed decision-making in chaotic situations, develop a comprehensive concept

of operations, and facilitate a communitywide scenario-based tabletop exercise. These findings were used by the Maryland Transit Administration and the local emergency response community to improve their chemical emergency preparedness, planning and technologies designed to protect the public from chemical incidents.

OHA has extended demonstration projects to four other cities that will test similar capabilities: Houston, TX; Boise, ID; New Orleans, LA, and Nassau County, NY. These four cities were chosen through a competitive selection process evaluating their chemical threat risk (city and venue) and community interest and goals to improve chemical incident preparedness. The additional projects are intended to systematically study multiple types of "at-risk" venues in several cities with a variety of capabilities and resources.

Each community we visit benefits from our work. The demonstration projects focus mostly on improving information flow, enhancing decision-making, and aligning resources to optimize the emergency response system. The demonstration projects are designed to treat each community's response as a unique, holistic, and complex system, and to boost information flow and decision-making expertise. At the completion of all the demonstration projects, we will have examined in detail where the leverage points within the emergency response system exist and identify where specific solutions can address the greatest challenges, limitations, and gaps each community faces. Our analysis is intended to lead to the delivery of a set of preparedness tools, shared best practices, and guidance for comprehensive community preparedness to a large-scale chemical incident.

Path Forward

DHS and the Federal government have contributed to strengthening our Nation's chemical defense capabilities, and have provided support for community-level capacity-building. The Chemical Defense Demonstration Projects are already improving our understanding of the immediate response, at the community level, following a large-scale chemical incident, and will help us to identify leverage points within the complex emergency response system. This information will help the Chemical Defense Program, in collaboration with communities and Federal experts, to facilitate the building of tools to intervene at critical points and optimize the emergency response system when responding to chemical incidents.

The most important direction moving forward is translating our findings into implementation plans and actionable steps. We intend to share our collection of guidance, best practices, and newly developed decision-aids with all communities. We plan to partner with other agencies and relevant organizations to share our findings so that we can assist in the creation of training and education methods that will help decision-makers at all levels operate within a structured environment even during the chaotic first moments of a chemical incident, and optimize key information sharing in order to make sound critical decisions.

Supporting community response in the critical first few hours of an incident is very important, and the OHA Chemical Defense Program will continue to build best practices and tools for communities to help them make the critical decisions, allocate their resources, and conduct effective planning. However, there is still important work to do on planning and preparation for an end-to-end approach that takes into account a full chemical threat short and long term effects.

This essential work is taking place at DHS and across the Federal government and must continue until the approach is fully developed.

The chemical defense system spans all relevant components at Federal level. It also connects the local response to the Federal Interagency. Coordination across both of these groups is important, and DHS sits in a unique position to facilitate coordination. The OHA Chemical Defense Program continually looks for opportunities to amplify coordination and collaboration across government and make full use of all available resources for Federal and community response efforts. I and my team will continue to work with our colleagues in DHS, other agencies, and the academic community to identify gaps and bring together the right expertise to address them in a meaningful way. We will also continue to act as a resource to Federal, state and local groups working on chemical defense.

I thank you for your time and interest in this important issue, and look forward to answering your questions.