



Testimony
before the Subcommittee on Emergency
Preparedness, Response, and
Recovery, Committee on Homeland
Security, House of Representatives

For Release on Delivery
Expected at 10 a.m. ET
Friday, July 16, 2021

COUNTERING WEAPONS OF MASS DESTRUCTION

Opportunities for DHS to Better Address Longstanding Program Challenges

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GAO@100 Highlights

Highlights of [GAO-21-105332](#), a testimony before the Subcommittee on Emergency Preparedness, Response, and Recovery, Committee on Homeland Security, House of Representatives

Why GAO Did This Study

In December 2018, statute established the CWMD office, reorganizing several legacy offices, including the Domestic Nuclear Detection Office and Office of Health Affairs into one. The office manages programs intended to enhance the United States' ability to detect, deter, and defend against chemical, biological, radiological, and nuclear threats. However, programs operated and managed by the CWMD office have faced longstanding challenges, some which predate the reorganization.

This statement describes our 2016 work related to the CWMD office formation and findings from our past reports on CWMD programs from 2009 through May 2021, including challenges and opportunities for the effective operations and implementation of key programs related to biodefense, nuclear security, and chemical security.

To conduct our prior work, GAO reviewed relevant presidential directives, laws, regulations, policies, strategic plans, and other reports and interviewed federal, state, and industry officials, among others.

What GAO Recommends

GAO made 16 recommendations designed to address the challenges discussed in this statement. As of July 2021, DHS has taken steps to address some, but not all of them. Of the 16 recommendations GAO made, 10 remain open, and GAO continues to monitor DHS's progress to implement them.

View [GAO-21-105332](#). For more information, contact Chris Currie at (404) 679-1875 or CurrieC@gao.gov.

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Opportunities for DHS to Better Address Longstanding Program Challenges

What GAO Found

In April 2016, GAO evaluated Department of Homeland Security (DHS) plans to consolidate chemical, biological, radiological, and nuclear security programs into the Countering Weapons of Mass Destruction (CWMD) office. GAO recommended DHS use, where appropriate, the key mergers and organizational transformation practices identified in prior work, such as conducting adequate stakeholder outreach. DHS agreed with and addressed the recommendation by soliciting employee feedback on the transformation and formed a leadership team for the consolidation, among other practices. However, GAO observed that significant challenges remained at the CWMD office—such as low employee morale and questions about program efficacy. GAO has ongoing work evaluating these issues and plans to issue a report in early 2022.

Over the past decade, GAO has also conducted extensive work evaluating legacy and ongoing programs managed by the CWMD office and has identified program management challenges and opportunities for improvement in the following program areas:

- **Biosurveillance programs:** Since 2009, GAO has reported on progress and challenges with two of DHS's biosurveillance efforts—the National Biosurveillance Integration Center and the pursuit of replacements for the BioWatch program (aimed at detecting aerosolized biological attacks). For example, DHS faced challenges defining these programs' missions and acquiring suitable technologies. In December 2009 and September 2012, GAO highlighted the importance of following departmental policies and employing leading management practices to help ensure that the mission of each program is clearly and purposefully defined and that investments effectively respond to those missions. DHS agreed with and addressed these recommendations. Most recently, DHS agreed to a May 2021 GAO recommendation that it should follow best practices for conducting technology readiness assessments for a biodetection effort and described planned efforts to conduct one before the next key decision event.
- **Nuclear/radiological detection:** In May 2019, GAO found that the CWMD office lacked a clear basis for proposed changes to the strategies of the Securing the Cities program, which is designed to enhance the nuclear detection capabilities of federal and nonfederal agencies in select cities. GAO found the strategies were not based on threats or needs of the participating cities. DHS agreed with our recommendations aimed at improving communication and coordination with participating cities, but has not fully implemented them.
- **Chemical defense:** In August 2018, GAO found that DHS had not fully integrated and coordinated its chemical defense programs and activities, which could lead to a risk that DHS may miss an opportunity to leverage resources and share information. Improved program integration and coordination could lead to greater effectiveness addressing chemical threats. DHS agreed to develop a strategy and implementation plan to aid integration of programs, which it expects to finalize in September 2021.

Chairwoman Demings, Ranking Member Cammack, and Members of the Subcommittee:

I am pleased to be here today to discuss our work on the Department of Homeland Security's (DHS) Countering Weapons of Mass Destruction (CWMD) office. Our nation faces a variety of homeland security threats that continue to evolve and present an array of challenges. Multitudes of governmental and nongovernmental stakeholders are responsible for preventing and responding to these threats. In particular, chemical, biological, radiological, and nuclear weapons, also known as weapons of mass destruction (WMD), have the potential to kill thousands of people in a single incident.

Chemical attacks abroad and the threat of using chemical weapons against the West by the Islamic State of Iraq and Syria have raised concerns about the potential for chemical attacks occurring in the United States. Additionally, clandestine attacks using aerosolized biological agents could be carried out in urban areas, at sporting events, at transportation hubs, or at indoor facilities like office buildings.¹ The United States also faces a continuing threat that terrorists could smuggle in nuclear or radiological materials to use in a terrorist attack. According to DHS, terrorist attacks using chemical, biological, or radiological material may lack overt warning signs, which limits opportunities for intervention.² However, the consequences of such attacks are potentially high even though the likelihood of their occurrence is relatively low.³

In a June 2015 report to Congress, DHS proposed consolidating the agency's core chemical, biological, radiological, nuclear, and explosives functions.⁴ The CWMD office, formed by DHS in December 2017 and established by statute in December 2018, is a reorganization of several

¹GAO, *Biodefense: DHS Exploring New Methods to Replace BioWatch and Could Benefit from Additional Guidance*, [GAO-21-292](#), (Washington, D.C.: May 20, 2021).

²DHS *Strategic Plan for Fiscal Years (FY) 2020-2024*.

³DHS, *Quadrennial Homeland Security Review Report*, (Washington, D.C.: June 2014).

⁴During an initial review of chemical, biological, radiological, nuclear, and explosives functions at DHS, agency officials determined that the Office of Bombing Prevention should be included within the WMD consolidation option. Subsequent DHS consolidation planning did not include the Office of Bombing Prevention. The Countering Weapons of Mass Destruction (CWMD) Act of 2018 does not affect the organizational placement of the Office of Bombing Prevention. Pub. L. No. 115-387, 132 Stat. 5162.

DHS offices, including the Domestic Nuclear Detection Office and Office of Health Affairs.⁵ The office works to protect against the dangers posed by hostile state and non-state actors who seek to acquire and use nuclear, chemical, radiological, or biological materials in the form of weapons of mass destruction to harm Americans or U.S. interests.

The office manages programs intended to enhance the United States' ability to detect, deter, and defend against chemical, biological, radiological, and nuclear threats. These programs include partnerships with nonfederal governments designed to address the risk of nuclear and biological attacks in metropolitan areas and efforts to integrate and share information about those risks. The primary statutory missions of the CWMD office are coordinating with other federal efforts and developing a strategy and policy for the Department to: (1) plan for, detect, and protect against the importation, possession, storage, transportation, development, or use of unauthorized chemical, biological, radiological, or nuclear materials, devices, or agents in the United States; and (2) protect against an attack using such materials, devices, or agents against U.S. people, territory or interests.⁶

Since August 2016, we have evaluated DHS efforts to consolidate chemical, biological, radiological, and nuclear security programs into the CWMD office.⁷ Moreover, over the past decade, we have conducted extensive work evaluating legacy and ongoing programs managed by the CWMD office that address biological, nuclear, and chemical security issues.⁸ For example, we have conducted reviews of DHS's National

⁵Pub. L. No. 115-387, § 2(a)(2), 132 Stat. at 5162-63 (classified at 6 U.S.C. § 591).

⁶6 U.S.C. §§ 591g, 592. The Assistant Secretary for the CWMD reports to the Secretary of Homeland Security. Id. at § 591.

⁷GAO, *Homeland Security: DHS's Chemical, Biological, Radiological, Nuclear and Explosives Program Consolidation Proposal Could Better Consider Benefits and Limitations*, [GAO-16-603](#), Washington, D.C.: August 11, 2016.

⁸GAO, *Biosurveillance: Developing a Collaboration Strategy Is Essential to Fostering Interagency Data and Resource Sharing*, [GAO-10-171](#) (Washington, D.C.: Dec. 18, 2009); *Biosurveillance: DHS Should Reevaluate Mission Need and Alternatives before Proceeding with BioWatch Generation-3 Acquisition*, [GAO-12-810](#) (Washington, D.C.: Sept. 10, 2012); *Combating Nuclear Terrorism: DHS Should Address Limitations to Its Program to Secure Key Cities*, [GAO-19-327](#) (Washington, D.C.: May 13, 2019); and *Chemical Terrorism: A Strategy and Implementation Plan Would Help DHS Better Manage Fragmented Chemical Defense Programs and Activities*, [GAO-18-562](#) (Washington, D.C.: August 22, 2018), among others.

Biosurveillance Integration Center (NBIC), the BioWatch and Securing the Cities Programs, as well as chemical defense programs.

As such, this statement describes our prior work related to the CWMD office formation and findings from our past reporting on CWMD programs, including challenges and opportunities for the effective operations and implementation of key programs related to biodefense, nuclear security, and chemical security. This statement is based on our prior work issued from December 2009 through May 2021 on various CWMD efforts.⁹ It also includes updates on the status of recommendations. To conduct our prior work, we reviewed relevant presidential directives, laws, regulations, policies, strategic plans, and other reports and interviewed federal, state, and industry officials, among others. More information on our scope and methodology can be found in each of the reports cited throughout this statement. The work upon which this statement is based was conducted in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

CWMD Biodefense Efforts

National Biosurveillance Integration Center

The Implementing Recommendations of the 9/11 Commission Act of 2007 (9/11 Commission Act) established the National Biosurveillance Integration Center (NBIC) within DHS.¹⁰ The Act specifically tasked NBIC with integrating and analyzing information from human health, animal, plant, food, and environmental monitoring systems across the federal government and supporting the interagency biosurveillance community. As defined in the July 2012 NBIC Strategic Plan, integration involves combining biosurveillance information from different sources and domains to provide partners and stakeholders with a synthesized view of the information, and what it could mean. The primary goal of integration includes creating a common understanding of potential and ongoing

⁹Specific reports are cited throughout the statement.

¹⁰Pub. L. No. 110-53, title XI, § 1101, 121 Stat. 266, 375-79 (classified, as amended, at 6 U.S.C. § 195b).

BioWatch and Biological
Detection for the 21st Century

biological events and providing insights across data sources that cannot be gleaned in isolation.

In 2003, in response to the 2001 anthrax attack, DHS started the BioWatch program—designed to provide early indication of an aerosolized biological weapon. The BioWatch program uses routine laboratory testing designed to detect an aerosolized biological attack for five specific biological agents considered high risk for use as biological weapons. The BioWatch program is a federally-managed, locally-operated system. The CWMD office collaborates with more than 30 BioWatch jurisdictions throughout the nation to operate approximately 600 aerosol collectors, primarily in outdoor locations. The determination of whether a public health threat exists based on information from the BioWatch program can take 12 to 36 hours after the aerosol collection unit initially captures an agent. This 36-hour timeline consists of up to 24 hours for air sampling, up to 4 hours for retrieving the sample from an aerosol collection unit and transporting it to the laboratory, and up to 8 hours for laboratory testing.

Since the program's inception, DHS has pursued enhancements and replacements to the existing BioWatch system without success. DHS designed these efforts to further reduce the time to detection, limiting morbidity and mortality from aerosolized biological attacks. Biological Detection for the 21st Century (BD21) is DHS's current effort to replace BioWatch. DHS describes this multi-year acquisition effort as a system-of-systems that will incorporate multiple technology components and use machine learning and data analytics to provide contextual information and indication that a biological attack may have occurred.¹¹

¹¹A system-of-systems is a collection of technology elements that operate or function together within a larger system to create a new, more complex system, which offers more functionality and performance than simply the sum of the constituent technology elements.

National Biodefense Strategy

DHS was one of four agencies required by law to jointly develop a national biodefense strategy and associated implementation plan.¹² In September 2018, the White House issued the National Biodefense Strategy to promote a more efficient, coordinated, and accountable biodefense enterprise and established a governance structure to guide the strategy's implementation. In June 2019, we testified that the National Biodefense Strategy and its interagency governing leadership offer the potential for the nation to better define the role of detection technologies in a layered, national biodefense capability to help those that pursue these technologies better articulate their mission needs and align requirements and concepts of operation accordingly.¹³ As part of the implementation of the National Biodefense Strategy, DHS and its interagency partners will have the opportunity to assess the role of and investment in biodetection of aerosolized attacks in a layered approach to mitigating risks of a variety of biological threats. CWMD officials represent DHS on the Biodefense Coordination Team—a working group of experts from agencies with biodefense responsibilities. CWMD officials are also responsible for leading the Strategy's implementation at DHS.

Nuclear and Radiological Detection

In fiscal year 2007, DHS's Domestic Nuclear Detection Office initiated the Securing the Cities program and implemented it for the program's first decade. Securing the Cities operates as a cooperative agreement between CWMD and eligible cities designed to enhance the nuclear detection capabilities of federal, state, local, tribal, and territorial agencies.¹⁴ Cities use the funds to purchase commercial radiation detection devices and other detection equipment. The program also provides detection training for up to 5 years. Securing the Cities has three primary goals: (1) enhance regional capabilities to detect and interdict

¹²Signed into law on December 23, 2016, the National Defense Authorization Act for Fiscal Year 2017 required the Secretaries of Defense, Health and Human Services, Homeland Security, and Agriculture to jointly develop a national biodefense strategy and associated implementation plan, which shall include a review and assessment of biodefense policies, practices, programs and initiatives. Such Secretaries shall review and, as appropriate, revise the strategy biennially. See Pub. L. No. 114-328, div. A, title X, subtitle G, § 1086, 130 Stat. 2000, 2423-24 (2016) (classified, as amended, at 6 U.S.C. § 104).

¹³GAO, *Biodefense: The Nation Faces Longstanding Challenges Related to Defending Against Biological Threats*, [GAO-19-635T](#) (Washington, D.C.: June 26, 2019).

¹⁴A cooperative agreement is a legal instrument of financial assistance between a federal agency and a nonfederal entity that is used to enter into a relationship with the principal purpose to transfer anything of value, such as money, to a nonfederal entity to carry out a public purpose authorized by law. In 2019, five cities participated in the program.

unregulated nuclear and other radiological materials, (2) guide the coordination of participating cities in their roles defined by the Global Nuclear Detection Architecture, and (3) encourage participating cities to sustain their nuclear or radiological detection programs over time.¹⁵

Chemical Defense Efforts

DHS has a number of chemical defense responsibilities, programs, and activities spread across its various components. DHS's efforts to address a terrorist chemical attack also involve a wide range of components including the CWMD office.¹⁶ Upon formation of the CWMD office by DHS in December 2017, the office subsumed the majority of the Office of Health Affairs. CWMD took on the office's responsibility for the public health impact of national threats and hazards, including the impact of chemical releases. CWMD also took over as the advisor to the Secretary and other DHS leaders on medical and health security issues including chemical attacks.

DHS's Initial Plan for Consolidation Did Not Follow Key Transformation Practices

In 2016, as DHS prepared to create the CWMD office, we evaluated the proposed reorganization.¹⁷ We compared available documentation related to DHS's consolidation planning efforts against key transformation practices identified based on our review of previous public and private sector reorganizations.¹⁸ For example, key practices include dedicating an implementation team to manage the transformation process, soliciting employee views and gain their ownership for the transformation, and establishing a communication strategy to create shared expectations and report on progress.

We recommended DHS use the set of practices, where appropriate as part of the reorganization for the CWMD office. DHS agreed with the

¹⁵The Global Nuclear Detection Architecture is a multilayered framework encompassing many different federal programs, projects, and activities to detect and deter nuclear smuggling in foreign countries, at the U.S. border, and inside the United States.

¹⁶Other components include the National Protection and Programs Directorate, the Science and Technology Directorate, the Federal Emergency Management Agency, U.S. Customs and Border Protection, the Transportation Security Administration, and the U.S. Coast Guard.

¹⁷[GAO-16-603](#). In June 2015, DHS delivered a report to Congress which proposed consolidating the agency's core chemical, biological, radiological, nuclear and explosives functions into a new office. According to DHS officials, this proposal was based on a 2013 consolidation study.

¹⁸GAO, *Streamlining Government: Questions to Consider When Evaluating Proposals to Consolidate Physical Infrastructure and Management Functions*, [GAO-12-542](#) (Washington, D.C.: May 2012).

recommendation, and in October 2017 notified Congress that it planned to determine where to apply the key transformation practices and provided us with documentation demonstrating how it considered the practices. For example, at least 17 employee working groups were created to gather employee perspectives on the reorganization. Additionally, CWMD created a leadership team in January 2018 to manage the consolidation process. CWMD also created an internal communication strategy for the reorganization.

The steps DHS took to consider key practices during the consolidation were consistent with our recommendation, and we have since closed the recommendation as implemented. However, at the time we closed the recommendation, we observed that significant challenges remained at the CWMD office, such as low employee morale and questions about the efficacy of some CWMD programs. As part of ongoing work begun in September 2020, we are evaluating the extent to which the CWMD office continues to perform the missions of its predecessor offices, coordinates with its partners, and manages employee morale.

Opportunities Remain to Address Longstanding Challenges with CWMD Programs

Our prior work has highlighted challenges in programs operated and managed by the CWMD office, including those that predated its creation. We have identified opportunities for improvement to address the inherently fragmented nature of these kinds of security efforts, which require many federal, nonfederal, and industry partners to execute. Specifically, we have identified challenges in the following program areas: biodefense, nuclear/radiological detection, and chemical defense.

DHS's Biosurveillance and Detection Programs Have Struggled to Define and Carry Out Their Missions

Between 2009 and 2021, we have reported on progress and challenges with two of DHS's biodefense efforts—the National Biosurveillance Integration Center (NBIC) and the pursuit of replacements for the BioWatch program. These reports demonstrate the importance of following departmental policies and employing leading management practices to help ensure that the mission of each program is clearly and purposefully defined and that subsequent investments effectively respond to those missions.¹⁹ We have previously reported that the release of the National Biodefense Strategy in 2018 and establishment of the

¹⁹[GAO-10-171](#); [GAO-12-810](#); GAO, *Biosurveillance: DHS Should Not Pursue BioWatch Upgrades or Enhancements Until System Capabilities Are Established*, [GAO-16-99](#) (Washington, D.C.: Oct. 23, 2015); and GAO, *Biosurveillance: Challenges and Options for the National Biosurveillance Integration Center*, [GAO-15-793](#) (Washington, D.C.: Sept. 24, 2015).

National Biosurveillance
Integration Center
Collaboration Challenges

governance structure offer opportunities for DHS and partner agencies to consider how to address some of the challenges from a broader interagency and layered national security approach.²⁰

In December 2009, we reported that NBIC faced a variety of collaboration challenges with its partners, including confusion on roles and responsibilities and incomplete policies and strategies for operating across agency boundaries. To help NBIC enhance and sustain collaboration, including the provision of data, personnel, and other resources, we recommended that NBIC develop a strategy for addressing collaboration challenges and develop accountability mechanisms to monitor these efforts. In August 2012, NBIC issued the NBIC Strategic Plan, which intended to provide NBIC's strategic vision, clarify the center's mission and purpose, articulate the value that NBIC seeks to provide to its partners, and lay the groundwork for setting interagency roles, responsibilities, and procedures. Because NBIC created the plan we recommended, we closed those recommendations as implemented.

However, in follow-up work in 2015, we reported that a variety of challenges remained.²¹ Specifically, when we surveyed NBIC's 19 federal interagency partners,²² we found that:

- **Some partner agencies expressed uncertainty about NBIC's value.** Some of NBIC's partner agencies—which include various parts of the Departments of Health and Human Services, Defense, Agriculture, and others—expressed a lack of trust in providing data to NBIC and NBIC's ability to interpret that data. Partners were not sure how the information would be used and cited barriers to sharing information they collect from nonfederal entities. The participation of member agencies and their subject matter expertise is needed to create sophisticated meaning and interpretation of data in the proper context from a variety of monitoring systems covering human, animal, and plant health, and the environment.

²⁰GAO-21-292; GAO, *National Biodefense Strategy: Additional Efforts Would Enhance Likelihood of Effective Implementation*, GAO-20-273 (Washington, D.C.: Feb. 19, 2020); and GAO, *Biodefense: The Nation Faces Longstanding Challenges Related to Defending Against Biological Threats*, GAO-19-635T (Washington, D.C.: June 26, 2019).

²¹GAO-15-793.

²²Although NBIC has interaction with other stakeholders, we selected these 19 federal agencies based on their biosurveillance roles and responsibilities and because they were federal departments or components within federal departments that have signed the NBIC Advisory Board charter.

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- **Some partner agencies reported difficulties providing personnel to NBIC.** Despite the need for subject matter expertise from partner agencies, NBIC also faced challenges getting partner agencies to participate in NBIC activities, such as daily or weekly calls. Some partners felt the calls were repetitive of information emailed from NBIC. Partner agencies had difficulty in detailing subject matter experts to NBIC in a resource-constrained environment, although all partner agencies do have a point of contact for NBIC. At the time of our 2015 work, NBIC had started to partially fund other agencies' liaisons, but on a very limited basis.
 - **NBIC was unable to secure streams of raw data needed to conduct near real-time quantitative analysis to reveal unusual patterns and trends.** Because NBIC was unable to secure raw data, it relied on publicly available reports and global news sources. This led to partner agencies not seeing much value in NBIC's products, which generally repackage information with which they are already familiar. However, we did find in 2015 that NBIC's partners from supporting agencies, such as members of the intelligence community, who do not have the same level of expertise on health issues find the reports NBIC provides helpful context for emerging or ongoing events.

In September 2015, NBIC's interagency partners and other major stakeholders in the biosurveillance community acknowledged—and we agreed—that no single problem limits NBIC's mission to integrate biosurveillance data. Rather, over the years, several long-standing problems—such as data sharing across disparate missions—have combined to inhibit the achievement of this mission as envisioned in the 9/11 Commission Act. We identified options in our 2015 report for policy or structural changes that could help better fulfill the biosurveillance integration mission.²³ However, no significant change has occurred in NBIC's charge since that time. The options we outlined included:

- **Reinforce NBIC's Analyzer Role:** Under this option, NBIC would be provided with new authorities and resources designed to access

²³We identified these options and their benefits and limitations, on the basis of the roles of a federal-level biosurveillance integrator we identified in the 9/11 Commission Act, NBIC's strategic plan, and the perspectives of partners obtained during our structured interviews. These options are not exhaustive, and some options could be implemented together or in part. In developing these options, we did not evaluate the financial implications of implementing each option, to the extent they are knowable, but we acknowledge they are likely to result in an increase, decrease, or shifting of funding based on the changes described.

additional public and private data sources and statistical and modeling tools to develop meaningful information.

- **Strengthen NBIC's Coordinator Role:** Under this option, NBIC would be provided with greater authority for coordinating the federal biosurveillance enterprise.
- **Expand NBIC's Innovator Role:** Under this option, NBIC would be provided with new authorities and resources to lead research and development investments of new tools and technology to address gaps.
- **Status Quo: Continue to Execute the 2012 NBIC Strategic Plan:** In this option, NBIC would continue to implement the mission, goals, and objectives detailed in the August 2012 NBIC Strategic Plan or subsequent approved updates.
- **Repeal the NBIC Statute:** In this option, national biosurveillance integration would not be pursued through NBIC.

Challenges Acquiring Biodetection Technologies

Since 2012, we have assessed the BioWatch program and DHS efforts to upgrade or replace it.²⁴ Since 2003, DHS has focused on acquiring an autonomous detection system to replace the current BioWatch system, but has faced challenges in clearly justifying the BioWatch program's mission and need and ability to reliably acquire technology to address that need. In September 2012, we found that DHS approved the acquisition of an autonomous detection capability (known as BioWatch Generation 3, or Gen-3) in October 2009 without fully developing critical knowledge that would help ensure sound investment decision making, pursuit of optimal solutions, and reliable performance, cost, and schedule information.²⁵ Specifically, we found that DHS did not engage the early phases of its Acquisition Life-cycle Framework, which is designed to help ensure that the mission need driving the acquisition warrants investment of limited resources and that an analysis of alternatives systematically identifies possible alternative solutions that could satisfy the identified need.

In our September 2012 report, we recommended that before continuing the Gen-3 acquisition, DHS reevaluate the mission need and possible alternatives based on cost-benefit and risk information. DHS concurred with the recommendation and in 2012, directed the BioWatch program to

²⁴See, [GAO-12-810](#) and [GAO-16-99](#).

²⁵[GAO-12-810](#).

complete an updated analysis of alternatives. In April 2014, DHS canceled the acquisition of Gen-3 because the analysis did not confirm an overwhelming benefit to justify the cost of a full technology switch.

When DHS canceled the Gen-3 acquisition, it continued to rely on the current system for early detection of an aerosolized biological attack. However, in 2015 we found DHS lacked reliable information about BioWatch's technical capabilities to detect a biological attack, in part, because in the years since BioWatch's initial deployment in 2003, DHS had not developed technical performance requirements for the system.²⁶ We reported in 2015 that BioWatch has been criticized because it was deployed quickly in 2003 to address a perceived urgent need, but without sufficient testing, validation, and evaluation of its technical capabilities.²⁷

In our October 2015 report, we made recommendations to help ensure that biosurveillance-related funding is directed to programs that can demonstrate their intended capabilities, and to help ensure sufficient information is known about the current BioWatch system to make informed cost-benefit decisions about possible upgrades and enhancements to the system. We recommended that DHS not pursue upgrades or enhancements to the current BioWatch system until it: (1) established technical performance requirements necessary for a biodetection system to meet a clearly defined operational objective for the BioWatch program; (2) assessed the Gen-2 system against those performance requirements; and (3) produced a full accounting of statistical and other uncertainties and limitations in what is known about the system's capability to meet its operational objectives. DHS concurred and described steps to address these recommendations, but they remain open as DHS considers other options to replace BioWatch.

In May 2021, we reported on DHS's current effort to replace the BioWatch program, known as BD21.²⁸ BD21 intends to combine various technologies, such as biological sensors, data analytics, anomaly detection tools, collectors, and field screening devices to enable timelier and more efficient detection of an aerosolized attack involving a biological

²⁶GAO-16-99. Technical performance requirements would help DHS better understand the types and sizes of attacks the system could detect.

²⁷GAO-16-99 and Institute of Medicine and National Research Council, *BioWatch and Public Health Surveillance* (Washington, D.C.: National Academies Press, 2011).

²⁸GAO-21-292.

agent. We reported in May 2021 that the BD21 program office was following the agency's acquisition policy and guidance, but that the program was early in the acquisition lifecycle. Therefore, DHS had not yet selected the technologies to use and continued to analyze potential technologies to demonstrate that certain components of the overall concept are feasible, such as an anomaly detection algorithm.²⁹

However, we also reported that BD21 faces technical challenges due to inherent limitations in the technologies and uncertainties with combining technologies for use in biodetection. For example, common environmental material such as pollen, soil, and diesel exhaust can emit a signal in the same range as a biological threat agent, thereby increasing false alarm rates in biological aerosol sensors that monitor the air and provide data on biological material in the environment. Program officials reported that the risk of false alarms produced by biological sensor technologies could be reduced by using an anomaly detection algorithm in addition to the sensor. However, it is too early to determine whether integration of an anomaly detection algorithm will successfully mitigate the false alarm rate—specifically, because the algorithms have never been developed and used for the purpose of biodetection in an urban, civilian environment.

We also reported in May 2021 that the BD21 program office plans to conduct technology readiness assessments along the way as part of the acquisition lifecycle. In 2020, DHS issued a technology readiness assessment guide. We found it lacked detailed information about how the department will ensure objectivity and independence, among other important best practices identified in our technology readiness assessment best practices guide. To ensure decision makers and program managers have the information necessary to make informed decisions at key acquisition decision events, we recommended that, among other things, the BD21 program office conduct assessments that follow our best practices prior to the program's acquisition decision events. DHS concurred with our recommendations and provided

²⁹For BD21, an anomaly detection algorithm is intended to use data from biological sensors that continuously monitor the air, as well as other data sources, to determine if there is a departure or deviation from the baseline environmental data, known as an anomaly. Baseline environmental data is the characterization of background environments, which can vary by geography, climate, topography, and urban density, as well as by time of day, seasons, weather, animal population dynamics, farming patterns, construction, and manufacturing (emissions).

additional information on the steps the agency has taken or plans to take to address them. We will continue to monitor its progress.

Securing the Cities Program Faces Management Weaknesses

In May 2019, we identified several limitations in the CWMD office's efforts to implement the Securing the Cities program.³⁰ We found that CWMD lacked a clear basis for proposed changes to the program's strategies—which were not based on threats or needs of the cities. CWMD officials told us that the agency is considering several potential changes to the Securing the Cities program that would broaden its geographic reach and scope, including establishing new goals for the program, expanding geographic coverage, centralizing acquisition of detection equipment, increasing the role of other agencies, and including chemical and biological weapon detection and deterrence within the program's scope.

However, it had not (1) fully developed potential changes or documented a plan for making changes to the Securing the Cities program; (2) identified the basis for such changes; and (3) clearly communicated with the cities, raising concerns about how the changes will affect them. We also reported in 2019 that most of the officials we interviewed from the five cities in the program at the time said that DHS provided a high-level overview of potential changes in an August 2018 meeting, but little detail on how such changes would be implemented or affect city operations. We determined that if DHS did not clearly communicate to cities how the program would operate under potential changes, these cities could face difficulties planning for the future and achieving the program's detection and deterrence objectives.

Additionally, we reported in May 2019 that CWMD had not identified a clear basis for making program changes, and the extent to which these changes could be attributed to new priorities under DHS's reorganization was unclear. CWMD officials told us at the time that they had not conducted any studies or analyses that would justify making changes to the program. In DHS's fiscal year 2019 budget justification, CWMD noted the importance of using the Securing the Cities program to build capabilities far outside the immediate target areas, (i.e., cities) and the need to detect threats along the air, land, or sea pathways into and within the country that terrorists could potentially use to reach their targets. However, according to CWMD officials at the time of our 2019 review, the office had not identified a change in the nature or level of nuclear or radiological threats to explain its intent to move from its original city-

³⁰[GAO-19-327](#).

focused model for the program to a more national approach. CWMD officials said that the uncertainty surrounding making changes reflected a program under transition within an agency under transition—that is, the reorganization from the Domestic Nuclear Detection Office to CWMD.

Further, we reported that the CWMD Act of 2018 required development of an Implementation Plan for Securing the Cities (due December 2019).³¹ In 2019 we reported that the Act required that before making changes to the Securing the Cities program, the Assistant Secretary of CWMD brief appropriate congressional committees about the justification for proposed changes. This briefing was to include, among other things, an assessment of the effect of changes, taking into consideration previous resource allocations and stakeholder input. We reported that this new requirement would provide DHS an opportunity to identify the basis for potential changes, and that assessing such changes could provide more reasonable assurance that they would strengthen the program and not result in unintended consequences, such as reducing capabilities in current cities. In June 2021, the CWMD office issued the Implementation Plan for the Securing the Cities Program, which we are currently reviewing. Additionally, as part of our 2019 report, and to address program management deficiencies for the Securing the Cities program, we made four recommendations to CWMD, including to work with cities to address risks to sustaining detection capabilities, which remain open at the time of this statement. We are monitoring CWMD’s actions to address the report’s recommendations.³²

DHS Chemical Defense Programs Not Fully Integrated

In August 2018, we reported that DHS manages several programs and activities designed to prevent and protect against domestic attacks using chemical agents.³³ Some DHS components have programs that focus on chemical defense, such as the Science and Technology Directorate’s chemical hazard characterization. Others have chemical defense responsibilities as part of their broader missions, such as U.S. Customs and Border Protection, which is responsible for interdicting chemical agents at the border. The establishment of the CWMD office aimed to consolidate some chemical defense programs and activities, but we found—and DHS officials acknowledged—that DHS had not fully integrated and coordinated its chemical defense programs and activities.

³¹Pub. L. No. 115-387, § 2(a)(10), 132 Stat. at 5164-66 (classified at 6 U.S.C. § 596b).

³²[GAO-19-327](#).

³³[GAO-18-562](#).

As such, we reported in 2018 that several components—including Customs and Border Protection, U.S. Coast Guard, the Office of Health Affairs, and Science and Technology Directorate—conducted similar activities, such as acquiring chemical detectors or assisting local jurisdictions with preparedness, separately, without DHS-wide direction and coordination. We determined that as components carry out chemical defense activities to meet mission needs, there was a risk that DHS may miss an opportunity to leverage resources and share information that could lead to greater effectiveness addressing chemical threats.

We also reported that it was too early to tell the extent to which the new CWMD office would enhance the integration of DHS's chemical defense programs and activities. In August 2018, to help guide the consolidation of these programs, we recommended that DHS develop a strategy and implementation plan to help the CWMD office (1) mitigate the risk of fragmentation among DHS programs and activities, and (2) establish goals and identify resources to achieve these goals, consistent with the GPRA Modernization Act of 2010.³⁴ We also reported that CWMD officials agreed that the establishment of the new office was intended to provide leadership to and help guide, support, integrate, and coordinate DHS's chemical defense efforts and that a strategy and implementation plan could help DHS better integrate and coordinate its fragmented chemical defense programs and activities. DHS concurred with our recommendation, and CWMD issued a strategy in December 2019, but the implementation plan is in development and not expected to be finalized until September 2021.

Thank you, Chairwoman Demings, Ranking Member Cammack, and Members of the Subcommittee. This concludes my prepared statement. I would be happy to respond to any question you may have at this time.

³⁴Pub. L. No. 111-352, 124 Stat. 3866 (2011). The GPRA Modernization Act of 2010 updated the Government Performance and Results Act of 1993 (GPRA), Pub. L. No. 103-62, 107 Stat. 285. We reported this would also be consistent with a 2012 DHS effort, since abandoned, to develop a strategy and implementation plan for all chemical defense activities, from prevention to recovery. DHS officials stated the 2012 effort was not completed because of leadership changes and competing priorities.

GAO Contact and Staff Acknowledgments

If you or your staff has any questions concerning this testimony, please contact Christopher P. Currie at (404) 679-1875 or curriec@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. Individuals making key contributions to this statement include Kathryn Godfrey (Assistant Director), Susanna Kuebler (Analyst-In-Charge), Michele Fejfar, Rob Grace, Kevin Heinz, Sasan J. "Jon" Najmi, Sushil Sharma, Kelsey N. Wilson, Ned Woodward, and Adam Vogt. Key contributors for the previous work that this testimony is based on are listed in each product.

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