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Biological Threat Detection and Response Challenges Remain for BioWatch (REDACTED)

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Washington, DC 20528 / www.oig.dhs.gov

March 2, 2021

MEMORANDUM FOR: Gary Rasicot
Acting Assistant Secretary
Countering Weapons of Mass Destruction Office

FROM: Joseph V. Cuffari, Ph.D. **JOSEPH V**
Inspector General **CUFFARI** Digitally signed by
JOSEPH V CUFFARI
Date: 2021.02.22
15:24:10 -05'00'

SUBJECT: *Biological Threat Detection and Response Challenges
Remain for BioWatch – ~~For Official Use Only~~*

For your action is our final report, *Biological Threat Detection and Response Challenges Remain for BioWatch – ~~For Official Use Only~~*. We incorporated the formal comments provided by your office.

The report contains four recommendations aimed at improving the BioWatch Program. Your office concurred with all four recommendations. Based on information provided in your response to the draft report, we consider recommendations 1 through 4 open and resolved. Once your office has fully implemented the recommendations, please submit a formal closeout letter to us within 30 days so that we may close the recommendations. The memorandum should be accompanied by evidence of completion of agreed-upon corrective actions and of the disposition of any monetary amounts.

Please send your closure request to OIGAuditsFollowup@oig.dhs.gov.

Consistent with our responsibility under the *Inspector General Act*, we will provide copies of our report to congressional committees with oversight and appropriation responsibility over the Department of Homeland Security. We will post the report on our website for public dissemination.

Please call me with any questions, or your staff may contact Thomas Kait, Acting Assistant Inspector General for Audits, at (202) 981-6000.

Attachment

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DHS OIG HIGHLIGHTS

Biological Threat Detection and Response Challenges Remain for BioWatch

March 2, 2021

Why We Did This Audit

The BioWatch Program (BioWatch) is intended to detect biological agents and provide early warning in the event of a biological attack. We conducted this audit to determine to what extent BioWatch's information sharing ensures nationwide readiness in response to biological terrorism threats.

What We Recommend

We made four recommendations that, when implemented, will improve BioWatch.

For Further Information:

Contact our Office of Public Affairs at (202) 981-6000, or email us at [DHS-OIG.OfficePublicAffairs@oig.dhs.gov](mailto:OIG.OfficePublicAffairs@oig.dhs.gov)

What We Found

DHS' Countering Weapons of Mass Destruction's (CWMD) BioWatch has information sharing challenges that reduce nationwide readiness to respond to biological terrorism threats. According to its mission statement, BioWatch is designed to operate a nationwide aerosol detection system. The system is intended to detect potential biological threat agents, identify the agent used, and share information with stakeholders, serving as an early warning system.

However, BioWatch does not operate a nationwide early warning system. Its biological detection equipment is located in just 22 of 50 states (44 percent), which leaves 28 states without coverage. This occurred because BioWatch has not reassessed its strategic posture and designated locations needing coverage since 2003. Moreover, BioWatch equipment in 34 of 35 jurisdictions could not always collect air samples to test for biological threats because the equipment was not secured to prevent unplugging or security breaches.

Further, BioWatch monitors and detects just 6 of 14 (approximately 43 percent) biological agents known to be threats because it has not updated its biological agent detection capabilities with the 2017 threat assessment results. Also, as of 2018, BioWatch stopped conducting routine full-scale exercises with its jurisdictions in preparation for a potential bioterrorism attack. According to BioWatch officials, this occurred because CWMD leadership directed BioWatch to no longer conduct these exercises, leaving each jurisdiction discretion to perform its own exercises.

Without implementing changes to address BioWatch's challenges, the United States' ability to prepare for, detect, and respond to a potential bioterrorism attack is impeded, which could result in significant loss of human life.

CWMD Response

CWMD concurred with all four recommendations.



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Background

A primary mission of the Department of Homeland Security (DHS) is to prevent terrorist attacks and reduce the vulnerability of the United States to terrorism. Bioterrorism is a form of terrorism that is the deliberate, or intentional, release of a biological agent to cause illness or death in people, animals, or plants. Contrary to a chemical or nuclear attack, bioterrorism creates challenges because the public health impact of a biological attack can unfold gradually over time. Even a small amount of a biological agent released in or near a population center can result in catastrophic casualties, as well as economic and social instability throughout the United States. For these reasons, the speed and accuracy of biological detection and response has a direct impact on the number of people who could become ill or die.

In response to the 2001 anthrax attacks, the President and Congress established the BioWatch Program (BioWatch) in 2003.¹ The program embarked on an aggressive effort to deploy a nationwide system to surveil for aerosolized exposure caused by the intentional release of biological agents. This system was initiated in 30 of the most populous cities within the United States. After the creation of DHS, BioWatch was initially established under the Science and Technology Directorate, and in 2007 was transferred to DHS' Office of Health Affairs. Then, in 2018, BioWatch transferred to DHS' Countering Weapons of Mass Destruction (CWMD) office with a budget averaging \$76 million per fiscal year from 2018 to 2020.²

CWMD's BioWatch plays a critical role in the Nation's information sharing capabilities needed to effectively prepare for, detect, and respond to bioterrorism threats. According to BioWatch officials, the program operates the Nation's only biodetection system. The system is intended to detect potential biological agents, identify the agent used, and share information with stakeholders so that emergency response activities can be initiated. Early detection of biological attacks provides stakeholders with an early warning, which allows for timely intervention to minimize illness and death.

BioWatch provides biological threat coverage by deploying its equipment or portable sampling units (PSU) located in 35 jurisdictions, which are some of the largest metropolitan areas based on population within the United States. PSUs collect particulate matter from the air and deposit it onto a filter that is subsequently analyzed for biological agents at a BioWatch laboratory.

¹ *State of the Union Address*, Executive Office of the President, The White House, January 28, 2003.

² Countering Weapons of Mass Destruction Act of 2018, Pub. L. No. 115-387 (establishing, *inter alia*, the Countering Weapons of Mass Destruction Office within DHS).

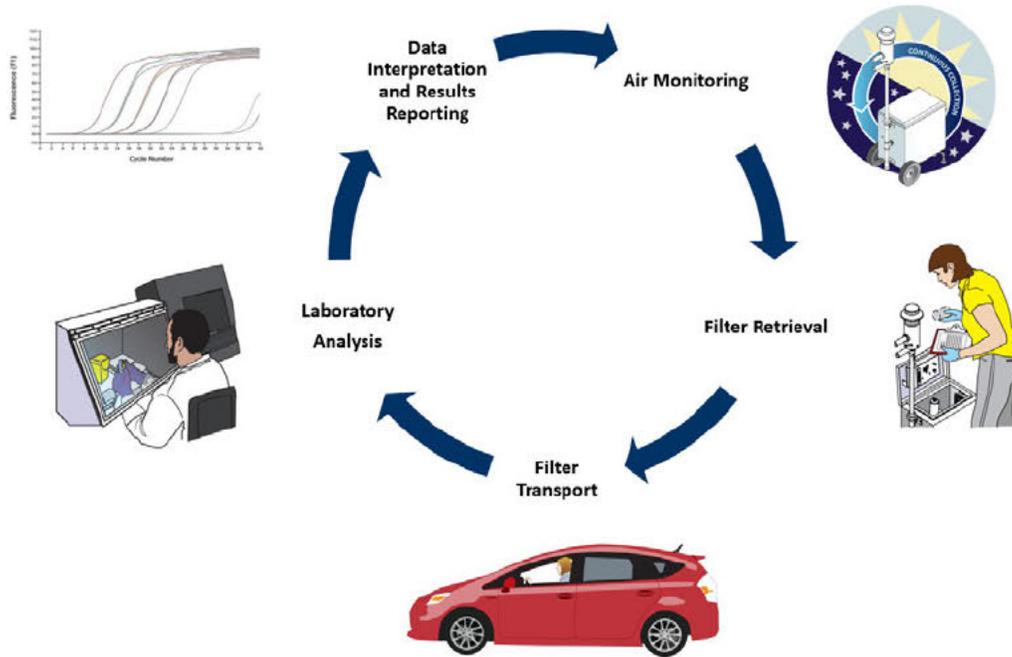


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BioWatch requires its jurisdictional partners to collect and transport PSU air filter samples to BioWatch laboratories 7 days a week, 365 days per year to ensure continuous monitoring for biological agents.

Once BioWatch laboratories receive the air filters, staff test for specific [REDACTED] associated with a biological agent such as variola virus.³ If the presence of [REDACTED] is consistent with one of the biological agents tested, the BioWatch Laboratory Director declares a BioWatch Actionable Result. This prompts stakeholders to participate in a BioWatch national conference call to provide an assessment of the biological agent and share information with state, local, and Federal stakeholders. Figure 1 provides an overview of the cyclical BioWatch operational process, starting with air monitoring.

Figure 1. BioWatch Operational Process



Source: CWMD BioWatch Instructor Guide

We conducted this audit to determine to what extent BioWatch information sharing ensures nationwide readiness in response to biological terrorism threats.

³ Variola is the virus that causes smallpox, a highly contagious and deadly disease.



Results of Audit

BioWatch's Challenges Reduce Nationwide Readiness to Respond to Biological Terrorism Threats

DHS' CWMD BioWatch has information sharing challenges that reduce nationwide readiness to respond to biological terrorism threats. According to BioWatch's mission statement, the program is designed to operate a nationwide aerosol detection system. The system is intended to detect potential biological agents, identify the agent used, and share information with stakeholders, serving as an early warning system.

However, BioWatch does not operate a nationwide early warning system. Its biological detection equipment is located in just 22 of 50 states (44 percent), which leaves 28 states without coverage. This occurred because BioWatch has not reassessed its strategic posture and designated locations needing coverage since 2003. Moreover, BioWatch equipment in 34 of 35 jurisdictions could not always collect air samples to test for biological threats because the equipment was not secured to prevent unplugging or security breaches.

Further, BioWatch monitors and detects just 6 of 14 (approximately 43 percent) biological agents known to be threats because it has not updated its biological agent detection capabilities with the 2017 threat assessment results. Also, as of 2018, BioWatch stopped conducting routine full-scale exercises with its jurisdictions in preparation for a potential bioterrorism attack. According to BioWatch officials, this occurred because in 2018, CWMD leadership directed BioWatch to no longer conduct these exercises, leaving each jurisdiction discretion to perform its own exercises.

Without implementing changes to address BioWatch's challenges, the United States' ability to prepare, detect, and respond to a potential bioterrorism attack is impeded, which could result in significant loss of human life.

BioWatch Does Not Provide Nationwide Biological Threat Coverage

BioWatch does not operate a nationwide early warning system that detects biological agent threats throughout the United States. According to BioWatch's mission statement, the program is designed to operate a nationwide aerosol detection system. The system is intended to provide early warning across all levels of government to support public health and emergency management communities in preparing for and responding to a biological incident. However, the program has a presence in just 22 of 50 states (44 percent), leaving 28



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states without biological threat coverage. Figure 2 illustrates BioWatch's presence (shaded areas) in the United States.



This occurred because BioWatch has not reassessed its strategic posture to have nationwide coverage since its inception in 2003. According to BioWatch officials, a biothreat risk assessment establishes BioWatch designated locations; however, this assessment has not been reevaluated since inception of the program.

BioWatch PSUs within Jurisdictions Did Not Always Collect Air Samples

In addition to the program having a limited presence, BioWatch's equipment or PSUs within its jurisdictions did not always collect the air samples needed to test for biological threats. According to *BioWatch Field Operations Standard Operating Procedures*, June 2018, and *BioWatch Program Planning Guidance*, PSUs should draw air through filters for 24 hours prior to collection. Jurisdictions are also required to collect air filters from the PSU equipment 7 days a week, 365 days per year, and to secure the PSUs at each site location. These daily collections are critical to program operations because the samples obtained from the filters allow the jurisdiction's BioWatch laboratory to share information on whether a biological agent has been released.

However, per CWMD's Field Operations data, 34 of the 35 (97 percent) jurisdictions with BioWatch PSUs did not always collect air samples on a daily basis as required to test for biological threats during calendar years (CY) 2018



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through 2019.⁴ Specifically, CWMD’s data identified 906 instances where air samples were not collected due to loss of power that included unplugged PSUs. CWMD’s data also identified 13 instances within 5 jurisdictions where PSU air samples were not collected due to security breaches involving vandalism, tampering, or theft.

We validated PSU security deficiencies through our observation of 6 of 17 PSU equipment locations in three states (Massachusetts, Illinois, and Florida), where the jurisdictions did not properly secure the PSUs and their respective power sources. In these six locations, PSUs did not have physical security barriers or locks. Therefore, the PSU power supplies for these units could be compromised by being unplugged, tampered with, vandalized, or stolen. Figure 3 shows two examples of PSUs that were not properly secured.



Figure 3. Unsecured PSUs

Source: DHS OIG observations of PSUs

Although required by BioWatch guidance, BioWatch officials stated they cannot force their jurisdictional partners to physically secure deployed PSUs because

⁴ CYs 2018 – 2019 data excludes the period from January 1, 2019 to March 26, 2019.

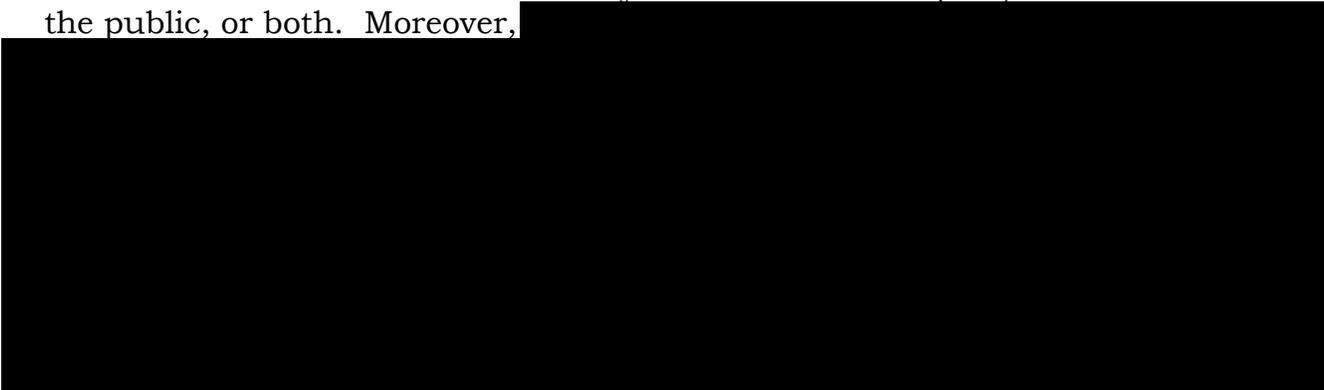


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the cooperative agreements do not contain this requirement.

BioWatch’s Biological Agent Detection Is Limited

BioWatch’s information sharing abilities are further limited because the program monitors and detects just 6 of 14 (approximately 43 percent) biological agents known from the air filter samples to be threats. According to the 2017 *Biodetection Technology Enhancement Program Threat Basis*, 14 aerosolized and hazardous biological agents present a biological threat. These threats present vulnerabilities that have been used by adversaries in the past, are harmful to the public, or both. Moreover,



This occurred because BioWatch has not aligned its capabilities to detect biological agents with the most current threat assessment. Therefore, it does not comprehensively monitor and detect all biological agents known to be threats. DHS conducted the 2017 bioterrorism threat assessment to inform decision makers of biological agent threats that can cause the greatest harm to humans if used in an aerosol attack. However, BioWatch officials stated that a more recent comprehensive assessment is needed to inform their decision making and budgeting to reevaluate their aerosol biological agent detection capabilities.

BioWatch Reduced Its Jurisdictional Preparedness Exercises

Lastly, BioWatch no longer conducts routine full-scale exercises in preparation for a potential bioterrorism attack. According to the *BioWatch Program Lessons Learned Report*, November 2018,⁵ biothreat exercises provide consistent and objective evaluations of readiness for continuous jurisdictional planning and leadership. These exercises provide stakeholders at all levels with the

⁵ See Department of Homeland Security/Countering Weapons of Mass Destruction Office, *BioWatch Program: Lessons Learned Report Bio-Watch – Coordinated Exercises 2017-2018* (November 2018).



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opportunity to share information, assess and validate capabilities, and address areas for improvement developed from after-action reports.

BioWatch officials stated that from 2015 through 2018, BioWatch had dedicated staff that routinely coordinated and completed these full-scale exercises with jurisdictions. During this timeframe, the exercises identified areas of improvement affecting bioterrorism readiness, such as:

- laboratories not having backup personnel in the event of a biological incident;
- difficulties ensuring the right stakeholders were included and notified of a potential biological attack;
- key stakeholders not being aware of or included in meetings declaring a BioWatch Actionable Result or potential biological attack;
- stakeholders not having familiarity with available Federal resources to help in the event of an attack;
- state and local officials being unaware of or hesitant to communicate public information and warning capabilities for BioWatch incidents; and
- training weaknesses in contingency planning for a potential biological attack.

The results of these full-scale exercises, which were coordinated by BioWatch, allowed jurisdictions to share and address the aforementioned deficiencies, and are a key component of national preparedness against a bioterrorism attack. However, in December 2018, BioWatch transferred to CWMD. According to BioWatch officials, once the program transitioned, CWMD leadership directed its Exercise Joint Program Activity to shift BioWatch routine full-scale exercises to jurisdiction coordinators for management and execution, leading to a reduction in information sharing efforts. BioWatch officials agree that conducting these exercises with its jurisdictions is an important part of improving information sharing and preparedness because it documents strengths, areas for improvement, and associated corrective actions.

Until CWMD addresses these information sharing weaknesses, the Nation's readiness to respond to a potential bioterrorism attack that may result in significant loss of life is at risk. BioWatch's limited footprint puts the Nation at a disadvantage to timely identify and respond to potential biological attacks. Given that BioWatch PSUs are located within just 35 jurisdictions in 22 states nationwide, just one missed hour or day of air sample collection puts the Nation at risk for a bioterrorism attack going undetected. Additionally, missed sample collections will continue to occur and prevent the analysis of biological agent threats. The monitoring and detection of these threats also remain limited without being aligned with current threat assessments. Lastly, without



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BioWatch conducting routine full-scale exercises with its jurisdictions, it is difficult to gauge the Nation's readiness to respond to a bioterrorism attack.

Recommendations

We recommend the CWMD Assistant Secretary:

Recommendation 1: Conduct risk assessments of BioWatch's posture and align its capabilities with the program's mission.

Recommendation 2: Revise and update BioWatch cooperative agreements to ensure physical security of all CWMD portable sampling unit equipment throughout all BioWatch jurisdictions.

Recommendation 3: Utilize the most recent threat assessment to enhance biological agent detection capabilities to respond to the most up-to-date threats.

Recommendation 4: Conduct routine full-scale exercises and share the after-action reports with all stakeholders to improve nationwide information sharing and preparedness.

Management Comments and OIG Analysis

CWMD concurred with all four recommendations. Appendix A contains a copy of CWMD's response in its entirety. CWMD also provided technical comments and suggested revisions to our report in a separate document. We reviewed the technical comments and made changes to the report where appropriate.

CWMD emphasized in its written comments to our draft report that BioWatch is integral to CWMD's mission and detailed its planned actions to promptly resolve the issues identified in the report. A summary of CWMD's response to each recommendation and our analysis follows.

CWMD Comments to Recommendation 1: Concur. CWMD will have the Los Alamos National Laboratory conduct a new assessment to assist BioWatch with optimizing its defense against bioterrorism. The estimated completion date is September 30, 2021.

OIG Analysis of CWMD Comments: CWMD's actions are responsive to the intent of this recommendation. This recommendation will remain open and resolved until we receive a copy of the risk assessment and how CWMD plans to align BioWatch capabilities to its mission.



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CWMD Comments to Recommendation 2: Concur. BioWatch will work closely with the DHS Grants Office and the Office of General Counsel, and develop appropriate language to include in cooperative agreements to strengthen security for the portable sampling units. A long term schedule for routine revisions and updates will be included in the BioWatch Management Plan. The estimated completion date is March 31, 2021.

OIG Analysis of CWMD Comments: CWMD's actions are responsive to the intent of this recommendation. This recommendation will remain open and resolved until we receive the approved language that will be updated and included in cooperative agreements, along with a copy of the approved BioWatch Management Plan showing the long-term revisions and updates to its cooperative agreements.

CWMD Comments to Recommendation 3: Concur. CWMD recently completed a threat assessment that includes biological threats. CWMD will coordinate with Federal, state, and local partner agencies to further assess the risks of specific pathogens to determine what additional changes to BioWatch agents are appropriate. The estimated completion date is December 31, 2021.

OIG Analysis of CWMD Comments: CWMD's actions are responsive to the intent of this recommendation. This recommendation will remain open and resolved until we receive documentation showing that an assessment was conducted and BioWatch implements planned actions.

CWMD Comments to Recommendation 4: Concur. CWMD will complete a full-scale exercise that includes biological threats in February 2021 and share an after-action report in April 2021. CWMD's Training and Exercise Division will develop a management plan that includes a 5-year exercise schedule for BioWatch to ensure jurisdictions exercise their capabilities on a periodic basis and that lessons learned are captured and shared. The estimated completion date is April 30, 2021.

OIG Analysis of CWMD Comments: CWMD's actions are responsive to the intent of this recommendation. This recommendation will remain open and resolved until we receive a copy of the April 2021 after-action report, and the Management plan that includes the 5-year exercise schedule.



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Objective, Scope, and Methodology

Department of Homeland Security Office of Inspector General was established by the *Homeland Security Act of 2002* (Public Law 107-296) by amendment to the *Inspector General Act of 1978*. Our audit objective was to determine to what extent BioWatch information sharing ensures nationwide readiness in response to biological terrorism threats.

To achieve our objective, we reviewed Federal laws and regulations, BioWatch budget data, and internal program guidance from CYs 2018 through 2019. We conducted interviews with officials from CWMD's BioWatch's Field Operations Division, Laboratory Operations Division, and Quality Assurance Division. We also interviewed officials from the Centers for Disease Control National Center for Emerging and Zoonotic Infectious Diseases' Office of the Director and Division of Preparedness and Emerging Infections, as well as DHS' Science and Technology Directorate.

We reviewed and analyzed prior audit reports related to the audit objective, including DHS OIG reports, Government Accountability Office reports, and congressional testimony. We also reviewed and analyzed applicable Federal requirements regarding management's responsibility for internal controls. We further analyzed BioWatch operations through internal audit reports, lessons learned documents from exercises, and after-action reports.

To evaluate BioWatch's nationwide posture, we assessed BioWatch designated locations within the United States and determined the number of states and cities having biological agent detection equipment. We assessed the reliability of BioWatch nationwide data by comparing participating jurisdictions and PSU locations to validate the completeness and accuracy of the data. We determined the data to be sufficiently reliable for assessing nationwide coverage.

Additionally, to evaluate whether BioWatch jurisdictions were collecting air samples in accordance with mandated policies, we analyzed data from CWMD's Quality Assurance internal audit reports and corroborated the information with BioWatch Field Operations officials. We also used BioWatch Field Operations' exception reporting data during CYs 2018 and 2019 that depicts jurisdiction's missed air sample collections. We used the exception reporting data to report air sample collection deficiencies and trends.

Further, by observing PSU equipment, we validated the collection deficiencies identified in BioWatch's Office of Field Operations 2018 – 2019 data were still ongoing. We judgmentally selected 17 PSU locations in 4 BioWatch



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jurisdictions in close proximity to DHS OIG Office of Audits field locations. The four BioWatch jurisdictions were located in Boston, MA; Chicago, IL; Miami-Broward, FL; and Miami-Dade, FL. Specifically, we visited 17 PSUs to observe the physical security measures in place to safeguard against unplugging or tampering with the equipment.

To assess BioWatch's ability to detect the most current aerosolized agents that represent a bioterrorism threat, we compared the Centers for Disease Control Bioterrorism Agents Category list and DHS' *Biodetection Technology Enhancement Program Threat Basis* assessment data with BioWatch's current agent detection capabilities. To evaluate BioWatch information sharing capabilities, we reviewed after-action reports from exercises conducted from 2015 through 2018 for its jurisdictions. We also reviewed flowcharts identifying the necessary response steps following a BioWatch Actionable Result declaration.

We conducted this performance audit between January and November 2020 pursuant to the *Inspector General Act of 1978*, as amended, and according to 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 upon our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based upon our audit objectives.



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Appendix A CWMD Comments to the Draft Report

Countering Weapons of Mass Destruction Office
U.S. Department of Homeland Security
Washington, DC 20528



**Homeland
Security**

January 12, 2021

MEMORANDUM FOR: Joseph V. Cuffari, Ph.D.
Inspector General

FROM: David E. Richardson
Assistant Secretary

SUBJECT: Management Response to Draft Report: "Biological Threat
Detection and Response Challenges Remain for BioWatch"
(Project No. OIG-20-019-AUD-CWMD)

Thank you for the opportunity to comment on this draft report. The U.S. Department of Homeland Security (DHS) Countering Weapons of Mass Destruction Office (CWMD) appreciates the work of the Office of Inspector General (OIG) in planning and conducting its review and issuing this report.

CWMD is pleased that the OIG recognized the critical role of BioWatch in preventing terrorist attacks, including acts of bioterrorism, that could seriously impact the health of people, animals, and elements in nature across the Nation. BioWatch is integral to CWMD's mission and serves as the Department's best tool to effectively prepare for, detect and respond to bioterrorism threats. CWMD remains committed to its partnership with the BioWatch network of scientists, laboratory technicians, emergency managers, law enforcement officers and public health officials that ensure the homeland is protected against a potential biological terrorism attack.

The draft report contained four recommendations with which CWMD concurs. Attached find our response to each recommendation. DHS previously submitted technical comments addressing several accuracy and contextual issues under a separate cover for OIG's consideration.

Again, thank you for the opportunity to review and comment on this draft report. Please feel free to contact me if you have any questions. We look forward to working with you again in the future.

Attachment



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**Attachment: Management Response to Recommendations
Contained in OIG-20-019-AUD-CWMD**

OIG recommended that the CWMD Assistant Secretary:

Recommendation 1: Conduct risk assessments of BioWatch's posture and align its capabilities with the program's mission.

Response: Concur. Los Alamos National Laboratory (LANL) conducted the original assessment in 2003 to guide the BioWatch deployment. LANL will conduct a new assessment to assist CWMD in optimizing our defense against bioterrorism. Estimated Completion Date (ECD): September 30, 2021.

Recommendation 2: Revise and update BioWatch cooperative agreements to ensure physical security of all CWMD portable sampling unit equipment throughout all BioWatch jurisdictions.

Response: Concur. BioWatch will work closely with the DHS Grants Office and the Office of General Counsel and develop appropriate language to include in cooperative agreements to strengthen security for the portable sampling units. A long-term schedule for routine revisions and updates will be included in the BioWatch Management Plan. ECD: March 31, 2021.

Recommendation 3: Use the most recent threat assessments to enhance its biological agent detection capabilities to respond to the most up-to-date threats.

Response: Concur. CWMD recently completed a threat assessment that includes biological threats. CWMD, in coordination with federal, state, and local partner agencies, will further assess the risks of specific pathogens to determine what additional changes to BioWatch agents are appropriate. ECD: December 31, 2021.

Recommendation 4: Conduct routine full-scale exercises and share the after-action reports with all stakeholders to improve nationwide information sharing and preparedness.

Response: Concur. A full-scale exercise that includes biological threats will occur February 16-20, 2021; an after-action report will be shared in April 2021. CWMD's Training and Exercise Division will develop a management plan that includes a five-year exercise schedule for BioWatch to ensure jurisdictions exercise their capabilities on a periodic basis and that lessons learned are captured and shared. ECD: April 30, 2021



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