

Evaluating the Implementation of the National Strategy for Biosurveillance

Iain Armstrong, Erin Berry, Alexander Bitter,
Leland Colburn, Kathleen Karika, Jose Paulino,
Rebekah Redden, Thomas “Tex” Vien,
Lodrick Williams

Faculty Advisor: COL(R) Don Bailey

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Executive Summary

Biological incidents, both man-made and naturally occurring, represent a significant threat to the national security of the United States. Identifying these crises begins with the detection and reporting of essential biological disease information, known as biosurveillance. As the first of its kind, the 2012 National Strategy for Biosurveillance targets the process essential information should take to reach decisionmakers. Although there are points of strength in the system, extensive research finds the current biosurveillance infrastructure does not adequately transmit information to decisionmakers. Therefore, this report recommends three improvements to the biosurveillance system: increase incorporation of information, improve interagency relationships, and strengthen governance in the biosurveillance community.

Acronyms

BIWAC	Biosurveillance Indications and Warning Analytics Community
CDC	Center for Disease Control and Prevention
CIA	Central Intelligence Agency
DHS	Department of Homeland Security
DOC	Department of Commerce
DoD	Department of Defense
DOE	Department of Energy
DOI	Department of the Interior
DOJ	Department of Justice
DOL	Department of Labor
DOT	Department of Transportation
EHR	Electronic Health Records
ELR	Electronic Laboratory Reporting
EPA	Environmental Protection Agency
FAVD	Food, Agriculture, and Veterinary Defense Division
FDA	Food and Drug Administration
GAO	Government Accountability Office
GOARN	Global Outbreak and Response Network
GSA	General Services Administration
HHS	Department of Health and Human Services
ICLN	Integrated Consortium of Laboratory Networks
MOU	Memorandum of Understanding
MOA	Memorandum of Agreement
NARMS	National Antimicrobial Resistance Monitoring System for Enteric Bacteria
NBIC	National Biosurveillance Integration Center
NCMI	National Center for Medical Intelligence
NSC	National Security Council
NTSIP	National Toxic Substances Incidents Program
ODNI	Office of the Director of National Intelligence

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OSTP	Office of Science and Technology Policy
SSA	Social Security Administration
State	Department of State
USDA	U.S. Department of Agriculture
USPS	United States Postal Service
VA	Department of Veterans Affairs

Introduction

Biological incidents, both man-made and naturally occurring, represent a significant threat to the national security of the United States. Identifying these crises begins with the detection and reporting of essential biological disease information, known as biosurveillance. In 2012, the first National Strategy for Biosurveillance was produced to respond to this threat. The Strategy's goal is "to achieve a well-integrated national biosurveillance enterprise that saves lives by providing *essential information* for better decisionmaking at all levels."¹ This report examines the Strategy, evaluates its implementation, and recommends policies for improving the national biosurveillance infrastructure.

This report asks: Is the current approach for the National Strategy for Biosurveillance (July 2012) conducive to meeting its desired endstate? If not, where does it need adjustment? It finds that the Strategy is ineffective in reaching its desired goal. At present, the Strategy does not have guidelines to provide complete situational awareness for decisionmakers in a timely fashion. Moreover, the Strategy's ambiguity inhibits cohesive implementation throughout the community. Given the current environment, this report targets data incorporation, relationships, and governance, offering recommendations to improve each area and to align the community with the Strategy's goal. This report first details its analytical framework and methodology. It then evaluates the National Strategy for Biosurveillance. Subsequently, it discusses the strengths and concerns in the biosurveillance system. Finally, the report provides its recommendations to address the areas of concern.

Framework

Scope

In order to address the research questions, this report constructed a framework including facts, assumptions, and research boundaries. The research group conducted its research applying four facts. First, private entities contribute a large portion of biosurveillance data. Second, the

¹ Executive Office of the President, The White House, *National Strategy for Biosurveillance*, (Washington, D.C., 2012), 1.

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findings of the 9/11 Commission that established NBIC is still in force.² Third, no single federal point of contact for biosurveillance exists. Fourth, the biosurveillance threat environment is complex and unstable while the reporting environment is simple and stable. The single assumption used is that the practice of scanning and discerning the environment does not fundamentally change during a bio-event.

For the purposes of this report, the biosurveillance community is defined as the individuals and agencies involved in biosurveillance. The biosurveillance infrastructure references the stovepipes through which these individuals and agencies work. Finally, the biosurveillance system is an overarching term including both the infrastructure and the community.

This research was limited by the definition of biosurveillance stated in the Strategy as, “the process of gathering, integrating, interpreting, and communicating essential information related to all-hazards threats or disease activity affecting human, animal, or plant health to achieve early detection and warning, contribute to overall situational awareness of the health aspects of an incident, and to enable better decisionmaking at all levels.”³ The research parameters were further bounded in four ways due to limited resources of time and expertise. First, the research targeted surveillance efforts, defined as the ongoing collection, analysis, and dissemination of pathogen-related data. Actions taken in response to these efforts are separate from biosurveillance and were not examined. Next, evaluation focused on federal biosurveillance infrastructure and its interaction with state, local, and tribal entities. International, state-to-state, local-to-state, and other non-federal biosurveillance interactions were outside the scope of this research question. Third, this report accepted the current fiscal environment and did not attempt to alter it. Finally, the efficacy of biosurveillance’s underlying components, including subject matter experts and technical surveillance systems, were not examined.

Methodology

This report followed a four-step research process to evaluate the Strategy and its implementation. First, researchers conducted a comprehensive literature review including academic reports, government documents, and organization theory. This established an

² “The Secretary shall establish, operate, and maintain a National Biosurveillance Integration Center (referred to in this section as the ‘NBIC’), which shall be headed by a Directing Officer, under an office or directorate of the Department that is in existence as of the date of the enactment of this section.” (Implementing Recommendations of the 9/11 Commission Report, Pub. L. No. 110—53, 121 Stat. 375-380, § 316 (2007).)

³ *National Strategy for Biosurveillance*, 2-3.

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understanding of the United States' current biosurveillance community and infrastructure. Through this process, the research team developed a biosurveillance organization chart, identifying key players, information flows, and integration centers.

Second, the literature review produced sources for an extensive interview campaign. The campaign targeted current and former biosurveillance stakeholders and subject matter experts. Over 50 interviews provided a nuanced picture of the state of the biosurveillance community. The process incorporated perspectives from academia, commercial interests, state and local officials, and senior executives at the federal level.⁴ This information was used to revise the biosurveillance organization chart. Many interviewees were very candid and provided useful information; however, some did not want to be cited by name given the current political environment. Consequently, several interviews are cited only on background.

Third, the four core functions within the Strategy were used to evaluate the information collected.⁵ Using this framework, the research team identified strengths and concerns within the biosurveillance community. These core functions guided the evaluation of the Strategy and influenced the recommendations for improving national biosurveillance efforts. During this process, the research team used an ends, ways, and means analysis to examine the Strategy's ways to determine if they were sufficient to meet its endstate. The means were a consistent variable based on the current budget. The Strategy's goal was evaluated as its endstate and was also a constant. Policy documents such as the Strategy generally outline the ways to reach the endstate; therefore, this research focused on analyzing the ways.

Finally, the research team identified key strengths and concerns and grouped them thematically under data, relationships, and governance. This led to the development of recommendations to address identified concerns within each category.

⁴ The following organizations declined to participate in the interview process: Congress, the Departments of Commerce, Veterans Affairs, State, Justice, Labor, and Transportation, the Office of Science and Technology Policy, the General Services Administration, the Food and Drug Administration, the Social Security Administration, the Office of the Director of National Intelligence, and the US Postal Service.

⁵ The four functions for national biosurveillance identified in the Strategy are scan and discern the environment, identify and integrate essential information, alert and inform decisionmakers, and forecast and advise impacts. (*National Strategy for Biosurveillance*, 5-6.)

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The Strategy clearly outlines a common definition for biosurveillance and a common goal, which creates the first cohesive framework for biosurveillance. While the Strategy provides a clear endstate and assumes constant means, it neglects to clarify or explain the ways necessary to achieve that endstate. The Strategy's ambiguity has not resolved inherent problems with data incorporation, weak relationships, and poor governance. These unresolved issues exacerbate existing stovepiping and prevent implementation of the Strategy's desired endstate. Although the corresponding Implementation Plan was produced in 2013, it has not been widely disseminated to the biosurveillance community and therefore remains ineffective in clarifying the ways to achieve the endstate.⁶

The Strategy focuses on four core functions that frame the main operations of effective biosurveillance. Ideally, to improve the system, the ways would target these four functions, yet the ways do not exist. The Strategy's call for integrating capabilities, building capacity, fostering innovation, and strengthening partnerships remain injunctions lacking a framework for evaluation. Additionally, the Strategy lacks a structure to identify challenges and to prioritize and allocate resources across the government. These weaknesses make effective implementation difficult.

Strengths and Concerns

Data Incorporation

The biosurveillance community analyzes massive amounts of data on a regular basis. Experts within agencies provide effective specialized analysis. An abundance of data streams exist; however, some data sources remain underutilized. The community faces many opportunities to expand data incorporation.

The current method of data collection and dissemination hinders biosurveillance integration, as agencies are unsure of their reporting responsibilities. Human and animal health programs are often unable to coordinate because the two data flows focus on different diseases,

⁶ *Implementation Plan National Strategy for Biosurveillance.*

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with limited interoperability between agencies.⁷ Without a dedicated analytical effort to bridge the two subjects, increased sharing may not yield better analysis. As an important method to bridge this gap, several biosurveillance stakeholders noted the importance of identifying and prioritizing pathogens of interest for all biosurveillance agencies.⁸ Furthermore, the lack of standards for both data verification and confidentiality concerns impedes sharing between agencies, even when interests otherwise align. Lastly, at the federal level, agencies struggle to effectively communicate their combined findings to policymakers. In sum, while data collection remains sufficient, dissemination and incorporation of that data into analyzed products for reporting remains problematic.

In the plant and animal community, fears regarding the lack of confidentiality measures impede sharing. Without existing standards for data protection, many individuals withhold information from the biosurveillance community due to the possible adverse economic impacts.⁹ For instance, farmers and ranchers may choose to withhold information about the health of their livestock due to concerns that the government will misuse the information or it will leak to the press.¹⁰ Potential consequences include drastic reactions, such as slaughtering livestock. These commercial concerns represent an area in need of improvement, particularly regarding plant and animal biosurveillance.

The lack of universal standards for confidentiality also impedes data incorporation in human surveillance. According to U.S. Department of Agriculture (USDA) and Department of Homeland Security (DHS) members, authorities and processes exist within DHS to protect personal information; however, the historical unwillingness to share hurts transparency and creates a cycle of distrust between stakeholders.¹¹ For example, the non-universal standards of electronic health records (EHRs) impede the flow of biosurveillance. If the biosurveillance community suggested creating a universal record, some stakeholders believe Congress would not permit its implementation because of possible violations to patient privacy.¹² The clash between

⁷ IOM (Institute of Medicine), 2012, *Information sharing and collaboration: Applications to integrated biosurveillance: Workshop summary*, (Washington, DC: The National Academies Press.), 14-15.

⁸ Department of Homeland Security, National Biosurveillance Integration Center, *National Biosurveillance Integration Center Strategic Plan*, (2012), 15.; Greg Koblentz, PhD. (George Mason University Biodefense Program), interviewed by Lodrick Williams.

⁹ Interview with federal government employee, February 25, 2014.

¹⁰ Marty Venier, PhD. (Emergency Response Coordinator, USDA), interviewed by Jose Paulino.; Mark Teachmann (Director of Interagency Coordination, USDA), interviewed by Lodrick Williams.

¹¹ Interview with former federal government employee, April 1, 2014.; Interview with federal government employee, February 26, 2014.

¹² Interview with former military officer, March 3, 2014.

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civil liberties and the misuse of information from the system result in the potential for abuse.¹³ Health information amassed from medical records via hospital visits and prescriptions lacks a standard to ensure anonymity and protection, decreasing its utility.

In order to use data effectively, stakeholders need expertise to interpret and verify information received. Analysts are reluctant to share information for fear that misinterpreted results will generate false reports.¹⁴ The lack of widespread expertise among policymakers represents another area for potential misinterpretation of information. Raw data requires subject matter experts for analysis; however, as information progresses through the decision chain, policy experts replace subject matter experts. As one public health specialist notes, politics at the executive level remain the largest impediment to communication lines. As information moves up the decision chain, it becomes too filtered and decisionmakers lose sight of the implications of the information they receive.¹⁵ Decisionmakers lack both a familiarity with the technical analysis and established procedures for receiving information.¹⁶ These communication difficulties between the experts and the policy makers inhibit data integration and effective reporting.

Relationships

Relationships amongst some biosurveillance stakeholders function well and continue to show promise in key areas. Though the wider biosurveillance community struggles with communicating and integrating data, specific established partnerships integrate information and produce high-quality analyzed products for dissemination outside their agency. However, agencies do not participate in these partnership activities at sufficient levels to overcome stovepiping. With respect to human health, the Center for Disease Control (CDC) established a strong relationship with the Department of Defense (DoD) through liaison programs and interagency working groups.¹⁷ Similarly, the USDA and the Food and Drug Administration (FDA) coordinate on animal health and food supply issues.¹⁸ Across the community, biosurveillance agencies developed necessary infrastructure and expertise to receive data from their state and local partners. Some stakeholders criticize these agencies for their high degree of

¹³ Michael Cohen, M.D. (Head of Brazos Valley Pathology), interviewed by Rebekah Redden.; Kim Dubose (Microbiology lab director at Brazos Valley Pathology), interviewed by Rebekah Redden.

¹⁴ Mark Teachmann (Director of Interagency Coordination, USDA), interviewed by Lodrick Williams.

¹⁵ Interview with public health specialist, March 5, 2014.

¹⁶ *Information Sharing and Collaboration*. 21.

¹⁷ Interview with military officer, March 7, 2014.

¹⁸ Interview with federal government employee, March 6, 2014.

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specialization and inability to communicate with other disciplines; however, the expertise contributes to effective analysis within the agencies.¹⁹

Lack of trust between agencies inhibits the functioning of formal relationships and the forming of informal ones. One manifestation of distrust revolves around the lack of a mandate to share information. Absent formal sharing agreements, transferring data depends on trust and relationships, which have been historically insufficient. Many agencies distrust the National Biosurveillance Integration Center (NBIC), within DHS, which is designed to function as the country's integration hub.²⁰ They feel that NBIC has not functioned as the intended integration hub. NBIC shares some information across agencies and coordinates reasonably well with some partners, but the value added from NBIC is not clear.²¹ Consequently, agencies resist sharing data with DHS, not trusting it to use their information effectively.

With each agency assessed on whether it completes its mission, there exists little incentive to help another agency with its analysis. Agency culture contributes to a pervasive lack of trust and sharing within the biosurveillance community. As one public health specialist declares, "When sharing data is not on the checklist an organization is graded on, then an organization will not do it."²² Additionally, agencies use different levels of confirmation for analyzed data.²³ Operating with unverified data diminishes the utility of sharing and lessens trust in data received from other agencies. Also, agencies maintain a large degree of pride over internal products.²⁴ Job evaluations and promotions remain based on internal products and performance, not on successful communication among agencies. This leads to an absence of reliable communication channels, as neither rules nor authority compel people to share. To combat this problem, some stakeholders advocate creating more informal channels of communication.²⁵

¹⁹ Interview with federal government employee, March 26, 2014.

²⁰ Recommendations of the 9/11 Commission Report, Pub. L. No. 110—53, 121 Stat. 375-380, § 316 (2007).

²¹ Interview with public health specialist, March 5, 2014.; Interview with senior federal government official, March 20, 2014.

²² Interview with public health specialist, March 3, 2014.

²³ Interview with senior federal government official, February 28, 2014.

²⁴ Interview with senior federal government official, March 20, 2014.

²⁵ Ibid.

Governance and Leadership

Federal biosurveillance agencies communicate effectively with their state and local counterparts and operate several successful interagency groups. Where well-established vertical flows of information and authority exist, individuals and agencies generally meet their responsibilities. State and local authorities collect most biosurveillance data, which becomes integrated at the federal level. Vertical lines of communication between states and the federal government operate well within stovepipes.²⁶ For example, state health departments provide the bulk of human health data, communicating raw data and analyzed information up the chain of command because of well-established relations with the CDC.²⁷ The Integrated Consortium of Laboratory Networks (ICLN), a collection of public health laboratories at the local, state, and federal level, successfully organizes laboratories with different areas of expertise to participate in biosurveillance efforts. It operates under a well-delineated set of responsibilities and communication protocols.²⁸ Other laboratory networks such as those contributing to the ICLN have similar success at integrating human and animal biosurveillance data due to a strong chain of command and good governance.²⁹

As alluded to previously, the most common criticism leveled at the federal biosurveillance system is also the most general: agencies fail to communicate with each other. Each agency works within its own area of expertise without contributing to general situational awareness. The biosurveillance infrastructure's decentralized structure and lack of a strong overall leader lead to ambiguity in responsibilities.³⁰ Integration centers demonstrate these difficulties. Biosurveillance coordination efforts operating through integration centers yield mixed results since their implementation. In 2007, Congress mandated the creation of NBIC with the mission to aggregate data from the biosurveillance community and to serve as a central analysis hub.³¹ Since its inception NBIC struggled to fulfill its role as an integration center due to personnel issues, resource constraints, and interagency politics.³² Recently, NBIC has established

²⁶ Kim Dubose (Microbiology lab director at Brazos Valley Pathology), interviewed by Rebekah Redden.

²⁷ Interview with public health specialist, March 6, 2014.

²⁸ Interview with military officer, March 14, 2014.; Greg Koblentz, PhD. (George Mason University Biodefense Program), interviewed by Lodrick Williams.; ICLN Portal. <https://www.icln.org/>; Scott Becker, PhD. (Executive Director of the Association of Public Health Labs), interviewed by Alex Bitter.

²⁹ Interview with federal government employee, March 10, 2014.

³⁰ Interview with biosurveillance expert, March 7, 2014.

³¹ Implementing Recommendations of the 9/11 Commission Report, § 316 (2007).

³² United States Government Accountability Office, *Efforts to Develop a National Biosurveillance Strategy Need a National Strategy and a Designated Leader*, by William Jenkins, GAO-10-645 (Washington D.C.: United States Government Printing Office, 2010), 27.

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clearer lines of communication between it and its partner agencies as it reconfigures its mission, yet there remains room for improvement.³³

NBIC did not attract analysts from its partner agencies, preventing it from serving as a forum for subject matter experts from across the community. As originally intended, it would be able to tap into structured but unanalyzed data received from its partners in order to formulate an independent biosurveillance assessment.³⁴ Due to NBIC's limited budget and its liaison analysts serving at the pleasure of their departments, the Center lacks sufficient subject matter experts. Furthermore, its partners consistently supply NBIC with their final reports, rather than the raw data that NBIC analysts need to formulate their own analyses. As a result, NBIC reports have not been timely, hindering its ability to serve as intended.³⁵ Consequently, agencies remain confused about the utility of NBIC's products.³⁶ With its expansive mission NBIC cannot make the investments necessary to carry out its mission.³⁷ Government employees associated with NBIC indicate that Congress should reexamine NBIC's mission to determine if it is being adequately supported.³⁸ Furthermore, NBIC has also failed to integrate information from a number of preexisting integration centers.³⁹ As indicated in the organization chart in Appendix 2, none of the biosurveillance interagency integration centers link to NBIC.

To function as intended and receive data for its analysis, NBIC needs trust from its partners. Several government officials think that NBIC became operational too quickly, not allowing them the time to build the trust and the connections needed for effective operation.⁴⁰ As a result, NBIC became unable to attract staff for liaison programs even when it possessed the means to support them.⁴¹ Furthermore, its initial approach of demanding both data flows and support from its partners with tenuous legal backing discouraged cooperation.⁴² This situation decreased its capabilities, and NBIC attracted bureaucratic enemies from competition for limited

³³ Interview with senior federal government official, March 27, 2014.

³⁴ *Information Sharing and Collaboration*, 50.

³⁵ *Ibid.*, 59.

³⁶ United States Government Accountability Office, *Developing a Collaboration Strategy is Essential to Fostering Interagency Data and Resource Sharing*, by Williams Jenkins, GAO-10-171 (Washington, D.C.: United States Government Printing Office, 2009), 21-22.

³⁷ Interview with federal government employee, March 10, 2014.

³⁸ Interview with senior federal government official, March 27, 2014.

³⁹ United States Government Accountability Office, *An Overall Strategy is Needed to Strengthen Disease Surveillance in Livestock and Poultry*, by Daniel Garcia-Diaz, GAO 13-424 (Washington, D.C.: United States Government Printing Office, 2013), 23-24.

⁴⁰ Mark Teachmann (Director of Interagency Coordination, USDA), interviewed by Lodrick Williams.

⁴¹ *Developing a Collaboration Strategy is Essential to Fostering Interagency Data and Resource Sharing*, 22.

⁴² *Information Sharing and Collaboration*. 28-29.

resources.⁴³ NBIC recently made significant inroads with its partners, signing a formal charter delineating roles and responsibilities. However, it still has difficulty securing the memorandums of understanding (MOUs) or policy agreements needed for specific information sharing agreements among agencies.⁴⁴

In conclusion, the federal community fails to effectively identify, analyze, and communicate biosurveillance information despite adequate support from state and local partners. Until the interagency flow of data is improved by repairing relations and enacting a better system of governance, the biosurveillance community will not fulfill the goals laid out in the Strategy.

Recommendations

Improving Biosurveillance Data Incorporation

Although in recent years interoperability of human health records among medical entities has improved, more can be done to facilitate the flow of this information to the biosurveillance community. Additionally, there are insufficient safeguards for plant and animal-related data shared with the biosurveillance community. Together these two concerns lead to incomplete situational awareness.

Recommendation: Standardize Human Health Records

To improve the acquisition of human health data to the biosurveillance community, all EHRs should be standardized. Standardization should adhere to current privacy requirements, reassuring healthcare providers their patients' privacy is maintained. The same standards should be used for public and private health entities. A working group should be established by the Department of Health and Human Services (HHS) to develop and implement standardized EHRs.

Current legislation remains inadequate to create interoperable medical records between clinical healthcare and governmental agencies. Legislation such as the Health Information Technology for Economic and Clinical Health (HITECH) Act and the Electronic Health Record Incentive Program offer monetary incentives to hospitals and health professionals to transition to EHRs. Congress mandated the development of the "meaningful use" of interoperable EHR

⁴³ Greg Koblentz, PhD. (George Mason University Biodefense Program), interviewed by Lodrick Williams.

⁴⁴ Interview with senior federal government official, March 27, 2014.; *National Biosurveillance Integration Center Strategic Plan*, 46-47.

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technology.⁴⁵ However, this legislation focuses on information sharing within public health, not sharing between clinical healthcare and public health.⁴⁶ Therefore, the meaningful use and incentive programs legislation should be expanded to mandate EHRs and electronic laboratory reporting (ELR) become interoperable with each other as well as with government software. Specifically, state health departments should be added to EHR incentive programs. This would increase the flow of data between clinical healthcare and public health.

Obstacles exist to introducing new reporting systems into biosurveillance data streams. Thus, to resolve interoperability issues, it would be best to expand the scope of existing systems.⁴⁷ For example, healthcare facilities already report patient data to insurance companies for reimbursement. This data is required to be more detailed and expansive than requirements from state health departments. The biosurveillance community has yet to take advantage of this novel data stream. By using the existing insurance coding system, the amount of healthcare data collected could be expanded without increasing the administration costs of healthcare. Therefore, the biosurveillance community could increase the volume of its aggregate medical data to an extent previously unobtainable.⁴⁸ An agreement should be created between insurance companies and federal biosurveillance consumers that ensures patient anonymity and the fast transmission of this data.

Recommendation: Protect Plant, Animal, and Environment-Related Commercial Interests

At present, the amount of data collected from commercial contributors, such as farmers, ranchers, and environmental observers, needs to increase. Thus, legislation should be drafted with coordination from the USDA and the Environmental Protection Agency (EPA) to protect the anonymity of commercial contributors' data. This legislation would prevent a particular farm, ranch, or location from being identified by the contributed information, even if the shared data were leaked or prematurely released to the public. Contributors will be more inclined to report potential diseases if they are assured it will not negatively impact their commercial interests.

⁴⁵ Department of Health and Human Services, Centers for Medicare & Medicaid Services, *Medicare and Medicaid Programs: Electronic Health Record Incentive Programs: Final Rule*, 42 CFR Parts 412, 413, 422 et al. (Washington, D.C.: Federal Register, 2010), 2-4.

⁴⁶ Interview with public health specialist, March 6, 2014.

⁴⁷ Interview with senior federal government official, March 20, 2014.

⁴⁸ Interview with military officer, March 3, 2014.

Improving the Biosurveillance System

The task of biosurveillance can be broken down into two main components: a data collection and analysis element and an administrative reporting element. Classical organization theory advocates a centralized, vertical, bureaucratic, and rigid system to tackle simple and predictable environments such as the bureaucratic world of biosurveillance reporting. Conversely, neoclassical organization theory recommends a decentralized, flat, and flexible system to address unpredictable, complex environments such as the biosurveillance collection and analysis environment.⁴⁹

At present, the biosurveillance community is dominated by multiple highly specialized stovepipes across the federal government, all of which individually report to decisionmakers at the senior executive level. The problem with this stovepiped structure is twofold.

First, the vertical stovepipes are highly parochial and poor at the interagency coordination and communication necessary to respond to the highly unpredictable data collection and analysis environment. In light of the complex and unstable biosurveillance collection and analysis environment, the U.S. government should promote an organizational structure with a flat, networked structure and a high degree of horizontal coordination at the federal operating level.⁵⁰ The flexibility of this organic organizational structure enables it to effectively handle the complex and unpredictable biosurveillance collection and analysis environment.

Second, the lack of centralization at the agency executive level within the predictable administrative environment results in incomplete situational awareness.⁵¹ This failure to speak with one voice inhibits the development of coherent situational awareness at the senior executive level. Instead, classical organization theory's hierarchical structure recommends consolidating these reporting streams into one voice. This voice provides clarity through a single, comprehensive situational awareness for decisionmakers.

In essence, the structure of the biosurveillance system is ill-fitted to the environments of both its data collection and analysis and its administrative reporting components. It is currently highly fragmented in reporting and heavily vertical in collection and analysis. Thus, the following recommendations create a federal biosurveillance system that is horizontally

⁴⁹ See Appendix 3 for more information on organization theory.

⁵⁰ A network is an arrangement of vertically and horizontally connected organizations sharing the same mission. The federal operating level is defined as the collectors, analysts, and mid-level employees at the federal level.

⁵¹ See Appendix 2 for an interagency biosurveillance organization chart. Each of the cabinet level agencies represents a separate point of contact to the White House regarding biosurveillance.

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networked at the data collection and analysis level and unified at the administrative reporting level. This configuration would match the structure of the biosurveillance system with its environment, maximizing its effectiveness.

Strengthening Relationships

The biosurveillance community suffers from weak organizational relationships between stovepipes. These weak relationships result in a lack of interagency trust, which inhibits information sharing. The development of effective exercises and the formalization of ad hoc working groups will strengthen these weak relationships.

Recommendation: Develop Exercises Emphasizing the Role of Biosurveillance

Improved coordination and informal relationships would increase the biosurveillance community's effectiveness. Exercises can play a strong role in building capabilities and organizational relations, improving confidence within the biosurveillance community. At present, exercises generally lack a clear purpose or a focus specifically on biosurveillance.⁵² As a consequence, exercises become missed opportunities for building relations and capabilities. The biosurveillance community should increase the frequency of exercises and design them with a clear focus. A single agency, preferably under DHS, should develop and execute the exercises in order to identify and correct weaknesses.

Exercises can also reveal flaws in the biosurveillance system. Exercises should include participants from across the biosurveillance system, allowing for observation of interagency dynamics. Difficulties in coordination should be noted and corrected. Exercises should target particular problems and emphasize particular skills or concepts.

Of special interest would be exercising the concept of network-centric operations within the context of biosurveillance, building flexibility and effectiveness into the biosurveillance system.⁵³ The concept of network-centric biosurveillance recognizes that agencies making up the federal biosurveillance system have complementary strengths and seeks to effectively coordinate

⁵² Interview with senior federal government official, April 2, 2014.

⁵³ Network-centric biosurveillance borrows from the military's concept of network-centric warfare, which creates a networked force in order to leverage the strengths of different units, improve information sharing, and build shared situational awareness. The result was increased speed and lethality of U.S. forces, despite geographic dispersion. For more information on the concept, refer to the *Implementation of Network-Centric Warfare*. (Department of Defense, Office of Force Transformation, *The Implementation of Network-Centric Warfare*, (Washington D.C., 2005).)

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their activities. These exercises would promote a networked operational structure which would facilitate information sharing and effective interagency coordination. This operational concept could greatly enhance the effectiveness of federal biosurveillance.

Exercises effectively build informal ties that strengthen biosurveillance.⁵⁴ Firsthand observation of the effectiveness of other agencies builds organizational trust currently lacking in the system. This is especially important for NBIC, perceived by its peers as failing to add value in previous exercises.⁵⁵ One of the first exercises should demonstrate NBIC's value and capabilities to its partner agencies. This increased organizational trust will improve coordination and information sharing across the biosurveillance community.

Recommendation: Formalize Ad Hoc Groups

Another method of strengthening relationships within the biosurveillance community as a whole is to formalize informal relationships. The biosurveillance community currently uses several ad hoc working groups to coordinate policy. These groups have made a limited impact in addressing the problem of stovepiping; their informal and temporary nature creates doubt about their influence.⁵⁶ Formalization could be accomplished by writing new policy documents or MOUs/MOAs. The Biosurveillance Indications and Warning Analytics Community (BIWAC) is the closest to this model. It began as an ad hoc working group and, although still informal, it has written a charter and other governing documents.⁵⁷ This is a step towards formalization. BIWAC's generally accepted success is a testament to benefits of this recommendation.⁵⁸ By locking in effective working groups, formalization decreases ambiguity and enhances capabilities.

⁵⁴ Andrew Card (former White House Chief of Staff), interviewed by Thomas Vien.

⁵⁵ Government Accountability Office, Homeland Security and Justice, *Developing a Collaboration Strategy is Essential to Fostering Interagency Data and Resource Sharing*, by William O. Jenkins Jr., GAO-10-171 (Washington D.C., 2009), 21.

⁵⁶ Interview with federal government employee, March 10, 2014.; Interview with senior federal government official, March 20, 2014.

⁵⁷ "Operational Biosurveillance: A Brief History of the Discipline," *Operational Biosurveillance*, April 8, 2010, accessed March, 17 2014, <http://biosurveillance.typepad.com/biosurveillance/2010/04/when-the-cdc-epidemic-intelligence-service-eis-was-created-in-reaction-to-concern-about-biological-threats-during-the-korea.html>.; Interview with senior federal government official, April 2, 2014.

⁵⁸ "Operational Biosurveillance: A Brief History of the Discipline.;" Interview with federal government employee, March 7, 2014.

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Improving Governance

At present, the federal biosurveillance system is distributed across several organizational stovepipes which do not communicate to decisionmakers with one voice. A consistent criticism is that the absence of leadership in the biosurveillance community leaves it rudderless. There are three recommendations to improve governance: create a lead integration center, create a unified policy advocate, and create a single point of contact to communicate to the senior executive level. NBIC is best equipped to serve as the lead integration center and BIWAC to serve as the interagency policy advocate. The biosurveillance community would benefit from an executive liaison serving as the single entity streamlining information from the integration center and policy center up to the White House.

Recommendation: Empower NBIC

The biosurveillance community needs to develop a network structure to maintain unified situational awareness. Therefore, NBIC should transition from its current analysis role to a coordinating role for its partner agencies. NBIC will add more value as an active coordinator of its partners, enabling and facilitating networked operation. The community confronts an unpredictable data collection and analysis environment with a diverse set of skills. If these strengths are properly coordinated across the community, the community will become far more than the sum of its parts. NBIC will enable networked operation by connecting its partners. These connections will also assist NBIC in providing unified situational awareness for the biosurveillance community. To facilitate this task, NBIC should maintain a comprehensive map of the entire U.S. biosurveillance community.

This modified role must be clarified in official documents and publicized. A consistent criticism of NBIC by its partners is the ambiguity of its role.⁵⁹ A good starting point would be to advertise its role as the preeminent integration center on the NBIC website. This information should also be communicated directly through memos to its partners.

Recommendation: Transform BIWAC

The biosurveillance community must build consensus and speak with a unified policy voice. Throughout the interviews, calls for a biosurveillance policy leader ranged from the

⁵⁹ *Developing a Collaboration Strategy is Essential to Fostering Interagency Data and Resource Sharing*, 22-25.

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Government Accountability Office (GAO) to HHS to DoD.⁶⁰ Additionally, the interviews often cited BIWAC as an example of a successful interagency biosurveillance organization.⁶¹ Out of the existing biosurveillance infrastructure, BIWAC has the greatest potential to succeed as a unified interagency policy voice for the community.

According to the *National Biosurveillance Science and Technology Roadmap*, “the BIWAC is a self-organized, information biosurveillance information sharing group with participants from multiple U.S. government organizations. The BIWAC shares biosurveillance data via unsophisticated web interfaces and has focused on interagency collaboration and relationship building.”⁶² It also participates in analyst-to-analyst information sharing, along with verification and validation of information through its portal, Wildfire, hosted by DoD. Although it is operationally focused its members also discuss policy.⁶³ BIWAC partners include the intelligence community, USDA, DoD, HHS, Department of State (State), and DHS through NBIC.⁶⁴ Membership has expanded through the unanimous agreement of the group and relationships based on strong trust between each BIWAC member. Unlike other biosurveillance interagency groups, BIWAC is not located under any single agency. This greatly contributes to its success because it has the freedom to choose its work and does not have the usual tasking obligations of a formal agency. It does, however, receive minimal general funding from NBIC and funding from the DoD’s National Center for Medical Intelligence (NCMI) for Wildfire.⁶⁵

BIWAC’s unique organizational characteristics and accepted success lends it to being transformed into an interagency policy advisory panel for the biosurveillance community. It is important for every biosurveillance entity and interest to be represented in the policy advisory panel to ensure buy-in. Human, animal, and environmental interests must be present in addition to man-made and naturally occurring diseases.⁶⁶ BIWAC meets this requirement through its varied member agencies, especially NBIC. Additionally, a transformed BIWAC making unified policy recommendations with the support of the community fulfills this requirement. BIWAC is

⁶⁰ Interview with federal government employee, March 7, 2014.; Interview with senior federal government official, March 20, 2014.; Interview with public health specialist, March 3, 2014.

⁶¹ Interview with federal government employee, March 7, 2014.

⁶² Executive Office of the President, National Science and Technology Council, *National Biosurveillance Science and Technology Roadmap*, Washington, D.C., 2013.

⁶³ Wildfire is run by the National Center for Medical Intelligence, a BIWAC member. It serves as a message board for BIWAC members to share unclassified biosurveillance information. (Ibid.)

⁶⁴ *Efforts to Develop a National Biosurveillance Capability Need a National Strategy and a Designated Leader*, 81.

⁶⁵ Interview with senior federal government official, April 2, 2014.

⁶⁶ Mark Teachmann (Director of Interagency Coordination, USDA), interviewed by Lodrick Williams.

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diverse and non-hierarchical, allowing it to effectively build consensus across stovepipes while speaking with one voice. The ideal policy advisory board should target the most stovepiped area, the federal operating level. As a group of deputies and mid-management analysts, BIWAC has a great chance at combatting stovepiping. BIWAC already has a positive reputation in the biosurveillance community and would have a stronger foundation for policy recommendations than a newly created entity or a completely redirected existing agency.

Transforming BIWAC would result in several logistical challenges, but where possible an effort should be made not to disrupt its current successful structure. Currently BIWAC is not mandated through the legislative or executive branches. While BIWAC is currently informal, it has written a charter, strategy, and business plan.⁶⁷ It should be formalized through a mandate and recognized as the policy advisory panel by all entities in the biosurveillance community. Much of BIWAC's success is attributable to not being located under a single federal agency and should therefore remain this way. Although its policy recommendations would be expressed through the executive liaison, the liaison will not circumscribe BIWAC's independence. Since BIWAC's success is also attributed to its strong foundation of trust between members, new members should be added as the current members see fit while maintaining universal trust. Additionally, although it initially met three times a year, BIWAC currently meets biannually due to resource constraints.⁶⁸ While acknowledging these constraints, the transformed BIWAC should meet at least quarterly to conduct timely analyses of current policies and issues and to maintain relationships. The current BIWAC does not produce official products. Instead, members relay its findings to their agencies. As a formal entity, BIWAC would be more public through means such as a website. It would also need to release its policy recommendations for consideration by its federal, state, and local partners. BIWAC's mission as a predominantly policy-focused group would not alter its successful internal structure; its area for impact would just be expanded.

BIWAC's first policy recommendation should address calls for a universal prioritized list of pathogens that the entire biosurveillance community needs to report to decisionmakers. This list will provide additional insight on how the Nation prioritizes different biosurveillance

⁶⁷ Interview with senior federal government official, April 2, 2014.

⁶⁸ Ibid.

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concerns, thus indicating to the agencies where to focus and potentially redirect resources.⁶⁹ There are several different ways to prioritize the list, for example: where the greatest impact can be made without major cash flows,⁷⁰ what are the most credible threats along with their probabilities,⁷¹ or where the greatest gaps are in the current system.⁷² Additionally, clearly prioritizing concerns will decrease the likelihood of overlap or duplicating efforts.⁷³ Some agencies, such as DoD and HHS, develop their own lists of individual concerns.⁷⁴ This proposed universal list should not replace, but augment the agency-specific lists. Since this list will indicate how to focus and direct resources, it should be located in the Implementation Plans that accompany subsequent National Strategies for Biosurveillance. BIWAC should regularly reevaluate the universal prioritized list and recommend potential changes. This universal prioritized list will help clarify and direct agencies to focus their efforts accordingly.

Recommendation: Establish an Executive Liaison for Biosurveillance

The biosurveillance community needs to transmit a clear and cohesive message to decisionmakers. An executive liaison for the biosurveillance community would serve as the principal conduit between the White House and the biosurveillance community. The liaison will receive information from the integration center, NBIC, and the policy advisory center, BIWAC. The creation of this position elevates the status of NBIC by the liaison exclusively communicating with NBIC for complete situational awareness. BIWAC's profile will also increase by producing policy recommendations for the liaison. The liaison would be a permanent member of the National Security Council (NSC) Staff and the official title would be Special Assistant to the President and Senior Director of Biosurveillance.⁷⁵ This position would not have any authority to task the biosurveillance community, but instead transmit the information produced by the community.

⁶⁹ Interview with former military officer, March 3, 2014.; John Wade (Vice President and General Manager, Life Sciences Research Business Unit), interviewed by Thomas Vien.

⁷⁰ Interview with public health specialist, March 3, 2014.

⁷¹ Interview with former military officer, March 3, 2014.; John Wade (Vice President and General Manager, Life Sciences Research Business Unit), interviewed by Thomas Vien.

⁷² Interview with military officer, March 7, 2014.

⁷³ Interview with federal government employees, March 10, 2014.; Interview with former military officer, March 3, 2014.; John Wade (Vice President and General Manager, Life Sciences Research Business Unit), interviewed by Thomas Vien.

⁷⁴ Interview with biosurveillance expert, March 7, 2014.

⁷⁵ This would be similar to the Special Assistant to the President for Biodefense proposed in H.R. 4034 by the House of Representatives. (WMD Prevention and Preparedness Act of 2014, H.R. 4034, 113th Cong., § 101, 103 (2014).)

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As an example of how this report envisions the implementation of these recommendations, consider the case of a West Nile incident. Both the animal and human biosurveillance collectors would identify the ongoing outbreak. They would communicate information up their respective stovepipes and to the appropriate interagency hubs, in particular NBIC. NBIC would then communicate the information about the outbreak to the executive liaison. Once the executive liaison has complete situational awareness from NBIC, it will provide the information to decisionmakers at the senior executive level to determine the appropriate response and the corresponding lead agency. Following the event, BIWAC would review all actions taken and provide the liaison with appropriate policy recommendations.

Conclusion

At present, there is no unified situational awareness available to decisionmakers due to difficulties in collecting data from stakeholders and communicating analyses between agencies. Current integration efforts have been insufficient. The system needs to be reorganized to fulfill the Strategy's goal of providing a timely warning to save lives. This research identified concerns regarding data collection, relationships, and the governance of the biosurveillance community. The biosurveillance system has continually improved since its inception; however, until the recommendations enclosed in this report are addressed, decisionmakers will be unable to make fully informed decisions regarding biological incidents.

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Appendix 1: Definitions

- **Advise:** To offer suggestions about the best course of current or future action using forecasts.
- **Alert:** To make aware or transmit a warning of a possible danger.
- **Biosurveillance Community:** The individuals and agencies involved in biosurveillance.
- **Biosurveillance Infrastructure:** The stovepipes through which collectors and analysts work.
- **Biosurveillance System:** Overarching term that includes both the biosurveillance community and the biosurveillance infrastructure.
- **Discern:** To distinguish the existence of a threat that requires further identification by analyzing the quality, quantity, and geographical spread of scanned data.
- **Federal Operating Level:** The collectors, analysts, and mid-level employees at the federal level.
- **Forecast:** To predict or estimate current or future incidents using indicators, models, and expertise.
- **Identify:** To determine which information and data streams will be used to formulate analyses.
- **Integrate:** To share relevant data and analyzed information within and between agencies.
- **Inform:** To impart awareness of facts or knowledge about a situation.
- **Network:** An arrangement of vertically and horizontally connected organizations sharing the same mission.
- **Scan:** To actively and purposefully gather data across geographic and subject matter areas.

Appendix 3: Organization Theory

Basic structural organization theory informed relationship and governance recommendations in this report. Structural theories can be broken into two schools: classical and neoclassical. These theories were combined with an analysis of environment complexity and stability to determine the most effective organizational structure for the biosurveillance system.

Classical organization theory emphasizes top-down, mechanistic structures. Mechanistic organizational structures are centralized and have rigid vertical hierarchies. They have highly specialized parts performing smaller tasks that are abstracted from the overall goal (such as assembly line workers who tighten bolts on a car). Coordination in classical mechanistic systems is accomplished through standardization and direct supervision, and communication follows vertical lines. Mechanistic structures are best at performing simple, routine tasks in a reliable manner and in a predictable environment.⁷⁶

Neoclassical organization theory stresses bottom-up, organic structures. Organic structures' decentralization and networked structure lack rigid hierarchies. When tackling problems, components of the network become "ad hoc centers of control authority and communication" based on particular expertise in addressing the issue at hand, while other components play supporting roles. Organizations in the network coordinate informally and communicate horizontally. Organic systems excel at the innovation needed for sophisticated tasks.⁷⁷

Classical mechanistic structure and neoclassical organic structure represent two extremes on a spectrum of organizational configurations. Most organizations lie somewhere in the middle. The level of uncertainty in an organization's environment determines an organization's optimum configuration. Recommendations of this report used the 2x2 framework in Figure 1 to assess environmental uncertainty along two dimensions: the simple-complex dimension and the stable-unstable dimension. The simple-complex dimension refers to the number and dissimilarity of external factors in the environment.⁷⁸ The stable-unstable dimension refers to the volatility or

⁷⁶ Burns, Tom, and G.M. Stalker, "Mechanistic and Organic Systems," in *Classics of Organization Theory*, ed. J. Steven Ott Jay M. Shafritz, Yong Suk Jang (Wadsworth Cengage Learning, 2011), 201.

⁷⁷ Ibid.

⁷⁸ Daft, Richard L., *Organization Theory and Design*, 10th ed.: South-Western Cengage Learning, 2008, 147-148.

predictability of the environment.⁷⁹ Figure 1 provides a comprehensive description of the types of environments.

Figure 1. Environmental Uncertainty

Environmental Change	<i>Stable</i>	<p>Simple + Stable = Low Uncertainty</p> <ol style="list-style-type: none"> 1. Small number of external elements and elements are similar 2. Elements remain the same or change slow 	<p>Complex + Stable = Low-moderate Uncertainty</p> <ol style="list-style-type: none"> 1. Large number of external elements and elements are dissimilar 2. Elements remain the same or change slowly
	<i>Unstable</i>	<p>Simple + Unstable = High-moderate Uncertainty</p> <ol style="list-style-type: none"> 1. Small number of external elements and elements are similar 2. Elements change frequently and unpredictably 	<p>Complex + Unstable = High Uncertainty</p> <ol style="list-style-type: none"> 1. Large number of external elements and elements are dissimilar 2. Elements change frequently and unpredictably
		<i>Simple</i>	<i>Complex</i>
Environmental Complexity			

Based on this framework, the researchers found that biosurveillance data collection and analysis operates in a complex, unstable environment (bottom-right quadrant). On the other hand, the administrative reporting component takes place in a simple, stable environment (top-left quadrant). Figure 2 prescribes the organizational structures best fitted to each environment:

⁷⁹ Ibid, 147-148.

Figure 2. Structural Prescriptions

Environmental Change	<i>Stable</i>	<p>Low Uncertainty</p> <ol style="list-style-type: none"> 1. Mechanistic structure: formal, centralized 2. Few departments 3. No integrating roles 4. Current operations orientation; low-speed response 	<p>Low-moderate Uncertainty</p> <ol style="list-style-type: none"> 1. Mechanistic structure: formal, centralized 2. Many departments, some boundary spanning 3. Few integrating roles 4. Some planning; moderate-speed response
	<i>Unstable</i>	<p>High-moderate Uncertainty</p> <ol style="list-style-type: none"> 1. Organic structure, teamwork: participative, decentralized 2. Few departments, much boundary spanning 3. Few integrating roles 4. Planning orientation; fast response 	<p>High Uncertainty</p> <ol style="list-style-type: none"> 1. Organic structure, teamwork: participative, decentralized 2. Many departments differentiated, extensive boundary spanning 3. Many integrating roles 4. Extensive planning, forecasting; high-speed response
		<i>Simple</i>	<i>Complex</i>
Environmental Complexity			

Based on Figure 2, the complex and unstable environment of biosurveillance data collection and analysis demands the flexibility of a neoclassical structure at the federal operating level (bottom-right quadrant). This environment should have a networked, decentralized structure with many integrating roles. Conversely, the simple and stable administrative reporting environment implies that the biosurveillance reporting structure would benefit from a simple and centralized structure (top-left quadrant). This simple, centralized structure would be able to report clearly and reliably.

Information Memorandum

Biological incidents, both man-made and naturally occurring, represent a significant threat to the national security of the United States. Identifying these crises begins with the detection and reporting of essential biological disease information, known as biosurveillance. As the first of its kind, the 2012 National Strategy for Biosurveillance's goal is "to achieve a well-integrated national biosurveillance enterprise that saves lives by providing *essential information* for better decisionmaking at all levels."⁸⁰ This report asks: Is the current approach for the National Strategy for Biosurveillance conducive to meeting its desired endstate? If not, where does it need adjustment? To answer these questions, this report examined the Strategy, evaluated its implementation, and recommended policies for improving the national biosurveillance infrastructure.

At present, the Strategy does not have guidelines to provide complete situational awareness for decisionmakers in a timely fashion. Moreover, the Strategy's ambiguity inhibits cohesive implementation throughout the community. Given the current environment, this report targets concerns relating to data incorporation, relationships, and governance.

To improve the current biosurveillance infrastructure, this report presents recommendations for the identified concerns. Addressing the data incorporation concern, the acquisition of human health data to the biosurveillance community should be expanded by standardizing all electronic health records. Consequently, the Department of Health and Human Services (HHS) should establish a working group to standardize private and public human health records, reflecting current privacy requirements. Additionally, animal and plant contributors are hesitant to report data, fearing negative economic effects if the shared data were leaked or prematurely released to the public. Therefore, the U.S. Department of Agriculture (USDA) and the Environmental Protection Agency (EPA) need legislation protecting commercial contributors' anonymity to assuage confidentiality concerns.

Organization theory framed the recommendations addressing the relationships and governance concerns. At present, the biosurveillance community is dominated by multiple highly specialized stovepipes across the federal government, all of which individually report to

⁸⁰ Executive Office of the President, The White House, *National Strategy for Biosurveillance*, (Washington, D.C., 2012), 1.

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decisionmakers at the senior executive level. The problem with this stovepiped structure is twofold. First, the vertical stovepipes are highly parochial and poor at the interagency coordination and communication necessary to respond to the highly unpredictable data collection and analysis environment. This demands the flexibility of a neoclassical structure at the federal operating level.⁸¹ This environment should have a networked, decentralized structure with many integrating roles. Second, the lack of centralization at the agency executive level within the predictable administrative environment results in incomplete situational awareness.⁸² This implies that the biosurveillance reporting structure would benefit from a simple and centralized structure. This simple, centralized structure would be able to report clearly and reliably.

The lack of interagency communication resulting from weak relationships hinders effective biosurveillance. Increased exercises with a clear focus would build capabilities and organizational relations, improving confidence within the biosurveillance community. DHS would likely lead these exercises. Increased interaction between agencies will help them identify weaknesses in coordination and test new operational concepts that can effectively integrate the entire community. To further improve communication between all agencies, existing ad hoc working groups should be formalized through policy documents or MOUs/MOAs. Formalization would decrease ambiguity in responsibilities and lock in effective working groups.

Currently, the agency stovepipes do not communicate to decisionmakers with one voice. There are three recommendations to improve governance: create a lead integration center, create a unified policy advocate, and create a single point of contact to communicate to the senior executive level. The National Biosurveillance Integration Center (NBIC) is best equipped to serve as the lead integration center, and the Biosurveillance Indications and Warnings Analytic Community (BIWAC) to serve as the interagency policy advocate. The biosurveillance community would benefit from an executive liaison serving as the single entity streamlining information from the integration center and policy center up to the White House.

The biosurveillance community needs to develop a network structure to maintain unified situational awareness.⁸³ Therefore, NBIC should transition from its current analysis role to a coordinating role for its partner agencies. NBIC will add more value as an active coordinator of

⁸¹ Federal operating level is defined as the collectors, analysts, and mid-level employees at the federal level.

⁸² See biosurveillance organization chart. Each one of the cabinet level agencies sitting at the top of the stovepipes represents a separate point of contact to the White House regarding biosurveillance.

⁸³ Network is defined as an arrangement of vertically and horizontally connected organizations sharing the same mission.

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its partners, enabling and facilitating networked operation. This modified role must be clarified in official documents and publicized. Additionally, the biosurveillance community must build consensus and speak with a unified policy voice. Out of the existing biosurveillance infrastructure, BIWAC has the greatest potential to succeed in this role due to its unique organizational characteristics and accepted success by members of the biosurveillance community. A transformed BIWAC would release its policy recommendations for consideration by its federal, state, and local partners.

Finally, the biosurveillance community needs to transmit a clear and cohesive message to decisionmakers. An executive liaison for the biosurveillance community, located on the National Security Council (NSC) Staff, would serve as the principal conduit between the White House and the biosurveillance community. The liaison will receive information from the integration center, NBIC, and the policy advisory center, BIWAC. This position would not have any authority to task the biosurveillance community, but instead would only transmit the information produced by the community to senior decisionmakers.

The biosurveillance system has continually improved since its inception; however, until the recommendations enclosed in this report are addressed, decisionmakers will be unable to make fully informed decisions regarding biological incidents.