
white paper, NNSA concluded that a centralized approach was technically feasible and could lead to cost savings.

- In a July 2011 draft solicitation to industry, Energy and NNSA proposed having a single contractor manage and operate two NNSA sites. Energy and NNSA estimated that the new approach would save around \$895 million (nominal) over the next 10 years, largely through efficiency gains and other improvements to the sites' business systems and support functions.

Energy and contractor officials noted that further assessment of the appropriateness of these and other potential efforts is warranted, as each can present challenges. For example, in response to the Deputy Secretary's August 2010 memo, the Office of Science expressed reluctance to implement a more centralized approach to procurement, citing the efficiencies of its current approach. Others in Energy noted, however, that similar concerns were expressed during prior streamlining efforts, including NNSA's own implementation of a centralized approach, and can be addressed through further assessment. In addition, a centralized approach may not always be more efficient or effective, but that determination can benefit from further assessment. For example, as GAO reported in September 2011, the anticipated cost savings from NNSA's proposal to consolidate management and operating contracts for two of its sites were uncertain, and NNSA's own analysis suggested that efficiencies could instead be achieved under its existing contracts through improved management practices.

Actions Needed and Potential Financial or Other Benefits

Energy and contractors at NNSA and Office of Science sites have taken steps, and are identifying further opportunities, to streamline support functions and reduce costs. As fiscal environments become more constrained, Energy needs to ensure that streamlining efforts will be effective. This includes understanding when it is appropriate to use a more centralized approach and addressing any challenges to further streamlining. As a result, GAO recommended in January 2012 that the Secretary of Energy should

- assess whether all appropriate efforts are being taken to streamline support functions at NNSA and Office of Science sites and to address implementation challenges.

Agency Comments and GAO's Evaluation

GAO provided a draft of its January 2012 report to Energy for review and comment. Energy generally agreed with the findings and recommendations from the report. As part of its routine audit work, GAO will track the extent to which progress has been made to address the identified action and report to Congress.

How GAO Conducted Its Work

The information in this analysis is based primarily on findings from the products listed in the related GAO products section. GAO reviewed documents and data and spoke with Energy, NNSA, and Office of Science officials and with contractors at eight sites—the four largest sites by budget from NNSA and Office of Science.

Related GAO Products

Department of Energy: Additional Opportunities Exist to Streamline Support Functions at NNSA and Office of Science Sites. GAO-12-255. Washington, D.C.: January 31, 2012.

Streamlining Government: Key Practices from Select Efficiency Initiatives Should be Shared Governmentwide. GAO-11-908. Washington, D.C.: September 30, 2011.

Modernizing the Nuclear Security Enterprise: The National Nuclear Security Administration's Proposed Acquisition Strategy Needs Further Clarification and Assessment. GAO-11-848. Washington, D.C.: September 20, 2011.

Contact Information

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10. Nuclear Nonproliferation

Comprehensive review needed to address strategic planning limitations and potential fragmentation and overlap concerns among programs combating nuclear smuggling overseas.

Why This Area Is Important

The proliferation of nuclear weapons represents one of the greatest threats to U.S. and international security. As little as 25 kilograms of weapon-grade highly enriched uranium or 8 kilograms of plutonium could be used to build a nuclear weapon. If terrorists or other nations were to acquire and use a nuclear weapon, the results could have far-reaching and long-lasting social, financial, and health impacts. The United States has pursued a range of nuclear nonproliferation programs to address this threat through the Department of Energy's (Energy) National Nuclear Security Administration (NNSA). In addition to NNSA, other U.S. government agencies—including the Departments of Defense (DOD), State (State), and Homeland Security (DHS)—support programs and activities to reduce proliferation concerns around the world. National Security Council (NSC) staff have the principal role in coordinating the implementation of NNSA, DOD, State, and other agency nonproliferation programs.

What GAO Found

GAO reported in December 2011 on issues relating to the coordination of federal programs involved in preventing and detecting nuclear smuggling overseas. GAO identified and reviewed 21 U.S. government programs and offices under five federal agencies—NNSA, DOD, State, DHS, and the Department of Justice (Justice)—that play a role in preventing and detecting smuggling of nuclear materials and illicit trafficking of related technologies overseas. These include programs that (1) conduct research and development on radiation detection technologies; (2) deploy radiation detection equipment along foreign borders and points of transit; (3) train and equip foreign customs and border security officials to identify and interdict illicit nuclear materials or technology transfers; (4) assist foreign governments in the development of export control systems; (5) enhance and coordinate with foreign antismuggling law enforcement and prosecutorial capabilities; and (6) analyze potential foreign nuclear smuggling cases and incidents.

Among other things, GAO found that none of the existing strategies and plans for coordinating federal efforts to prevent and detect nuclear smuggling and illicit nuclear transfers overseas incorporates all of the desirable characteristics of national strategies. GAO also identified potential fragmentation and overlap among some programs working in this area, especially those providing equipment and training in foreign countries to counter nuclear smuggling. Furthermore, there is no single recognized agency responsible for leading and directing federal efforts to combat nuclear smuggling. However, State is taking steps to enhance one of the principal interagency coordinating mechanisms.

Regarding strategic planning to combat nuclear smuggling overseas, GAO found that existing interagency strategies to coordinate efforts governmentwide lacked some of the desirable characteristics of a national strategy, such as identifying financial resources needed and monitoring mechanisms to be used to determine progress and make improvements. For example, the 2010 Global Nuclear Detection Architecture Strategic Plan—developed jointly by DHS, DOD, Energy, State, Justice, the intelligence community, and the Nuclear Regulatory Commission—did not identify the financial resources needed to achieve the strategic plan’s objectives or the monitoring mechanisms that could be used to determine programmatic progress and needed improvements. Similarly, implementation guidelines for international nuclear and radiological border security efforts issued by NSC in 2005 did not establish priorities, identify measures to track progress, or define the resources needed to effectively implement the strategy.

GAO also identified potential fragmentation and overlapping functions among some of these programs implemented by these federal agencies. Specifically, GAO identified six programs providing training to improve the capabilities of foreign border security and customs officials to prevent smuggling and illicit nuclear shipments: (1) NNSA’s Second Line of Defense program, (2) International Nonproliferation Export Control Program, and (3) Cooperative Border Security Program;¹ (4) State’s Export Control and Related Border Security program; and (5) DOD’s Weapons of Mass Destruction-Proliferation Prevention Program and (6) International Counterproliferation Program. Similarly, GAO identified four programs that are involved in providing equipment to foreign governments to enhance the ability of their customs and border security organizations to detect nuclear smuggling: (1) NNSA’s Second Line of Defense program, (2) State’s Export Control and Related Border Security program, (3) DOD’s Weapons of Mass Destruction-Proliferation Prevention Program, and (4) DOD’s International Counterproliferation Program. In prior reports on nuclear nonproliferation programs, GAO has found that consolidating programs sharing common goals and implementing similar projects can maximize limited resources and may achieve potential cost savings or other programmatic and administrative efficiencies.

In raising the issue of potential fragmentation and overlap, agency officials representing these programs told GAO that not all of them have the same focus, that some concentrate on specialized niches, and that many are complementary. For instance, in the area of training, NNSA officials told GAO that the Second Line of Defense program is focused on training in the use and long-term sustainment of the radiation detection

¹The Cooperative Border Security Program was an independent program at the time of GAO’s audit on the coordination of federal programs involved in combating nuclear smuggling overseas. However, the program is no longer an independent program, and its functions were merged into the International Nonproliferation Export Control Program in June 2010.

equipment provided by the program, whereas the International Nonproliferation Export Control Program concentrates on training foreign customs and border guard personnel at official points of entry to detect illicit weapons of mass destruction-related commodity transfers and assisting border security officials to detect illicit trafficking of weapons of mass destruction-related items in "green border" areas between official points of entry. Regarding the provision of equipment, NNSA, State, and DOD officials noted that the Second Line of Defense program tends to provide larger equipment, such as radiation portal monitors and cargo scanning equipment, while the Export Control and Related Border Security program and International Counterproliferation Program provide smaller-scale equipment, such as handheld radiation detection pagers, hazardous materials kits, and investigative suits to foreign customs and border security organizations. While the agencies noted that these programs are complementary to one another, in GAO's view the fragmented and overlapping nature of the programs nevertheless raises questions as to whether greater efficiency could be obtained through possible consolidation of such efforts.

Furthermore, GAO found that no single federal agency has lead responsibility to direct federal efforts to prevent and detect nuclear smuggling overseas. In the past, GAO has reported that interagency undertakings can benefit from the leadership of a single entity with sufficient time, responsibility, authority, and resources needed to ensure that federal programs are based upon a coherent strategy, are well coordinated, and that gaps and duplication in capabilities are avoided. For efforts to detect nuclear material smuggling into or movement within the United States, a 2005 presidential directive gave DHS's Domestic Nuclear Detection Office responsibility for developing the Global Nuclear Detection Architecture and managing the domestic portion of the global architecture. However, this directive divided responsibility for the international portion of the global architecture among State, DOD, and Energy.

The 2010 Global Nuclear Detection Architecture Strategic Plan takes a step toward clarifying lead agencies responsible for different elements of the global architecture, including efforts overseas. Specifically, for the exterior layer of the global architecture—the portion focused on enhancing international capabilities for detecting nuclear and radiological materials abroad—the strategic plan identifies four performance goals, designating lead and supporting agency roles for each. However, it is unclear whether these more defined roles give authority to these lead agencies to provide direction and guidance across multiple agencies and programs. For instance, State and DOD officials told GAO that neither State nor any other federal agency has the authority to direct the activities or coordinate implementation of programs administered by other agencies involved in preventing or detecting nuclear smuggling overseas.

Regarding interagency coordinating mechanisms, the NSC has established mechanisms to coordinate efforts in this area, including a Countering Nuclear Threats Interagency Policy Committee (IPC) and a sub-IPC for international nuclear and radiological border security efforts.

NSC officials declined GAO's request to discuss various aspects of the IPC structure and how it coordinates U.S. efforts to combat nuclear smuggling overseas. However, some officials from other agencies expressed doubts about the value of the NSC's coordinating role. Notably, DOD officials told GAO that they believed NSC has played a negligible role in coordination of programs to counter nuclear smuggling.

Coordinating groups have been established beneath the IPC structure to facilitate greater interagency cooperation at a working level to address the nuclear smuggling threat in foreign countries. One of the principal coordinating mechanisms for U.S. export control and related border security assistance activities overseas is an interagency working group (IWG). This IWG meets on a regular basis and officials at DOD, NNSA, and State told GAO the meetings are well attended and are useful for exchanging information—such as sharing calendars and information on planned program activities—and building relationships between program managers. However, agency officials GAO interviewed identified some limitations with this mechanism and its ability to facilitate a more cohesive national response to this threat. For example, NNSA and DOD officials told GAO that the coordination meetings are hampered by the participation of many individuals and are oriented toward high-level discussion, making in-depth discussion of specific issues affecting program implementation difficult in these settings. In addition, NNSA and DOD officials stated that while the IWG is useful for information exchange, it is not a mechanism designed or suitable for conducting more fundamental interagency strategic planning or for developing guidance and priorities for individual agency programs.

State officials told GAO that they have addressed the first limitation by chairing executive-level and regional sub-IWG meetings. For example, the quarterly executive-level meetings involving senior-level participation at the deputy assistant secretary level, allow for high-level discussion of agency programmatic goals and funding priorities, while regional sub-IWG meetings conducted at the action-officer level provide for more focused attention on nonproliferation capacity building in specific countries or regions. In addition, State officials told GAO that they have proposed addressing the second limitation by using the IWG as a means of developing common interagency strategies and approaches toward other countries and to encourage individual programs to engage or disengage in particular regions, countries, and functional areas.

GAO concluded that effective coordination of federal government efforts to prevent and detect nuclear smuggling overseas is limited by shortcomings in strategic plans, potential fragmentation and overlap among some programs, and divided responsibilities among several agencies. Furthermore, it is apparent that no single agency or program has the authority to undertake and implement a strategic re-evaluation and restructuring across the government to address these concerns.

Actions Needed and Potential Financial or Other Benefits

To address these concerns, GAO recommended in December 2011 that the Assistant to the President for National Security Affairs (NSC) should

- undertake—or direct and delegate an appropriate agency or agencies to undertake—a comprehensive review of the structure, scope, and composition of agencies and programs across the federal government involved in preventing and detecting smuggling of nuclear materials, equipment, and technologies overseas. Such a review should assess several issues, including: (1) the level of overlap and duplication among agencies and programs, especially in the provision of training and nuclear detection equipment; (2) potential for consolidation of these functions to fewer programs and agencies; (3) the feasibility, costs, and benefits of establishing a special coordinator to preside over the allocation of U.S. counter-nuclear-smuggling assistance to foreign nations and be responsible for directing the interagency process of development, funding, and implementation of all U.S. government programs related to combating nuclear smuggling overseas; and (4) any U.S. laws that would need to be amended by Congress in order to facilitate consolidation, elimination, or other changes to existing programs; and
- issue new guidance that incorporates the elements of effective strategic plans, including clearly delineating the roles and missions of relevant programs, specific priorities and objectives, performance measures and targets, overall program cost estimates, and projected time frames for program completion.

Agency Comments and GAO's Evaluation

GAO provided a draft of its December 2011 report to NSC for report and comment. NSC did not comment on these recommendations.

GAO provided a draft of this report section to the Office of Management and Budget for review and comment. The Office of Management and Budget provided technical comments, which were considered and incorporated as appropriate. The Office of Management and Budget provided comments regarding the roles and responsibilities of other agencies, noting the administration has taken several steps to enhance and promote counter nuclear smuggling options within the national security agencies. These observations were addressed in conjunction with discussions GAO had with the other agencies during the course of its work. As part of GAO's routine audit work, GAO will track actions to address these recommendations and report to Congress.

How GAO Conducted Its Work

The information in this analysis is based on findings from the product listed in the related GAO products section. GAO reviewed uncosted NNSA nuclear nonproliferation program funding, but did not specifically discuss funding associated with the programs where GAO identified potential fragmentation and overlap, and GAO did not quantify the potential financial savings associated with those programs.

Related GAO Product

Nuclear Nonproliferation: Action Needed to Address NNSA's Program Management and Coordination Challenges. GAO-12-71. Washington, D.C.: December 14, 2011.

Contact Information

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11. Personnel Background Investigations

The Office of Management and Budget should take action to prevent agencies from making potentially duplicative investments in electronic case management and adjudication systems.

Why This Area Is Important

The federal government spent over \$1 billion to conduct more than 2 million personnel background investigations for government employees in fiscal year 2011. The Office of Personnel Management (OPM) conducts the majority of these investigations for federal agencies including the Department of Defense (DOD). DOD requests more investigations from OPM than any other federal agency and received over 788,000 background investigations that cost over \$787 million in fiscal year 2011. Agencies use electronic case management systems to identify employees who need investigations and monitor the status of investigations. In addition, agencies use electronic adjudication systems to store records of the decisions that officials make based on investigations, such as whether an applicant is suitable for federal employment, and in some cases, whether the applicant is eligible for a security clearance, enabling him or her to access classified information.

In light of long-standing delays in completing these processes and other concerns, Congress set objectives and established requirements for improving aspects of the personnel security clearance process in the Intelligence Reform and Terrorism Prevention Act of 2004.¹ Among other things, the act established requirements for reciprocity—an agency's acceptance of a background investigation or clearance determination completed by any authorized investigative or adjudicative agency, subject to certain exceptions. When agencies do not reciprocally accept a background investigation or clearance determination completed by another agency, government resources may be used inefficiently to conduct duplicative investigations and adjudications. To meet the objectives laid out in the act and oversee reforms of the employment suitability and security clearance eligibility processes, DOD and the Office of the Director of National Intelligence established the Joint Security Clearance Process Reform Team (Joint Reform Team) in 2007. In 2008, the President issued an executive order² to ensure an efficient, practical, reciprocal, and aligned system for the suitability and security processes, among other things. The order (1) established a Suitability and Security Clearance Performance Accountability Council, which is accountable to the President to achieve the goals of reform (2) designated the Deputy Director for Management at the Office of Management and Budget (OMB)

¹Pub. L. No. 108-458 (2004) (codified at 50 U.S.C. § 435b).

²Exec. Order No. 13467, *Reforming Processes Related to Suitability for Government Employment, Fitness for Contractor Employees, and Eligibility for Access to Classified National Security Information* (June 30, 2008).

as the chair of the Council; and (3) outlined the responsibilities of the Council, which include establishing requirements for enterprise information technology. Since 2008, the Joint Reform Team under the guidance of the Performance Accountability Council has encouraged agencies to automate their paper-based case management and adjudication systems by using electronic systems.³

What GAO Found

Multiple agencies have invested in or are beginning to invest in potentially duplicative, electronic case management and adjudication systems despite governmentwide reform effort goals that agencies leverage existing technologies to reduce duplication and enhance reciprocity. The governmentwide reform effort, led by the Performance Accountability Council, has resulted in progress in reducing delays in the amounts of time needed to conduct investigations and adjudicate clearances. Additionally, the Joint Reform Team, under the Performance Accountability Council's leadership, set as a goal in its information technology strategy that agencies will leverage existing systems to reduce duplication and enhance reciprocity.

However, of the agencies that GAO reviewed, GAO found that since 2007 three agencies—DOD, the Department of Justice (Justice), and the Department of Homeland Security (DHS) have each developed and implemented their own electronic systems for case management and adjudication. In addition, GAO identified three other agencies—the National Reconnaissance Office,⁴ the Department of Veterans Affairs, and the Department of the Treasury—that are beginning to invest in new systems that may duplicate the systems that DOD, Justice, and DHS have already implemented. Moreover, OPM officials told GAO that OPM plans to develop a new electronic case management and adjudication system. See the table below for the agencies GAO identified that have developed or are planning to develop their own electronic systems for case management and adjudication and the amounts those agencies have invested as of fiscal year 2011.

³The Performance Accountability Council is currently comprised of representatives from 11 executive branch agencies, including DOD and the Office of the Director of National Intelligence.

⁴While the National Reconnaissance Office is an agency within DOD, it is beginning to invest in an electronic system distinct from DOD's system.

Agency Investments in Electronic Systems That Have Potentially Duplicative Capabilities for Case Management and Adjudication

Agency	Status	Investment as of FY11
Department of Defense	Completed	\$32 million
Department of Justice	Completed	15 million
Department of Homeland Security	Completed	6.5 million
National Reconnaissance Office	In development	6.8 million
Department of Veterans Affairs	In development	900,000
Department of the Treasury	In development	300,000 ^a
Office of Personnel Management	Planned	Unknown

Source: GAO.

^aAccording to officials at the Department of the Treasury, the agency seeks \$300,000 to fund its system.

According to DOD officials, DOD has intended to share the technology for its case management and adjudication system with other agencies since it developed its system. According to Department of Energy officials, the agency piloted a part of DOD's system in 2010 and it is still considering whether to implement it. In addition, DOD officials told GAO that the Social Security Administration plans to use DOD's system. DOD officials estimate that to implement the DOD system, agencies would need to invest approximately \$300,000, in addition to any expenses agencies could incur if they chose to customize DOD's system to meet specific needs. Furthermore, DOD officials estimate that agencies may need to spend approximately \$100,000 per year for long-term support and maintenance of the system. Likewise, OPM officials told GAO that OPM plans to share the technology for any case management and adjudication system that it develops with the agencies that request investigations from OPM.

However, the Performance Accountability Council has not developed specific governmentwide guidance regarding how agencies should leverage existing technologies to prevent agencies from making duplicative investments in electronic case management and adjudication systems. As a result, individual agencies can decide to develop their own new systems without evaluating whether utilizing an existing system would be a more cost-effective approach. Since it was established, the Performance Accountability Council and the Joint Reform Team have issued several reports detailing reform-related plans, including a *Strategic Framework* in February 2010. The *Strategic Framework* established goals, performance measures, roles and responsibilities, and proposed metrics for determining the quality of security clearance investigations and adjudications. However, the Council did not include specific guidance in the *Strategic Framework* about how agencies might leverage existing technologies. Without specific guidance regarding how agencies should leverage existing technologies, agencies may miss opportunities to avoid duplicative investments in electronic systems for case management and adjudication.

Actions Needed and Potential Financial or Other Benefits

GAO recommended in February 2012 that OMB's Deputy Director for Management, in his capacity as Chair of the Performance Accountability Council, should

- develop additional guidance to help ensure that reform stakeholders identify opportunities for preventing duplication in the development of electronic case management and adjudication technologies in the suitability determination and personnel security clearance processes.

The federal government may realize multiple potential benefits from taking the actions GAO describes, including improved reciprocity and cost savings by preventing duplication of investments in electronic systems. Agencies that operate the same electronic systems for case management and adjudication may be able to share records of personnel background investigations with one another more easily, which may improve reciprocity and result in cost savings by using existing investigations rather than paying for new ones to be conducted.

Agency Comments and GAO's Evaluation

GAO provided a draft of its February 2012 report to OMB for review and comment. OMB agreed with GAO's recommendation that OMB develop additional guidance to help ensure that reform stakeholders identify opportunities for preventing duplication in the development of electronic case management and adjudication technologies in the suitability determination and personnel security clearance processes. As part of its routine audit work, GAO will track the extent to which progress has been made to address the identified actions and report to Congress.

How GAO Conducted Its Work

The information contained in this analysis is based on findings from the products listed in the related GAO products listed below. GAO selected agencies to review that meet a combination of one or more of the following criteria: (1) utilizes OPM to conduct most of its security clearance investigations for civilians, military, and industrial (contractor) personnel; (2) ranks among OPM's top 10 largest investigation customers, by volume and/or by total expenditures in fiscal year 2010; and (3) is a member of the Performance Accountability Council. GAO also reviewed selected additional agencies that are developing or planning to develop an electronic system for case management and adjudication. GAO then interviewed knowledgeable officials at each of these agencies about the status of and their plans for investments in electronic systems for case management and adjudication.

Related GAO Products

Background Investigations: Office of Personnel Management Needs to Improve Transparency of Its Pricing and Seek Cost Efficiencies. GAO-12-197. Washington, D.C.: February 28, 2012.

High-Risk Series: An Update. GAO-11-278. Washington, D.C.: February 2011.

Personnel Security Clearances: Overall Progress Has Been Made to Reform the Governmentwide Security Clearance Process. GAO-11-232T. Washington, D.C.: December 1, 2010.

Personnel Security Clearances: Progress Has Been Made to Improve Timeliness but Continued Oversight Is Needed to Sustain Momentum. GAO-11-65. Washington, D.C.: November 19, 2010.

DOD Personnel Clearances: Preliminary Observations on DOD's Progress on Addressing Timeliness and Quality Issues. GAO-11-185T. Washington, D.C.: November 16, 2010.

Personnel Security Clearances: An Outcome-Focused Strategy and Comprehensive Reporting of Timeliness and Quality Would Provide Greater Visibility over the Clearance Process. GAO-10-117T. Washington, D.C.: October 1, 2009.

Personnel Security Clearances: Progress Has Been Made to Reduce Delays but Further Actions Are Needed to Enhance Quality and Sustain Reform Efforts. GAO-09-684T. Washington, D.C.: September 15, 2009.

Personnel Security Clearances: An Outcome-Focused Strategy Is Needed to Guide Implementation of the Reformed Clearance Process. GAO-09-488. Washington, D.C.: May 19, 2009.

DOD Personnel Clearances: Comprehensive Timeliness Reporting, Complete Clearance Documentation, and Quality Measures Are Needed to Further Improve the Clearance Process. GAO-09-400. Washington, D.C.: May 19, 2009.

High-Risk Series: An Update. GAO-09-271. Washington, D.C.: January 2009.

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12. Cybersecurity Human Capital

Governmentwide initiatives to enhance cybersecurity workforce in the federal government need better structure, planning, guidance, and coordination to reduce duplication.

Why This Area Is Important

Threats to federal information technology (IT) infrastructure and systems continue to grow in number and sophistication, posing a risk to the reliable functioning of government and highlighting the need to ensure that the federal and contractor workforce has the knowledge, skills, and abilities to maintain the security of federal IT infrastructure and systems.

In discussing his 2009 Cyberspace Policy Review,¹ President Obama declared the cyber threat to be “one of the most serious economic and national security challenges we face as a nation.” Because of the importance of federal information systems to government operations, as well as continuing weaknesses in the information security controls over these systems, GAO has identified federal information security as a governmentwide high-risk area since 1997.²

Cybersecurity professionals help to prevent or mitigate vulnerabilities that could allow malicious individuals and groups access to federal IT systems. Specifically, the ability to secure federal systems is dependent on the knowledge, skills, and abilities of the federal and contractor workforce that uses, implements, secures, and maintains these systems.

What GAO Found

GAO's work and the work of other organizations suggest that there are leading practices that workforce planning for critical positions such as federal cybersecurity positions should address. These include defining roles, responsibilities, skills, and competencies for these positions and establishing a training and development program that supports the competencies an agency needs to accomplish its mission.

The Department of Commerce's National Institute of Standards and Technology (NIST), Chief Information Officers (CIO) Council, Office of Personnel Management (OPM), and the Department of Homeland Security (DHS) have separate efforts intended to help agencies define roles, responsibilities, skills, and competencies for their cybersecurity workforce. However, it is unclear how or whether the aforementioned entities will effectively align their efforts and, if so, the timeframe for accomplishing that. The four efforts are discussed briefly below:

¹President Barack Obama *Cyberspace Policy Review: Assuring a Trusted and Resilient Information and Communications Infrastructure* (Washington, D.C.: May 29, 2009).

²See GAO, *High Risk Series: An Update* GAO-11-278 (Washington, D.C.: February 2011).

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- As part of its responsibilities under the Federal Information Security Management Act, NIST has defined cybersecurity roles and responsibilities in NIST Special Publications 800-16, 800-37, and 800-50.
 - In October 2010, the CIO Council released an updated version of 11 standard cybersecurity roles that agencies could use as a guideline in developing detailed position descriptions and training. For each role, the CIO Council plans to develop a workforce development matrix that lists suggestions for qualifications for entry, intermediate, and advanced performance levels for the role; additional sources for skill and competency materials; educational and professional credentials; and learning and development sources. While several of the NIST-defined cybersecurity roles map to the roles defined by the CIO Council, others do not. As of August 2011, NIST had not indicated plans to modify the roles identified in NIST publications to align with the CIO Council roles. According to NIST, its standards and guidance which include its definition of cybersecurity roles and responsibilities were issued based on its responsibilities under the Federal Information Security Management Act, and as such, do not need to be revised to align with the CIO Council roles. However, providing multiple unaligned sources of guidance to federal agencies limits their value as a tool for agencies.
 - OPM developed a governmentwide cybersecurity competency model that identified the most common job series used by cybersecurity professionals across the federal government; however, the identified competencies are not unique to cybersecurity work, and there is no mechanism in place to determine if agencies will use this model.
 - In support of the National Initiative for Cybersecurity Education,³ DHS is developing a framework consisting of 31 specialties across seven categories of cybersecurity work, which is intended to provide a common language for describing the cybersecurity workforce. According to DHS, once the framework has been finalized, other federal documents, including relevant NIST Special Publications, will be revised to conform to it. However, no time frame was provided on when this will occur and it is unclear whether or not NIST will revise its publications to conform to the framework.

Although NIST guidelines are currently widely used throughout the federal government, it is unclear whether or how the results of the efforts of the CIO Council, OPM, or DHS will be used governmentwide. A more

³The National Initiative for Cybersecurity Education began in March 2010 as an expansion of Initiative 8 of the Comprehensive National Cybersecurity Initiative, which focused on efforts to educate and improve the federal cybersecurity workforce. According to the interagency committee recommendations establishing the National Initiative for Cybersecurity Education, it is to provide program management support and promote intergovernmental efforts to improve cybersecurity awareness, education, workforce structure, and training.

consolidated effort to develop one framework defining roles, responsibilities, skills, and competencies for the federal cybersecurity workforce rather than four separate efforts, would be a more efficient use of resources.

In addition to efforts to define roles, responsibilities, skills and competencies, there are multiple governmentwide cybersecurity training efforts under way. In 2005, the Office of Management and Budget (OMB) and DHS began to collaborate on an initiative, called the Information Systems Security Line of Business, to address common information systems security needs across the government, including cybersecurity training. As part of this collaboration, DHS designated five agencies—the Departments of Defense, State, and Veterans Affairs (VA), the National Aeronautics and Space Administration (NASA), and OPM—to be security training shared service centers available to all federal agencies so as to reduce duplication and improve the quality of information security training. The training courses that these agencies offer are organized into two training tiers: general security awareness training and role-based security training. While one of the goals of the shared program is to reduce duplication, there are several areas in which the training roles overlap among the agencies, and no process exists for coordinating or eliminating duplication among the efforts. For example, NASA, VA, and State all have training for employees in system administrator roles. Additionally, both NASA and VA offer training for CIOs, and NASA and State both offer training directed at the system owner role. However, neither the individual agencies nor DHS evaluate the training for duplicative content, effectiveness, or extent of use.

Actions Needed and Potential Financial or Other Benefits

To ensure that governmentwide cybersecurity workforce initiatives are better coordinated, GAO recommended in November 2011 that Directors of OMB and OPM and the Secretaries of the Departments of Commerce and Homeland Security should

- consolidate and align efforts to define roles, responsibilities, skills, and competencies for the federal cybersecurity workforce.

Regarding the Information Systems Security Line of Business initiative, GAO also recommended in November 2011 that the Secretary of DHS should

- implement a process for tracking agency use of training, gather feedback from agencies on the training's value and opportunities for improvement, and develop a process to coordinate training offered to minimize the production and distribution of duplicative products.

Implementation of these recommendations could help the government more efficiently and effectively develop the federal cybersecurity workforce in a constrained fiscal environment.

Agency Comments and GAO's Evaluation

GAO provided a draft of its November 2011 report to OMB, OPM, the Department of Commerce, and DHS, for review and comment. OPM, the Department of Commerce, and DHS generally agreed with GAO's recommendation to consolidate and align efforts to define roles and responsibilities, skills, and competencies for the federal cybersecurity workforce. OMB provided technical comments, which were incorporated as appropriate. In addition, DHS officials agreed with GAO's recommendations regarding improvements to the Information Systems Security Line of Business and stated that the department is developing a mechanism for gathering input to address GAO's recommendation and will work with other shared service centers to ensure that they align with the National Initiative for Cybersecurity Education activities and findings. As part of GAO's routine audit work, GAO will track agency actions to address these recommendations and report to Congress.

GAO provided a draft of this report section to OMB for review and comment. OMB provided additional technical comments. However, GAO did not revise its findings based on these comments. In one instance, OMB indicated that GAO's statement that the CIO Council released an updated version of 11 standard cybersecurity roles in October 2010 was not completely accurate and that the CIO Council document we referenced did not update the 11 roles. GAO disagrees. The CIO document clearly shows that the roles were updated on October 29, 2010. OMB also noted that the October 2010 CIO Council document contained additional information discussing efforts at NIST and the National Initiative for Cybersecurity Education. GAO was not provided this additional information at the time of its review, but to the extent this information supports better coordination of federal cybersecurity workforce development efforts, this is a positive step. Furthermore, OMB commented that it is intended that NIST will account for the cybersecurity workforce framework developed by the National Initiative for Cybersecurity Education in its follow on work. Any steps OMB and NIST take to better coordinate federal cybersecurity efforts will be helpful. Nevertheless, we continue to believe that consolidating and aligning efforts to define roles, responsibilities, skills, and competencies for the federal cybersecurity workforce will help the government more efficiently and effectively develop the workforce in a fiscally constrained environment.

How GAO Conducted Its Work

The information contained in this analysis is based on findings from the product in the related GAO product section. GAO identified governmentwide initiatives based on interviews with subject matter experts at federal agencies and private organizations, and a review of publicly released information on the initiatives. GAO reviewed plans, performance measures, and status reports. GAO also interviewed officials at agencies responsible for these initiatives, such as NIST, OPM, the National Science Foundation, and OMB. GAO assessed the status and plans of these efforts against GAO's prior work on strategic planning, training and development, and efficient government operations.

Related GAO Product

Cybersecurity Human Capital: Initiatives Need Better Planning and Coordination. GAO-12-8. Washington, D.C.: November 29, 2011.

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13. Spectrum Management

Enhanced coordination of federal agencies' efforts to manage radio frequency spectrum and an examination of incentive mechanisms to foster more efficient spectrum use may aid regulators' attempts to jointly respond to competing demands for spectrum while identifying valuable spectrum that could be auctioned for commercial use, thereby generating revenues for the U.S. Treasury.

Why This Area Is Important

The radio frequency spectrum is a natural resource that is used to provide wireless communications services critical to the U.S. economy and a variety of government functions, such as national defense, homeland security, and other vital public safety activities. The federal government controls the use of spectrum by authorizing federal agencies' requests for spectrum and issuing licenses to nonfederal users. As the nation continues to experience significant growth in commercial wireless broadband services, the demand for spectrum has increased and additional capacity will be needed to accommodate future growth.

Since most spectrum has already been allocated for federal, nonfederal, or shared uses, a number of initiatives are under way to identify previously assigned spectrum that can be repurposed for commercial wireless broadband. When spectrum is repurposed for commercial use, an auction may be held to distribute licenses through a bidding process. Since the first auction in 1994, auctions have generated nearly \$52 billion for the U.S. Treasury and have provided additional spectrum for new commercial applications. In addition, some spectrum is available for unlicensed use, meaning an unlimited number of users can share the spectrum on a non-interference basis. Unlicensed spectrum supports a variety of technologies, including wireless fidelity (Wi-Fi) networks, and regulators are attempting to make more unlicensed spectrum available in the hopes of fueling innovation and economic growth. Spectrum management decisions require that regulators weigh the potential economic and technological benefits of increased spectrum availability against the need for federal agencies to use spectrum to achieve their missions.

Over the past 10 years, GAO has identified weaknesses in spectrum management—which is fragmented between the Department of Commerce's National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC)—that could impact the nation's ability to meet the growing demand for spectrum. In addition, GAO identified FCC's spectrum management as a major governmental challenge, specifically citing the need to balance competing demands for limited spectrum.

What GAO Found

Spectrum management in the United States is fragmented between NTIA and FCC.¹ NTIA is responsible for managing the federal government's use of spectrum, and FCC regulates spectrum use by nonfederal entities, such as television broadcasters, wireless service providers, and state and local public safety officials. A number of other entities also play a role in spectrum management. For example, the Interdepartment Radio Advisory Committee (IRAC), which consists of 19 agencies that hold over 90 percent of all federally assigned spectrum, coordinates federal use of spectrum and provides NTIA policy advice on spectrum issues. In addition, the Office of Management and Budget (OMB) is involved in spectrum management through the federal budget process and has issued a circular (OMB Circular A-11) that provides guidance for the use of spectrum-dependent systems by federal agencies.

Given the fragmented federal approach, coordination is essential to ensure that NTIA and FCC take a holistic approach to efficiently and effectively manage spectrum use. As GAO reported in March 2006, changes that affect existing users of spectrum can cause contentious stakeholder conflicts that cross the jurisdictions of both agencies and can lead to protracted negotiations.

As GAO reported in November 2011, coordination challenges between NTIA and FCC were one of four factors contributing to delays in efforts to repurpose spectrum for new commercial uses. Efforts to repurpose spectrum require that NTIA and FCC coordinate to determine what spectrum is suitable for new commercial uses, and the extent to which federal agencies will be affected by efforts to relocate or modify their current spectrum assignments. Repurposed spectrum that can be auctioned for new commercial uses can generate significant revenues for the U.S. Treasury, and GAO and the National Commission on Fiscal Responsibility and Reform have supported the continued use of auctions to assign spectrum licenses.

While NTIA and FCC have taken steps to improve coordination and are collaborating on efforts to make spectrum available for wireless broadband, the extent to which they are effectively coordinating and will be able to quickly meet growing demands for spectrum is unclear due, in part, to a lack of transparency in their joint planning efforts. In 2003, NTIA and FCC signed a Memorandum of Understanding (MOU) that stated the Assistant Secretary for Communications and Information at NTIA and the Chairman of FCC would meet twice a year to conduct joint spectrum planning activities, as required by the NTIA Act, to ensure spectrum is used for its

¹The responsibility for managing spectrum was divided between NTIA (an executive agency) and FCC (a federal independent regulatory commission) to avoid concentrating licensing power into one executive agency, while at the same time taking into account the President's responsibility for both national defense and fulfilling agency missions.

"highest and best purpose."² According to the MOU, the joint spectrum planning is to include considerations of the future spectrum requirements of public and private users, with the goal of promoting efficient use of spectrum that reflects the economic and national security interests of the nation.

However, according to NTIA and FCC officials, these meetings did not occur regularly during one prior FCC Chairman's term. FCC officials also told us that the results of the meetings are not publicly available because they contain pre-decisional information. In addition, NTIA and FCC have not jointly developed a strategic spectrum plan encompassing federal and nonfederal spectrum use, despite statutory requirements and a 2004 Presidential Memorandum to do so. In fact, when GAO asked which documents comprise the national spectrum strategy, NTIA and FCC officials identified different documents.

As GAO reported in November 2011, 62 of 71 experts and stakeholders we surveyed strongly or somewhat agreed that there is a need to maintain an ongoing strategic spectrum plan. GAO has also reported on the importance of transparency and oversight in spectrum management decisions. Lacking information on the extent to which NTIA and FCC are coordinating to strategically manage spectrum, Congress and stakeholders have no assurance that spectrum is being used for its highest and best purpose, and it is difficult to assess whether NTIA and FCC are fulfilling the intent of the NTIA Act and the MOU.

Furthermore, as GAO reported in April 2011, NTIA relies heavily on federal agencies to self-evaluate and determine their current and future spectrum needs, with limited oversight or emphasis on holistic spectrum management to ensure that spectrum is being used efficiently across the federal government. NTIA has explained that because federal agencies use spectrum for a variety of applications and missions, it must rely on the agencies' expertise when reviewing spectrum assignments. However, prior GAO reports found that such a fragmented, decentralized approach proves problematic, since agency use of spectrum may not reflect the economic value of spectrum for the following reasons:

- Agencies focus on mission requirements—not an underlying, systematic consideration of spectrum efficiency—when making investments in spectrum technologies.
- Agencies do not pay for the spectrum they receive (outside of an administrative fee to NTIA). While OMB's Circular A-11 requires that agencies consider the economic value of spectrum when purchasing

²See National Telecommunications and Information Administration Act, title I, § 103, 112 (1992) codified as amended at 47 U.S.C. §§ 902 (b)(2)(L)(i), 922, and Memorandum of Understanding Between the Federal Communications Commission and the National Telecommunications and Information Administration, signed January 31, 2003.

spectrum-dependent systems, the requirements only apply to new procurements.

- Agencies receive no economic benefit from freeing up spectrum that can be auctioned for other uses and potentially generate revenue for the U.S. Treasury. In May 2004, GAO recommended that NTIA develop a pilot to implement incentives for agencies to use spectrum more efficiently, and NTIA undertook a review to identify potential incentives. However, according to NTIA, it did not carry out the studies recommended by the review due to limited resources and other strategic priorities. Some experts GAO spoke with noted the need to better incent agencies to use spectrum more efficiently, and a subcommittee of the Department of Commerce's Spectrum Management Advisory Committee made recommendations on this issue in a January 2011 report. NTIA officials told us that NTIA has also highlighted the need to amend the Commercial Spectrum Enhancement Act³ to provide agencies with up-front funding to cover their planning costs associated with future spectrum reallocations, as well as covering the costs of sharing spectrum and enabling agencies to upgrade their technology.
- Agencies might not have the up-front resources needed to invest in new technologies, which could result in the agencies using outdated, inefficient equipment. GAO has noted that OMB has experience managing a dedicated governmentwide fund that supports the up-front costs of improving efficiency in certain programs, such as improving the administrative efficiency of federal assistance programs. Although this fund is not spectrum-related, OMB officials noted that one of the benefits of having a centralized multiyear source of dedicated funding for efficiency projects is the ability to enhance agencies' abilities to undertake efficiency issues that need to be reviewed over time or that are affected by multiple federal agencies.⁴

With respect to using incentives to encourage more efficient spectrum use among non-federal users, GAO found that FCC has taken steps to rely more heavily on market mechanisms, such as auctions, to dictate the allocation of spectrum, and recommended Congress consider extending FCC's auction authority.⁵ FCC is also pursuing additional approaches to expand economic incentives, such as incentive auctions—in which an existing user could receive a portion of the proceeds from the auction—however, some of these approaches require congressional approval and face mixed support among stakeholders.

³Pub. L. No. 108-494, title II, 118 Stat. 3991 (2004).

⁴GAO-11-908 provides more information about OMB's Partnership Fund for Program Integrity Innovation, which funds efforts to improve the efficiency of federal assistance programs.

⁵GAO-12-118.

Actions Needed and Potential Financial or Other Benefits

In its previously issued reports, GAO has consistently noted that spectrum management is not guided by a long-range holistic vision encompassing federal and nonfederal users. A Presidential Memorandum required NTIA and FCC to collaborate to make more spectrum available for wireless broadband. NTIA and FCC are also working together to accommodate more flexible and efficient models of spectrum use. These efforts could lead to additional spectrum auctions, which could generate increased revenues for the U.S. Treasury and provide spectrum for new commercial applications. Enhanced transparency in NTIA and FCC's joint spectrum management efforts could aid Congress' oversight and ensure that the agencies are on the path to efficient and effective spectrum management. In addition, GAO, the Department of Commerce, and an FCC task force have noted the need to develop incentives that encourage agencies to use spectrum more efficiently.

To improve transparency in national spectrum policy decisions, assure coordination between managers of government and privately-owned spectrum, and help ensure that spectrum is used for its highest and best purpose, the Assistant Secretary for Communications and Information at NTIA and the Chairman of the FCC should

- report periodically to Congress on their joint spectrum planning activities and their consultation with other relevant government agencies. The report should include information on estimated future spectrum requirements for public and private uses, the spectrum allocation actions necessary to accommodate those uses, and any actions taken to promote the efficient use of spectrum.

To improve spectrum efficiency among federal agencies, Congress may wish to consider

- evaluating what incentive mechanisms could be used to move agencies toward more efficient use of spectrum, which could free up some allocated for federal use spectrum to be made available for other purposes. OMB's experience managing governmentwide efficiency programs could prove helpful in this evaluation.

Agency Comments and GAO's Evaluation

GAO provided a draft of this report section to the Department of Commerce, FCC, and OMB for review and comment. The Department of Commerce, FCC, and OMB provided technical comments, which were incorporated as appropriate. The Department of Commerce stressed that spectrum management is a difficult, complex undertaking with multiple growing demands from commercial and governmental users, requiring that regulators balance regulatory certainty for existing users against flexibility to accommodate new users. The Department of Commerce added that NTIA and FCC will need to continue to improve their processes to meet competing demands for spectrum, specifically noting the need to develop a regulatory basis for spectrum sharing. The Department of Commerce stated that if so directed by Congress, NTIA would work with FCC to report on planning activities, but cautioned

against over-simplifying the complexity of spectrum management, noting that it is impossible to simply calculate a number that represents how much spectrum each user requires. GAO acknowledges the complexity of such decisions, but believes that increased transparency in NTIA and FCC's statutorily-required joint planning efforts would prove useful for Congress and stakeholders. With respect to applying market incentives to encourage more efficient federal spectrum use, the Department of Commerce noted potential difficulties with applying such incentives. For example, the Department of Commerce stated that federal agencies seldom have exclusive spectrum access and a band of spectrum may be used to support a variety of technologies and operations. Thus, providing incentives to one federal user to use less spectrum may not mean that other federal users in the same spectrum will do the same. However, the Department of Commerce stated that NTIA would do its best to ensure the implementation of any efficiency requirements ultimately specified by Congress, and would fully consider any proposals to fund efficiency gains such as those carried out by OMB in other fields.

FCC noted that it has increased strategic planning for spectrum designated for commercial use, and has worked to ensure greater transparency in FCC's planning efforts. FCC also provided some information on its efforts to expand the use of market incentives to encourage efficient spectrum use among commercial users, which were incorporated as appropriate.

OMB disagreed with GAO's recommendation that NTIA and FCC report periodically to Congress on their joint spectrum planning activities and their consultation with other relevant government agencies. OMB stated that since NTIA and FCC have distinct missions and serve discrete populations of spectrum users, additional public reporting would not likely appreciably enhance spectrum management efforts. OMB also noted that NTIA and FCC are collaborating with one another and with other federal agencies to identify spectrum that can be made available for wireless broadband, and that NTIA periodically reports on the progress of these efforts. GAO recognizes that NTIA and FCC are collaborating to make additional spectrum available for broadband. However, GAO has previously noted that coordination challenges between NTIA and FCC have delayed efforts to repurpose spectrum for new commercial uses, and changes that affect existing users of spectrum can cause contentious stakeholder conflicts that cross the jurisdictions of both agencies and can lead to protracted negotiations. Given that NTIA and FCC have not jointly developed a national strategic spectrum plan, despite being statutorily required to do so, and did not, during one prior Chairman's term, hold statutorily-required spectrum-planning meetings, GAO believes that increased transparency in NTIA and FCC's coordination efforts would prove useful in maintaining coordination between the agencies. In its comments, OMB also stated that the Administration has put forth proposals to encourage more efficient use of spectrum, such as providing FCC with new authority to conduct incentive auctions, and modifying existing law to provide federal agencies with up-front funding to plan for

spectrum reallocations and allowing support for upgrading agency communication capabilities.

How GAO Conducted Its Work

The information contained in this analysis is based on findings from the products listed in the related GAO reports section as well as additional work GAO conducted. GAO interviewed NTIA and FCC officials, as well as academic experts and think tank representatives.

Related GAO Products

- *Commercial Spectrum: Plans and Actions to Meet Future Needs, Including Continued Use of Auctions*. GAO-12-118. Washington, D.C.: November 23, 2011.
- *Streamlining Government: Key Practices from Select Efficiency Initiatives Should Be Shared Governmentwide*. GAO-11-908. Washington, D.C.: September 30, 2011.
- *Spectrum Management: NTIA Planning and Processes Need Strengthening to Promote the Efficient Use of Spectrum by Federal Agencies*. GAO-11-352. Washington, D.C.: April 12, 2011.
- *Telecommunications: Options for and Barriers to Spectrum Reform*. GAO-06-526T. Washington, D.C.: March 14, 2006.
- *Telecommunications: Strong Support for Extending FCC's Auction Authority Exists, but Little Agreement on Other Options to Improve Efficient Use of Spectrum*. GAO-06-236. Washington, D.C.: December 20, 2005.
- *Spectrum Management: Better Knowledge Needed to Take Advantage of Technologies That May Improve Spectrum Efficiency*. GAO-04-666. Washington, D.C.: May 28, 2004.

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14. Health Research Funding

The National Institutes of Health, Department of Defense, and Department of Veterans Affairs can improve sharing of information to help avoid the potential for unnecessary duplication.

Why This Area Is Important

The majority of federal funding for health research and related activities is spent by the National Institutes of Health (NIH), within the Department of Health and Human Services (HHS), the Department of Defense (DOD), and the Department of Veterans Affairs (VA).¹ In fiscal year 2010, NIH, DOD, and VA obligated about \$40 billion, \$1.3 billion, and \$563 million, respectively, for activities related to health research.² Applications for federal funding of health research are typically submitted by principal investigators³—the lead researchers for research projects—through their institution, and in some cases they may submit applications to multiple agencies at the same time for funding consideration.⁴ It is common for agencies to fund health research on topics of common interest, such as breast cancer and post-traumatic stress disorder (PTSD).⁵ In some cases, funding similar research on the same topics is appropriate and necessary, for example, for purposes of replicating or corroborating prior research results. However, without effective sharing of information among

¹Specifically, about 94 percent of federal funding for medical sciences research in fiscal year 2008 was obligated by these three federal agencies, according to data from the National Science Foundation.

²With respect to DOD, we obtained data on obligations of funds made available for research, development, testing, and evaluation in the annual appropriation for the Defense Health Program. With respect to VA, we obtained data on obligations of its appropriation for Medical and Prosthetic Research.

³Principal investigators are typically individuals designated by the applicant organization, such as a university receiving federal grants, to have the appropriate level of authority and responsibility to direct the project or program to be supported by the award.

⁴Agency officials told us that multiple agencies cannot fund the same research application unless they work together to jointly fund it.

⁵In some instances, research is initiated in response to congressional direction. For example, according to DOD, the Office of Congressionally Directed Medical Research Programs is funded through the annual Defense Appropriations Act and manages research in many areas, including breast cancer. According to DOD, funds identified during the appropriations process at the request of members of the House and Senate are used for congressionally directed research.
<http://cdmrp.army.mil/about/fundingprocess.shtml> (last visited Dec. 2, 2011). Future GAO work is expected to examine the Office of Congressionally Directed Medical Research Programs.

federal agencies about their funding decisions, they may use available funds inefficiently due to duplication of effort.⁶

What GAO Found

NIH, DOD, and VA each lack comprehensive information on health research funded by the other agencies, which limits their ability to identify potential areas of duplication in the health research they fund. NIH, DOD, and VA program managers—officials who typically manage agency research portfolios and may provide input to senior agency officials responsible for making funding decisions—told GAO that, when reviewing health research applications, they typically search publicly available databases for potentially duplicative research projects funded by other federal agencies.⁷ These databases are used by various federal agencies, including NIH, DOD, and VA, to maintain information on funded health research applications. For example:

- To obtain information on NIH-funded research applications, DOD and VA program managers told GAO that they search NIH's Research Portfolio Online Reporting Tools Expenditures and Results, known as RePORTER, an electronic database that provides the public with information on the expenditures and results of NIH-supported health research. This database is also used by NIH and DOD officials to obtain information on some, but not all, of the health research applications funded by VA.⁸
- To obtain information on DOD-funded health research applications, the NIH and VA program managers GAO interviewed said that they use DOD's Congressionally Directed Medical Research Programs website, which includes a database that provides information on health research applications funded through these programs, though

⁶GAO recognizes that, in some instances, it is appropriate for multiple agencies or entities to be involved in the same programmatic or policy area due to the nature or magnitude of the federal effort. For purposes of this report, the term "unnecessary duplication" refers to duplicative research funding that is not necessary to corroborate or replicate prior research results for scientific purposes.

⁷Officials at NIH, DOD, and VA also stated that they consider the opinions of peer reviewers, who are typically scientists or professors who score proposals for scientific merit, to determine whether applications may be duplicative of other research. NIH and VA applications have a required section where principal investigators and other key personnel must list all current funding they receive and all other applications they have submitted at the time of their application. Peer reviewers generally have access to this information when scoring the proposals.

⁸According to VA officials, NIH's database contains information on about one quarter of all VA-funded health research applications. VA officials told us that they are working to add information on most VA-funded applications to this database by August 2012. In addition, NIH officials stated that they search NIH's database for information on proposals funded by NIH.

not those funded outside these programs, such as those funded by separately managed research centers.⁹

According to NIH, DOD, and VA officials, the information provided in the research databases they use to identify any potential duplication when making funding decisions is generally not sufficient. For example, NIH's public database provides basic application information such as the title, principal investigator name, abstract, and agency contact information for each application.¹⁰ However, program managers said they need more details on the aims and methodologies of funded applications in order to determine whether applications considered for funding are duplicative of funded research. Officials noted that even applications with identical titles may have different aims. In such cases, officials said they typically obtain information not contained in the databases by contacting colleagues at other federal agencies to obtain details on specific applications.

Officials at NIH, DOD, and VA added that they also communicate with officials at other agencies through participation on joint committees that have members from various federal agencies. For example, NIH officials stated that the Interagency Breast Cancer and Environmental Research Coordinating Committee, a committee established in 2010 by NIH, facilitates exchanges of information about breast cancer environment and research efforts across various agencies. While DOD's database for applications funded through its Congressionally Directed Medical Research Programs provides information about applications' aims and methodologies, DOD's database does not provide contact information for the officials associated with specific applications. One program manager at NIH and several VA officials said that they had difficulty knowing who to contact at DOD to obtain further information on specific applications.

Another limitation of the databases is that they do not always allow for efficient, comprehensive searches to identify unnecessary duplication of research. As stated earlier, information on health research funded by NIH, DOD, and VA is in different databases with varying types and amounts of information. DOD and VA officials told GAO that, in general, when searching multiple databases for potential duplication, the large number of funded applications on related topics makes comprehensive checks difficult and time-consuming. Because of this, officials at NIH, DOD, and VA told GAO that they often limit searches to principal investigators' other federally funded research projects, which they are generally required to

⁹NIH, DOD, and VA officials told us that they also may search other databases, such as clinicaltrials.gov, [DeployMed ResearchLINK](http://DeployMedResearchLINK), and PubMed, which contain information on federally funded health research.

¹⁰NIH officials said the system that provides information to NIH's database may contain additional information for VA applications, such as the actual application and supporting documentation; however, this information is only available to NIH and VA officials.

list on their applications.¹¹ To address this challenge, VA officials told GAO that they are working to make comprehensive searching of the various databases less time-consuming. VA awarded a contract for the development of an electronic tool to search multiple databases and check for potential duplication among health research applications funded by various agencies and other sources.¹² According to VA officials, this tool, when implemented, will allow these officials to identify in a timely manner applications that are most likely to be duplicative.

Officials at NIH, DOD, and VA acknowledged that duplication may sometimes go undetected. GAO performed searches on funded applications for breast cancer and PTSD research in NIH's database and DOD's Congressionally Directed Medical Research Programs' website using various key words frequently found in related research.¹³ While most of the applications identified did not appear to be duplicative, GAO identified two applications, one funded by VA and the other by DOD, that a VA program manager confirmed were duplicative as described in the databases. However, the databases were not updated to reflect modifications that had been made to the applications' aims. The VA official told GAO that these two applications were originally identical and submitted by the same principal investigator. VA funded one of the applications with the understanding that DOD would not fund the second, duplicative application. Subsequently, according to DOD officials, DOD funded the second application after the principal investigator made some modifications to its aims in order to make it no longer duplicative. However, VA officials did not have information on DOD's funding of the application or on how it had been modified. This example illustrates how the databases used to check for duplication in health research do not always provide comprehensive information needed to evaluate research for potential duplication across federal agencies during the funding decision process.

Actions Needed and Potential Financial or Other Benefits

Because multiple federal agencies fund research on topics of common interest, there is potential for unnecessary duplication. As long as research on similar topics continues to be funded by separate agencies, it is incumbent on the agencies to coordinate effectively with each other. While NIH, DOD, and VA take steps to check for duplication in the health research they fund, the agencies have opportunities to improve sharing of

¹¹ Officials told us that they check this information prior to funding to ensure that the application is not duplicative of other federally funded research conducted by the principal investigator.

¹² This tool will be completed by June 28, 2012, according to VA's contractor. After its completion, VA plans to use it internally to analyze its research portfolio and to identify potential duplication across research funded by various entities. VA also plans to make some information resulting from its use of the tool available to the public.

¹³ The searches we performed were not comprehensive or generalizable.

information needed to evaluate research for potential duplication when making funding decisions. In order to do so, the Director of NIH as well as the Secretaries of DOD and VA should

- determine ways to improve access to comprehensive electronic information on funded health research shared among agency officials and improve the ability of agency officials to identify possible duplication.

For example, NIH, DOD, and VA could collaborate to allow for more efficient, comprehensive searches to identify duplication, by, for example, increasing commonalities among their respective databases; providing additional information in their respective databases, such as more details on the aims and methodology of applications that may be useful to program managers evaluating applications for duplication; and ensuring contact information for agency officials associated with specific applications is made available in their respective databases, if possible. NIH, DOD, and VA could also provide program managers with information to help them identify when they receive similar applications and to monitor the funding status of these applications, such as which applications receive funding, and which are modified during the funding process.

Determining ways to improve access to comprehensive information and to improve officials' ability to identify duplication could help agency officials in their efforts to avoid duplication when determining which health research applications to fund.

Agency Comments and GAO's Evaluation

GAO provided a draft of this report section to HHS, DOD, and VA for review and comment. HHS and DOD provided written comments. DOD generally agreed with GAO's findings, and HHS did not state whether it agreed or disagreed. In its comments, on behalf of NIH, HHS provided more detail on NIH's policies and procedures concerning monitoring and managing potential overlap in funding, particularly within NIH. HHS also described an internal NIH database that is also available to VA staff and that provides more detailed information on grants than is included in NIH's public RePORTER database, but is not generally available to staff at other agencies. For this work, GAO focused on RePORTER because it is the NIH database that officials at other agencies told GAO they use when checking for information on NIH- or VA-funded research and is available to officials at all agencies. HHS and VA also provided technical comments, which were incorporated as appropriate. All written comments are reprinted in appendix IV. As part of its routine audit work, GAO will track the extent to which progress has been made to address the identified actions and report to Congress.

How GAO Conducted Its Work

The information contained in this analysis is based on findings from the products listed in the related GAO reports section as well as additional work GAO conducted. GAO used breast cancer and PTSD research as examples of areas of research that are funded by these three agencies. Within NIH, GAO focused on the National Cancer Institute and the

National Institute of Mental Health, because these entities fund the majority of breast cancer and PTSD research within NIH, respectively, according to NIH officials. Within DOD, GAO focused on the Defense Health Program and, within VA, the Office of Research and Development, because these entities fund the majority of health research within DOD and VA, according to officials with whom GAO spoke. GAO focused its work on coordination across federal agencies that impacts decisions to fund health research. GAO collected and analyzed documents provided by NIH, DOD, and VA officials. GAO did not focus its review on coordination within federal agencies. In addition, GAO searched the available databases containing information on applications funded by NIH, DOD, and VA—RePORTER and DOD’s Congressionally Directed Medical Research Programs website—to identify examples of potentially duplicative research applications funded by these agencies. GAO searched for the terms “breast cancer” and “PTSD” and then searched for terms that were frequently cited in titles that appeared to indicate potential duplication. GAO also interviewed 23 officials at NIH, DOD, and VA whom it selected because of their involvement in coordination across federal agencies when determining which research applications to fund in the areas of breast cancer and PTSD.

Related GAO Products

Defense Health: Coordinating Authority Needed for Psychological Health and Traumatic Brain Injury Activities. GAO-12-154. Washington, D.C.: January 25, 2012.

HHS Research Awards: Use of Recovery Act and Patient Protection and Affordable Care Act Funds for Comparative Effectiveness Research. GAO-11-712R. Washington, D.C.: June 14, 2011.

VA Health Care: VA Spends Millions on Post-Traumatic Stress Disorder Research and Incorporates Research Outcomes into Guidelines and Policy for Post-Traumatic Stress Disorder Services. GAO-11-32. Washington, D.C.: January 24, 2011.

National Institutes of Health: Awarding Process, Awarding Criteria, and Characteristics of Extramural Grants Made with Recovery Act Funding. GAO-10-848. Washington, D.C.: August 6, 2010.

VA Health Care: Progress and Challenges in Conducting the National Vietnam Veterans Longitudinal Study. GAO-10-658T. Washington, D.C.: May 5, 2010.

VA Health Care: Status of VA’s Approach in Conducting the National Vietnam Veterans Longitudinal Study. GAO-10-578R. Washington, D.C.: May 5, 2010.

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15. Military and Veterans Health Care

The Departments of Defense and Veterans Affairs need to improve integration across care coordination and case management programs to reduce duplication and better assist servicemembers, veterans, and their families.

Why This Area Is Important

In 2007, in reaction to media reports criticizing the deficiencies in the provision of outpatient services at Walter Reed Army Medical Center, various review groups investigated the challenges that the Departments of Defense (DOD) and Veterans Affairs (VA) faced in providing care to wounded, ill, and injured servicemembers. The review groups cited common areas of concern, including case management, which helps ensure continuity of care by coordinating services from multiple providers and guiding servicemembers' transitions between care providers, from active duty status to veteran status, or back to the civilian community. One of these review groups, the President's Commission on Care for America's Returning Wounded Warriors—commonly referred to as the Dole-Shalala Commission—issued a report noting that while the military services did provide case management, some servicemembers were being assigned multiple case managers, having no single person to monitor and coordinate their activities, which often resulted in confusion, redundancy, and delay in addressing servicemembers' health care issues.¹

To elevate the response needed to address the problems associated with the provision of care and services for returning servicemembers, DOD and VA established the Wounded, Ill, and Injured Senior Oversight Committee (Senior Oversight Committee) in May 2007. Co-chaired by the Deputy Secretaries of Defense and Veterans Affairs, the Senior Oversight Committee was designed to be the main decision-making body for the oversight, strategy, and integration of DOD's and VA's efforts to improve seamlessness across the recovery care continuum.² The committee included the most senior decision makers from both departments, who met on a routine basis to ensure timely decisions and actions, including ensuring that the recommendations of various review groups were properly evaluated, coordinated, implemented, and resourced.

Under the purview of the Senior Oversight Committee, DOD and VA jointly developed the Federal Recovery Coordination Program (FRCP) in response to the Dole-Shalala Commission's recommendation for an integrated approach to care management. Specifically, the FRCP was

¹President's Commission on Care for America's Returning Wounded Warriors, *Serve, Support, Simplify* (July 2007).

²The 2007 Dole-Shalala Commission report outlined a vision for a recovery care continuum that provides continuous and integrated care management across both DOD and VA to create seamless transitions between the many providers and facilities recovering servicemembers and veterans must navigate.

designed to assist Operation Enduring Freedom and Operation Iraqi Freedom servicemembers,³ veterans, and their families with access to care, services, and benefits provided through DOD, VA, other federal agencies, states, and the private sector. The FRCP was envisioned to serve "severely" wounded, ill, and injured servicemembers who are most likely to be medically separated from the military, including those who have suffered traumatic brain injuries, amputations, burns, spinal cord injuries, visual impairment, and post-traumatic stress disorder.⁴ The program uses coordinators to monitor and coordinate both the clinical and nonclinical services⁵ needed by program enrollees, by serving as the single point of contact among all of the case managers of DOD, VA, and other governmental and private care coordination⁶ and case management⁷ programs that provide services directly to servicemembers and veterans.

Separately, the Recovery Coordination Program (RCP) was established in response to the National Defense Authorization Act for Fiscal Year 2008 to improve the care, management, and transition of recovering servicemembers. It is a DOD-specific program that was designed to use coordinators to provide nonclinical care coordination to "seriously" wounded, ill, and injured servicemembers, who may return to active duty unlike those categorized as "severely" wounded, ill, or injured. The RCP is centrally coordinated by DOD's Office of Wounded Warrior Care and Transition Policy, but is implemented separately by each of the military services. Most of the military services have implemented the RCP within their existing wounded warrior programs, including the Navy Safe Harbor

³Operation Enduring Freedom, which began in October 2001, supports combat operations in Afghanistan and other locations, and Operation Iraqi Freedom, which began in March 2003, supported combat operations in Iraq and other locations. Beginning September 1, 2010, Operation Iraqi Freedom was referred to as Operation New Dawn.

⁴The Department of Defense established three injury categories—mild, serious, and severe. Servicemembers with "mild" wounds, illnesses, or injuries are expected to return to duty in less than 180 days; those with "serious" wounds, illnesses, or injuries are unlikely to return to duty in less than 180 days and possibly may be medically separated from the military; and those who are "severely" wounded, ill, or injured are highly unlikely to return to duty and also likely to medically separate from the military.

⁵For the purposes of this report, clinical services include services such as scheduling medical appointments and providing outreach education about medical conditions such as post-traumatic stress disorder. Nonclinical services include services such as assisting servicemembers with financial benefits and accessing accommodations for families.

⁶According to the National Coalition on Care Coordination, care coordination is a client-centered, assessment-based interdisciplinary approach to integrating health care and social support services in which an individual's needs and preferences are assessed, a comprehensive care plan is developed, and services are managed and monitored by an identified care coordinator.

⁷According to the Case Management Society of America, case management is defined as a collaborative process of assessment, planning, facilitation, and advocacy for options and services to meet an individual's health needs through communication and available resources to promote quality, cost-effective outcomes.

Program, the Air Force Warrior and Survivor Care Program,⁸ and the Marine Wounded Warrior Regiment. The Army Wounded Warrior Program and the U.S. Special Operations Command's Care Coalition also provide care coordination services using coordinators referred to as "advocates" that meet the requirements of the RCP, although they did not specifically implement the RCP program. Depending on how a military service's wounded warrior program is structured, a servicemember may receive either case management or care coordination services or both. For example, the Navy Safe Harbor Program only provides care coordination services and does not have a case management component, whereas the Marine Wounded Warrior Regiment provides all servicemembers with both case management and care coordination services.⁹

What GAO Found

Many recovering servicemembers and veterans are enrolled in more than one care coordination or case management program, and as a result, they may have multiple care coordinators and case managers, potentially duplicating agencies' efforts and reducing the effectiveness and efficiency of the assistance they provide. (See table below.) For example, although the FRCP and RCP were intended to serve different populations, a DOD official told GAO that shortly after the military services implemented the RCP, they began to provide assistance to servicemembers who were "severely" wounded, ill, and injured—individuals who may also be enrolled in the FRCP—because DOD officials believed these servicemembers would also benefit from having RCP coordinators.¹⁰ As a result, servicemembers may have care coordinators from both programs. In addition, recovering servicemembers and veterans who have a care coordinator also may be enrolled in one or more of the multiple DOD or VA programs that provide case management services to "seriously" and "severely" wounded, ill, and injured servicemembers, veterans, and their families. These programs include the military services' wounded warrior programs and VA's Operation Enduring Freedom/Operation Iraqi Freedom Care Management Program, among others. For one wounded warrior program—the U.S. Special Operations Command's Care Coalition—enrollees may be dually enrolled in another wounded warrior program because servicemembers that are part of the Special Operations

⁸The Air Force Warrior Survivor Care Program is an overarching wounded warrior program, which includes a care coordination component called the Air Force Recovery Care Program and a case management component called the Air Force Wounded Warrior Program.

⁹The Marine Wounded Warrior Regiment provides nonclinical case management services to its enrollees. Although it does not provide clinical case management services, the program does facilitate access to medical programs and care needs that have been identified for its servicemembers.

¹⁰According to the Army, they have been providing care to severely wounded, ill, and injured servicemembers since 2004.

Forces belong to a separate military service branch.¹¹ Servicemembers who have specialty needs also may have case managers affiliated with specialty programs or services, such as for polytrauma or spinal cord injury, during their recovery process, outside of, but in coordination with, wounded warrior programs.

Characteristics of Selected Department of Defense and Department of Veterans Affairs Care Coordination and Case Management Programs for "Seriously" and "Severely" Wounded, Ill, and Injured Servicemembers, Veterans, and Their Families

Program	Severity of enrollees' injuries ^a	Number of active enrollees (Sept. 2011)	Type of services provided		
			Clinical	Nonclinical	Recovery plan
DOD and VA Care Coordination Program					
Federal Recovery Coordination Program	Severe ^b	777	•	•	•
DOD Recovery Coordination Programs by Military Service ^c					
Navy Safe Harbor Program	Mild to severe	728		•	•
Air Force Recovery Care Program	Mild to severe	946 ^d		•	•
Marine Wounded Warrior Regiment's Recovery Coordination Program	Serious to severe	1,020 ^e		•	•
Other DOD Care Coordination Programs by Military Service					
Army Warrior Care and Transition Program: Army Wounded Warrior Program ^f	Severe	9,144 ^g		•	•
U.S. Special Operations Command's Care Coalition Recovery Program ^h	Serious to severe	115 ⁱ		•	•
DOD Case Management Programs by Military Service					
Army Warrior Care and Transition Program: Warrior Transition Units and Community Based Warrior Transition Units ^f	Serious to severe	9,778 ^g	•	•	•
Air Force Wounded Warrior Program	Serious to severe	1270 ^d		•	
Marine Wounded Warrior Regiment ^l	Serious to severe	1,020 ^e		•	
U.S. Special Operations Command's Care Coalition	Mild to severe	3,615 ⁱ		•	
VA Case Management Program					
VA Operation Enduring Freedom/Operation Iraqi Freedom Care Management Program	Mild to severe	50,256	•	•	•

Source: GAO analysis of DOD and VA program information.

Notes: The characteristics listed in this table are general characteristics of each program; individual circumstances may affect the enrollees served and services provided by specific programs. For the purposes of this report, clinical services include services such as scheduling medical appointments and providing outreach education about medical conditions such as post-traumatic stress disorder. Nonclinical services include services such as assisting servicemembers with financial benefits and accessing accommodations for families.

¹¹According to a U.S. Special Operations Command's Care Coalition Recovery Program official, when an enrollee is dually enrolled in another wounded warrior program, the U.S. Special Operations Command's Care Coalition Recovery Program takes the lead for providing nonclinical case management.