

March 2005

HOMELAND SECURITY

Much Is Being Done to Protect Agriculture from a Terrorist Attack, but Important Challenges Remain



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Why GAO Did This Study

U.S. agriculture generates more than \$1 trillion per year in economic activity and provides an abundant food supply for Americans and others. Since the September 11, 2001, attacks, there are new concerns about the vulnerability of U.S. agriculture to the deliberate introduction of animal and plant diseases (agroterrorism). Several agencies, including the U.S. Department of Agriculture (USDA), the Department of Homeland Security (DHS), the Department of Health and Human Services (HHS), the Environmental Protection Agency (EPA), and the Department of Defense (DOD), play a role in protecting the nation against agroterrorism. GAO examined (1) the federal agencies' roles and responsibilities to protect against agroterrorism, (2) the steps that the agencies have taken to manage the risks of agroterrorism, and (3) the challenges and problems that remain.

What GAO Recommends

To enhance the agencies' ability to reduce the risk of agroterrorism, GAO recommends, among other things, that (1) USDA examine the costs and benefits of developing stockpiles of ready-to-use vaccines and (2) DHS and USDA determine the reasons for declining agricultural inspections. USDA, DHS, and HHS generally agreed with our recommendations. DOD and EPA made technical comments but took no position on the report's recommendations.

www.gao.gov/cgi-bin/getrpt?GAO-05-214.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Robert Robinson, 202-512-3841, Robinsonr@gao.gov.

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Much Is Being Done to Protect Agriculture from a Terrorist Attack, but Important Challenges Remain

What GAO Found

After the terrorist attacks of September 11, 2001, federal agencies' roles and responsibilities were modified in several ways to help protect agriculture from an attack. First, the Homeland Security Act of 2002 established DHS and, among other things, charged it with coordinating U.S. efforts to protect against agroterrorism. The act also transferred a number of agency personnel and functions into DHS to conduct planning, response, and recovery efforts. Second, the President signed a number of presidential directives that further define agencies' specific roles in protecting agriculture. Finally, Congress passed legislation that expanded the responsibilities of USDA and HHS in relation to agriculture security.

In carrying out these new responsibilities, USDA and other federal agencies have taken a number of actions. The agencies are coordinating development of plans and protocols to better manage the national response to terrorism, including agroterrorism, and, along with several states, have conducted exercises to test these new protocols and their response capabilities. Federal agencies also have been conducting vulnerability assessments of the agriculture infrastructure; have created networks of laboratories capable of diagnosing animal, plant, and human diseases; have begun efforts to develop a national veterinary stockpile that intends to include vaccines against foreign animal diseases; and have created new federal emergency coordinator positions to help states develop emergency response plans for the agriculture sector.

However, the United States still faces complex challenges that limit the nation's ability to respond effectively to an attack against livestock. For example, USDA would not be able to deploy animal vaccines within 24 hours of an outbreak as called for in a presidential directive, in part because the only vaccines currently stored in the United States are for strains of foot and mouth disease, and these vaccines need to be sent to the United Kingdom (U.K.) to be activated for use. There are also management problems that inhibit the effectiveness of agencies' efforts to protect against agroterrorism. For instance, since the transfer of agricultural inspectors from USDA to DHS in 2003, there have been fewer inspections of agricultural products at the nation's ports of entry.

Burning Carcasses during the 2001 U.K. Outbreak of Foot and Mouth Disease



Source: U.S. Department of Agriculture.

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Abbreviations

APHIS	Animal Plant Health Inspection Service
ARS	Agricultural Research Service
CBP	Customs and Border Protection
CDC	Centers for Disease Control and Prevention
DHS	Department of Homeland Security
DOD	Department of Defense
EPA	Environmental Protection Agency
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
FMD	foot and mouth disease
GAO	Government Accountability Office
HHS	Health and Human Services
HSPD	Homeland Security Presidential Directive
NVSL	National Veterinary Services Laboratories
OIE	Office Internationale des Epizooties
PPQ	Plant Protection and Quarantine
USDA	United States Department of Agriculture

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United States Government Accountability Office
Washington, D.C. 20548

March 8, 2005

The Honorable Daniel K. Akaka
Ranking Minority Member
Subcommittee on Oversight of Government Management, the Federal
Workforce, and the District of Columbia
Committee on Homeland Security and Governmental Affairs
United States Senate

The Honorable Bennie G. Thompson
Ranking Minority Member
Committee on Homeland Security
House of Representatives

U.S. agriculture annually generates more than \$1 trillion in economic activity, including more than \$50 billion in exports, and provides an abundant and economical supply of food for Americans and others around the world.¹ Protecting agriculture is therefore critically important to the well-being of Americans and the U.S. economy. While the United States has never experienced a terrorist attack against agriculture, this important industry is vulnerable for a variety of reasons, including the relative ease with which livestock and crop diseases could be obtained and disseminated. Many of these diseases are endemic in other parts of the world and can be extracted from common materials, such as soil. Farms in general are easily accessible because they are located in rural areas and have minimal security, especially crop farms. Moreover, the highly concentrated breeding and rearing practices of our livestock industry make it a vulnerable target for terrorists because diseases could spread rapidly and be very difficult to contain. For example, between 80 and 90 percent of grain-fed beef cattle production is concentrated in less than 5 percent of the nation's feedlots. Therefore, the deliberate introduction of a highly contagious animal disease in a single feedlot could have serious economic consequences.

Most experts believe that the major effect of an attack on agriculture would be economic.² While many animal diseases are not transmissible to

¹These agricultural activities include such items as farming, food-processing, and transportation.

²See appendix II for a summary of experts' observations; many experts held similar views.

humans, others are, and when this occurs there could be serious human health consequences. For example, one of these transmissible diseases, avian influenza, has caused 42 human deaths in Asia since January 2004, when accidental outbreaks infected poultry flocks. Experts also believe that livestock and poultry are more likely to be targets of a terrorist attack than crops because deliberately spreading plant diseases is inherently more difficult, requiring, among other things, favorable weather conditions such as wind. One scenario of particular concern is the intentional introduction of foot and mouth disease, a highly contagious livestock disease that does not typically affect humans. The 2001 accidental outbreak of the disease in the United Kingdom caused approximately \$5 billion dollars in losses to the food and agriculture sector, as well as comparable losses in the tourism industry. By the time this disease was eradicated, over 4 million animals had been slaughtered and burned, and the nation was banned from exporting livestock and animal products that could transmit the virus. Numerous other animal and plant diseases are also of concern, including classical swine fever and soybean rust. Appendix III provides information on the animal and plant diseases of primary concern that the U.S. Department of Agriculture (USDA) believes could be used in an attack against agriculture.

In 1998, we reported that the United States did not have a process in place to detect and respond to a terrorist attack against agriculture and that if such an attack were to occur, the country would rely on the process used to respond to naturally occurring diseases.³ Specifically, we reported that USDA—the agency primarily responsible for responding to major outbreaks of disease involving livestock, poultry, and crops—lacked a comprehensive, national strategy for responding to a widespread attack. Among the problems we identified were concerns about the ability of farmers, local veterinarians, and other experts to detect, correctly identify, and report cases of disease in a timely manner.⁴ We also found that some states had not developed or tested emergency response plans.

³U.S. Government Accountability Office, *U.S. Agriculture: Vulnerability of Crops and Livestock to a Biological Attack*, [GAO/C-RCED-98-1](#) (Washington, D.C.: May 8, 1998).

⁴Farmers may be the first to recognize the presence of an animal disease through normal routine care and would then request a veterinarian—usually USDA-accredited—to diagnose the disease. Accredited veterinarians are supposed to recognize clinical signs and lesions of exotic animal diseases.

Since we last reported, the terrorist attacks of September 11, 2001, have heightened concerns about agriculture's vulnerability to terrorism, including the deliberate introduction of livestock, poultry, and crop diseases. Attacks targeted at agriculture are commonly referred to as agroterrorism. For the purposes of this report, "agroterrorism" refers to the deliberate introduction of animal and plant diseases at the farm level, prior to further processing or production. Although other definitions of agroterrorism can be broader and include the entire food chain, our definition does not refer to the deliberate contamination of manufactured food items, which was outside the scope of this review. In this context, you asked that we address (1) changes that have taken place since September 2001 in the roles and responsibilities of federal agencies to protect against agroterrorism, (2) specific steps that the United States has taken to manage the risks of agroterrorism, and (3) what challenges and problems remain.

To identify the changes in agencies' roles and responsibilities to protect against agroterrorism, we reviewed laws, regulations, and presidential directives prior to and after the terrorist attacks of September 11, 2001. We also interviewed officials from the Department of Homeland Security (DHS); the USDA; the Food and Drug Administration (FDA)⁵ and Centers for Disease Control and Prevention (CDC) within the Department of Health and Human Services (HHS); the Environmental Protection Agency (EPA); the Department of Defense (DOD); and the Department of Justice. To examine the specific steps that the United States has taken to manage the risks of agroterrorism, we reviewed and analyzed unclassified agency documents and contacted federal and state offices of Inspectors General to assess what work has been done in relation to agroterrorism.⁶ We also conducted structured interviews in person or via telephone with officials in five states, selected in part for their leading role in producing agricultural commodities sold before processing. These officials included representatives from state departments of agriculture, emergency management, and homeland security offices; agricultural inspectors from DHS and USDA; and veterinarians, plant health, and other officials from regional USDA and FDA offices. We examined the steps taken by the agencies in the context of our work on homeland security risk

⁵FDA is responsible for ensuring the safety and security of certain farm products including fruits, vegetables, and milk.

⁶We also reviewed classified documents, but none of that information is included in this report.

management.⁷ To determine what challenges may remain, we conducted structured interviews with experts from academia, private think tanks, and other research institutions. We also reviewed an extensive body of relevant literature, attended conferences, and spoke with industry and agency officials. Additional details about the scope and methodology of our review are presented in appendix I. We conducted our review from February 2004 through January 2005 in accordance with generally accepted government auditing standards.

Results in Brief

Since the terrorist attacks of 2001, federal agencies' roles and responsibilities have been modified to protect against agroterrorism. Under the Homeland Security Act of 2002, DHS was established and charged with responsibility for coordinating national efforts to protect against terrorism, including agroterrorism. As a result of this legislation, DHS also assumed responsibility for certain functions previously performed by other agencies, and some personnel who performed those functions were transferred to DHS. For example, the Federal Emergency Management Agency (FEMA), including its personnel, was transferred to DHS which gave it the responsibility for planning for emergencies and major disasters. Most of USDA's agricultural inspectors were transferred to DHS, although USDA retains some functions related to inspecting agricultural products, such as conducting specialized inspections; developing and supervising training; and developing policies and procedures. This transfer gave DHS the role to prevent the entry of infectious diseases and pests into the United States. As a part of this transfer, DHS and USDA signed an interagency memorandum of agreement that, among other things, authorized USDA to request the use of DHS inspectors during a major outbreak—whether intentional or natural—of agricultural pests and diseases. Also, a number of presidential directives were issued that further define agencies' roles and responsibilities for protecting against agroterrorism. For example, Homeland Security Presidential Directive (HSPD)-9 defines how the various agencies will work together to protect the agriculture and food industries. Legislation has also expanded the responsibilities of USDA and HHS. Specifically, through the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (the "Bioterrorism Act of 2002"), USDA and HHS gained authority to regulate agents and toxins that pose a serious threat to public health, animals, plants, and animal and plant

⁷U.S. Government Accountability Office, *Homeland Security: A Risk Management Approach Can Guide Preparedness Efforts*, [GAO-02-208T](#) (Washington, D.C.: Oct. 31, 2001).

products. The agencies believe these agents could be used in a terrorist attack.

In carrying out their new roles and responsibilities, federal agencies have taken steps to better manage the risks of agroterrorism, including development of national plans and the adoption of standard protocols. For example, DHS led the development of a National Response Plan that, for the first time, spells out how the nation would work together in the event of a terrorist attack on its critical infrastructure sectors, including agriculture. In addition, federal agencies have adopted standard protocols for managing such emergencies and, through federal grants, have provided incentives for states to adopt similar protocols. Among other things, these protocols include establishing emergency operation centers and a chain of command. To test these protocols and response capability in general, federal and state officials are conducting test exercises. At the federal level, a number of other agency-specific actions are also under way, including the following:

- FDA and USDA are in varying stages of conducting vulnerability assessments to determine which agricultural products are most vulnerable to terrorist attacks.
- USDA and HHS are enhancing their diagnostic and monitoring capability by creating laboratory networks.
- Agencies have formed numerous working groups to protect agriculture. For example, DHS created a Food and Agriculture Sector Coordinating Council to help the federal government and industry share ideas about how to mitigate the risk of an attack on agriculture. DHS recently created a Government Coordinating Council to oversee the tasks of the various working groups.
- USDA has established a steering committee to guide efforts to develop a National Veterinary Stockpile that, among other things, is intended to address what vaccines are needed to respond to animal diseases most damaging to human health and the economy.
- DHS, USDA, and HHS have funded research to address a range of issues related to agroterrorism. For example, DHS provided \$33 million in 2004 to establish two university-based Centers of Excellence to oversee research on post-harvest food protection and on diseases that affect livestock and poultry.

-
- USDA created 16 Area and Regional Emergency Coordinator positions to help states develop individual emergency response plans and to serve as a technical resource for states, industry, and other stakeholders.

While these actions are important and necessary steps, the United States still faces several complex challenges that limit the nation's ability to quickly and effectively respond to a widespread attack on livestock and poultry:

- Many United States' veterinarians lack training needed to recognize the signs of foreign animal diseases. According to a 2004 report produced for USDA, while all U.S. veterinary schools offer information about foreign animal diseases, only about 26 percent of their graduates have taken a course specifically dedicated to foreign animal diseases. Furthermore, foreign animal disease training is not required for USDA-accredited veterinarians, the ones most likely to be called upon if livestock were attacked. Two years ago, USDA drafted a rule to make such training a prerequisite for accreditation, but other draft rules have taken precedence and caused it to be delayed.
- USDA does not use rapid diagnostic tools to test animals at the site of an outbreak. They employ this technology only within selected laboratories. According to experts, on-site use of these tools is critical to speeding diagnosis, containing the disease, and minimizing the number of animals that need to be slaughtered. DOD uses rapid diagnostic tools to identify disease agents on the battlefield, but USDA officials consider this technology to be still under development. Nevertheless, USDA officials told us that they agree it is important to evaluate the costs and benefits of developing and validating these tools for use outside of a laboratory setting.
- Vaccines cannot be deployed within 24 hours of an outbreak as called for in HSPD-9. First, supplies are limited because USDA maintains vaccines for only one foreign animal disease—foot and mouth disease—since this disease is so highly contagious. USDA generally prefers to immediately slaughter diseased animals rather than to vaccinate them. Also, these vaccines cannot be rapidly deployed because they are not stored in a “ready-to-use” state and would first need to be sent to the United Kingdom for bottling and testing. USDA officials told us that it has recently established a steering committee that will address vaccine stockpiling issues, but it is not clear that the committee will address the

costs and benefits of developing ready-to-use vaccines that can be quickly deployed against animal diseases of primary concern.

- Current USDA policy requires a complex process for deciding if and when to use vaccines—a process that could be too lengthy during an attack. USDA officials agree that they can explore the possibility of designing a more rapid decision-making process but cautioned this process is complex and takes into consideration many variables, such as the location of outbreaks in relation to susceptible animal populations, as well as trade concerns and restrictions.

We also found several management problems that reduce the effectiveness of the agencies' routine efforts to protect against agroterrorism.

- Agricultural inspections at ports of entry—the first line of defense against the entry of foreign animal and plant diseases—have declined over the past 2 years at a time when imports have increased. Neither USDA nor DHS officials can fully explain why this drop occurred. Since the transfer of most USDA agricultural inspectors to DHS, data show a decline in the number of agricultural inspections at ports of entry nationwide from 40.9 million in fiscal year 2002, when USDA was fully responsible for agricultural inspections, to 37.5 million in fiscal year 2004, when DHS had primary responsibility. However, officials pointed out some factors that may be contributing to this reduction, most importantly, the large number of unfilled vacancies for agricultural inspectors. DHS officials told us they plan to address this shortage by hiring more than 500 inspectors by fiscal year 2006, but also stated that the ability to hire and deploy new inspectors is impeded by the length of time needed for background checks. Inspectors also told us that another factor contributing to the decline in inspections is that they do not always receive timely information about high-risk cargo that needs to be inspected. While DHS officials told us these instances represent a small fraction of inspections, they agreed that changes can be made to improve the flow of information.
- There are weaknesses regarding the flow of critical information among key stakeholders. First, DHS is not promptly and effectively seeking input from key stakeholders on critical national guidance documents. For example, officials in key agricultural states and industry representatives told us that DHS did not give them enough time to review and comment on draft federal guidance, including the National Response Plan. As a result, state officials and industry representatives

we spoke with are concerned that the response plan may set unrealistic expectations regarding the states' capabilities to meet the requirements of the plan. Second, "after-action" reports on the results of national and state-level test exercises that simulate the consequences of a major agroterrorism event and test the response capabilities needed to manage such an event, are not systematically shared among key stakeholders. DHS officials told us that they are developing a Homeland Security Information Network that could facilitate sharing this information.

- States are not receiving sufficient technical federal assistance in developing emergency response plans and other activities to effectively prepare them to deal with agroterrorism. This lack of assistance results in part from implementation problems associated with the Area and Regional Emergency Coordinators positions—USDA has not yet filled all 16 of these positions. USDA officials told us they face difficulties hiring these coordinators due to the extensive travel required since each coordinator must cover a broad geographic area. Federal and state officials we interviewed told us that, even if the vacancies were filled, the current number of emergency coordinators is insufficient, as each coordinator is responsible for up to 6 states on the animal health side and 27 states on the plant side.
- Shortcomings exist in DHS' coordination of federal working groups and research efforts. Although DHS has lead responsibility for coordinating efforts to protect against agroterrorism, officials from other agencies told us that the tasks assigned to various interagency working groups are not consistent with activities outlined in national guidance, including important documents such as the National Response Plan. This could lead to confusion and undermine the efforts of "national" planning. DHS has also not developed controls to coordinate research efforts with other agencies, even though HSPD-9 specifically designates DHS as the agency responsible for coordinating research efforts to protect against agroterrorism. For example, some of the DHS-supported activities at the Centers of Excellence, such as vaccine research, appear to duplicate research conducted by USDA. USDA officials told us they agree that there needs to be more coordination and cooperation between USDA and DHS on research activities.
- Finally, while steps are being taken to integrate agencies' diagnostic laboratory networks, USDA has not yet integrated the databases of the member laboratories within its own networks, nor have they integrated

with HHS laboratories for diseases of common concern. As a result, USDA's ability to look at diagnostic data from across the country, detect trends, and implement a response is limited, and HHS may not receive timely information from USDA on agricultural diseases that could spread to humans. USDA plans to integrate information from its laboratory networks for diseases of concern by mid-2005 and has established an interagency working group with HHS to discuss integrating their respective laboratory networks.

We are making several recommendations aimed at improving agencies' efforts to mitigate and quickly and effectively respond to a widespread attack on animal agriculture and to address routine management problems that impair the agencies' ability to protect against agroterrorism in general. For example, we are recommending that the Secretary of Agriculture, within the context of the agency's overall risk management efforts, expedite the review and issuance of the draft rule on USDA's accreditation process for veterinarians, which would require training in recognizing foreign animal diseases; evaluate the costs and benefits of using rapid diagnostic tools at the site of an outbreak; examine the cost and benefits of developing stockpiles of ready-to-use vaccines that can be quickly deployed against animal diseases of primary concern; and simplify the decision-making process for determining if and/or when to use vaccines to control an outbreak to ensure that rapid decisions can be made in the event of a terrorist attack. We are also recommending that the Secretaries of Agriculture and Homeland Security work together to analyze agricultural inspections data to identify reasons for the decline in agricultural inspections and areas for improvement.

In commenting on a draft of this report, USDA, DHS, and HHS generally concurred with the report's recommendations. USDA said that it found the report offered a number of insightful and appropriate recommendations but also raised some concerns regarding rapid diagnostic tools and vaccines. DHS noted that it was in the process of implementing several corrective actions in response to our report. HHS welcomed the attention to animal diseases. The agencies also provided additional information, comments, and clarifications on the report's findings that we have addressed as appropriate throughout the report. DOD and EPA took no position on the report's contents but provided minor technical comments that we incorporated as appropriate.

Background

Concentrated Livestock Production

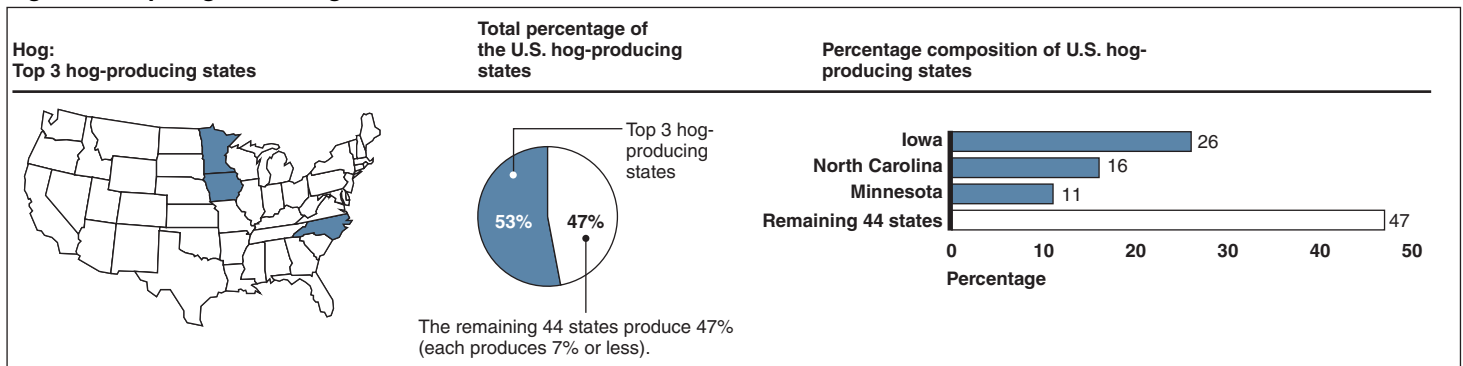


Source: Egames, Inc.

Livestock production generated \$106 billion in farm revenue, or more than one-half of all farm revenue in 2001. Intensive livestock production in which large numbers of poultry, swine, and dairy and beef cattle are held in confinement facilities accounted for about \$80 billion of this revenue. As a result, a few areas contain a very large population of animals that are at risk.

Experts believe that the deliberate introduction of animal and plant diseases at the farm level would cause severe economic disruption given that agriculture accounts for 13 percent of the U.S. gross domestic product and 18 percent of domestic employment. In the event of agroterrorism, losses to farmers could result from decreases in the price of livestock, poultry, and crops; reductions in sales due to a decline or halt in productivity; inability to move animals to the market; and costs associated with disease control, including disposal of contaminated animals or plants. Losses could be particularly severe in states where animal and crop production is concentrated. For example, three states produce 53 percent of the total U.S. hog production and three states produce 39 percent of the total U.S. soybean production.⁸ (See figs. 1 and 2.) Substantial losses could also arise from halting exports; the value of U.S. agricultural exports in fiscal year 2003 exceeded \$56 billion.

Figure 1: Top Hog-Producing States in 2002

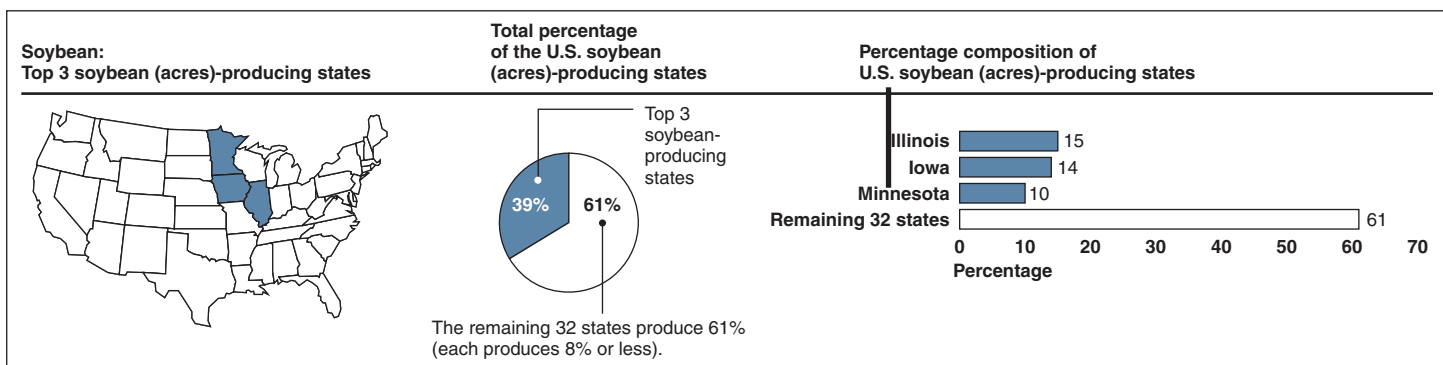


Source: U.S. Department of Agriculture, 2002 Census of Agriculture.

Note: Three states did not disclose their information.

⁸See appendix IV illustrating the concentrated nature of production for other select animals and plants.

Figure 2: Top Soybean-Producing States in 2002



Source: U.S. Department of Agriculture, 2002 Census of Agriculture.

Note: Nine states do not produce soybeans. Six states did not disclose their information.

USDA has primary responsibility for protecting the agriculture sector. Within USDA, the Animal and Plant Health Inspection Service (APHIS) is responsible for protecting America’s animals and plants from agricultural pests and diseases. APHIS’s Veterinary Services operates the National Veterinary Services Laboratories (NVSL), which is responsible for activities such as training and approving personnel from state and university diagnostic laboratories to conduct diagnostic tests for foreign animal diseases. NVSL is composed of four facilities, three of which are located in Ames, Iowa. The fourth, the Foreign Animal Disease Diagnostic Laboratory, is located at the Plum Island Animal Disease Center off the coast of New York. The Plum Island Animal Disease Center also houses the North American Foot and Mouth Disease Vaccine Bank.⁹ Regarding plant health, APHIS’ Plant Protection and Quarantine (PPQ) program is responsible for safeguarding crops from pests and diseases.¹⁰

USDA also supports research into protecting the agricultural sector. USDA’s Cooperative State Research, Education, and Extension Service funds university-based agricultural research, including research on

⁹The North American Foot and Mouth Disease Vaccine Bank located at Plum Island Animal Disease Center was developed in 1982 and is jointly owned by the United States, Canada, and Mexico.

¹⁰APHIS also has a Wildlife Services Program, which conducts surveillance and monitoring of wild animal populations that may potentially impact livestock by spreading disease. Wildlife Services employees have been especially trained to assist Veterinary Services personnel during animal health emergencies.

agricultural biosecurity. In addition, USDA's in-house research agency, the Agricultural Research Service (ARS), conducts research in fields that complement homeland security efforts, such as the development of vaccines. The Agricultural Research Service also conducts research at the Plum Island Animal Disease Center.

USDA's Food Safety and Inspection Service is responsible for the safety of meat, poultry, and certain egg products, while FDA is responsible for shell eggs, seafood, and milk. In fiscal year 2003, USDA received approximately \$495 million for homeland security activities, which included those that address agroterrorism and other routine USDA programs. FDA received approximately \$160 million in fiscal year 2003 for homeland security efforts, including protecting against agroterrorism.

Other federal agencies play a part in protecting the agriculture sector. Examples include:

- If an outbreak of zoonotic disease—that is, a disease that can infect and possibly cause death to both animals and humans—occurs, CDC becomes involved to help control the spread of the disease and minimize the impact of the outbreak.
- In the event of a disease outbreak, EPA provides technical support to federal and state agencies and the private sector to ensure protection of land, drinking water, and air from potential contamination associated with the disposal of diseased animal carcasses and infected plant material. EPA is also responsible for reviewing and approving the use of pesticides to prevent the spread of crop and animal diseases, both during an emergency and for prevention purposes.
- In the event of an agricultural emergency that USDA cannot handle alone, DOD provides veterinarians from its Veterinary Corps to USDA under a Memorandum of Understanding. In addition, the U.S. Army Medical Research Institute of Infectious Diseases in Fort Detrick, Maryland, conducts research designed to help protect soldiers from diseases, including many that are zoonotic and may be potential agroterrorism threats.

International organizations also play a role, particularly the Office Internationale des Epizooties (OIE), an organization headquartered in

Paris, France, that has 166 member countries, including the United States.¹¹ OIE classifies member countries or certain zones within these countries as being disease-free if they meet certain criteria detailed in the OIE International Animal Health Code. The international community generally places a high value on products from countries that OIE classifies as disease-free without the use of vaccination. Such countries can export both live animals and animal products easily to other countries. In contrast, countries that are classified as disease-free but who use vaccines are restricted in their ability to trade. Most countries that are foot and mouth disease (FMD) - free without vaccination resort to a “stamping out,” or cull and burn, process to eradicate the disease. The United Kingdom followed this process during the FMD outbreak in 2001. As a member state of OIE, the United States would also generally follow this process.¹²

Federal Agencies’ Roles and Responsibilities Were Modified to Protect against Agroterrorism

Following the terrorist attacks of 2001, Congress and the President modified the roles and responsibilities of federal agencies to better protect against agroterrorism. Congress passed the Homeland Security Act of 2002,¹³ establishing the Department of Homeland Security as the chief coordinating agency for efforts to protect the United States from terrorist acts, including agroterrorism. To outline agency goals and tasks for protecting against agroterrorism, the President issued four Homeland Security Presidential Directives. Congress also passed legislation that clarifies USDA’s responsibilities over agriculture and food security.

¹¹The OIE is also known as the World Animal Health Organization.

¹²According to USDA officials, OIE now recognizes that countries may regionalize. This means that, in the past, when OIE evaluated the animal disease situation in a country intending to export animals and/or animal products, it judged the country as a whole. If an infectious disease existed somewhere within a country’s borders, or if its presence was suspected, the whole country was considered infected. Today, a country may be able to trade if that country can demonstrate that the disease is regionalized. In light of this, USDA officials told us that they would remain flexible about how to handle the “stamping out process”; however, according to USDA’s draft procedure manual for contagious animal diseases, all susceptible animals on infected farms and those within certain proximity would still be depopulated as quickly as possible to stop the spread of the disease.

¹³Homeland Security Act of 2002, Pub. L. No. 107-296, 116 Stat. 2135.

The Department of Homeland Security Is Responsible for Coordinating Efforts to Protect against Agroterrorism and Has Absorbed Staff and Functions from Other Agencies

The Homeland Security Act of 2002 created the Department of Homeland Security and assigned the new agency lead coordinating responsibility for protecting the nation against terrorist acts, including agroterrorism. The act transferred functions and personnel from other agencies to DHS, which allowed it to accomplish this role. For example, the Homeland Security Act of 2002 transferred the functions and personnel of FEMA, which had been responsible for mitigating, planning for, and responding to natural emergencies and major disasters, into DHS to support the new agency's responsibility for protecting the United States from terrorist attacks. In addition, DHS is responsible for consolidating federal response plans for various emergencies, including agroterrorism, into a single coordinated plan, which is called the National Response Plan. DHS is also responsible, through FEMA, for providing emergency response to terrorist attacks, including managing the response, coordinating federal response resources, and aiding recovery.¹⁴ Under federal law, once the President makes an official declaration of an emergency or a major disaster, DHS is authorized to direct federal agencies to support state and local efforts; coordinate relief assistance; provide technical and advisory assistance to state and local governments for management, control, and reduction of immediate threats to public health and safety; and provide financial assistance.¹⁵

The Homeland Security Act of 2002 transferred most of USDA's responsibility for conducting agricultural import inspections to DHS, which provided DHS with the capability to recognize and prevent the entry of organisms that may be used for agroterrorism. The act also authorized the transfer of no more than 3,200 inspector positions from USDA's Plant Protection and Quarantine Unit to DHS.¹⁶ DHS and USDA signed an interagency Memorandum of Agreement that, among other things, further clarified the responsibilities of both agencies at the border. Pursuant to this agreement, USDA may request the use of DHS inspectors during a major

¹⁴In addition to receiving authority from the Homeland Security Act, DHS derives its authority to oversee planning, response, and recovery functions, through FEMA, from the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1974, Pub. L. No. 93-288, as amended.

¹⁵Through an interagency agreement, FEMA, working under the authority of the Secretary of Agriculture, can support federal, state, and local governments in agricultural emergencies.

¹⁶Although most of the inspectors from USDA's Plant Protection and Quarantine unit transferred to DHS, all of USDA's inspectors in its Veterinary Services unit remained in USDA.

animal or plant health incident of national significance—whether intentional or natural.¹⁷ DHS acquired USDA's authority to inspect passenger declarations and cargo manifests, international passengers, baggage, cargo, and conveyances,¹⁸ and hold suspect articles for quarantine to prevent the introduction of plant or animal diseases. (See fig. 3.) USDA retained its traditional authorities to conduct veterinary inspections of live, imported animals; establish policy for inspections and quarantine functions; provide risk analysis; develop and supervise training on agriculture for DHS and USDA inspectors; conduct specialized inspections of plant or pest material; and identify agricultural pests. Under DHS' usual practices, a DHS inspector who comes across a questionable agricultural product should hold it and turn the item over to USDA inspectors for a more thorough analysis of its potential threat to U.S. agriculture.

Figure 3: Agricultural Inspector Transferred to DHS Inspecting Suspect Cargo



Source: GAO.

¹⁷DHS Agreement Number BTS-03-0001.

¹⁸Though neither the Homeland Security Act of 2002 nor the Memorandum of Agreement between USDA and DHS define "conveyance," the term typically means ships, aircraft, vehicles, buses, and rail cars.

The Homeland Security Act of 2002 also consolidated research efforts in chemical, biological, and nuclear defense by transferring a number of research facilities to DHS, including USDA's Plum Island Animal Disease Center. The center is the only place in the United States where certain highly infectious foreign animal diseases are studied, including FMD. Since the transfer, DHS has assumed responsibility for the security and management of the facility. Although USDA still administers its own research and diagnostic programs on the island, DHS and USDA have established a Senior Leadership group at the center to integrate research efforts in general and to coordinate the management for joint research projects. For example, this group integrates USDA and DHS research efforts on FMD.

The Homeland Security Act of 2002 transferred the Office for Domestic Preparedness and its grant-making functions from the Department of Justice's Office of Justice Programs to DHS.¹⁹ This transfer established DHS as the primary source of much federal homeland security funding to state and local governments. In fiscal year 2005, DHS will distribute formula and discretionary grants to the states through the Homeland Security Grant Program.²⁰ These grants have 2-year performance periods and support expenditures, which include planning, organizing, equipment, training, test exercises, and management and administration. DHS gives states the flexibility to choose which emergency "disciplines"—such as law enforcement, hazardous material response, and public works—to fund, using the grants. Most DHS grant programs require states to obligate not less than 80 percent of the total grant award to local units of government.²¹ In the program application kit, DHS provides guidance on the types of expenditures that are allowable. Beginning in fiscal year 2004, DHS provided states with examples of resources, which could be acquired with grant funds for prevention, response, and recovery efforts related to agricultural and/or food security preparedness. These resources include

¹⁹The emergency preparedness grant programs administered by HHS, including those of CDC and FDA, were not transferred to DHS.

²⁰The FY 2005 Homeland Security Grant Program combines six separate grant programs into one application. These programs are the State Homeland Security Program, the Law Enforcement Terrorism Prevention Program, the Citizen Corps Program, Emergency Management Performance Grants, the Metropolitan Medical Response System Program, and the Urban Areas Security Initiative.

²¹Any expenditure by state or local entities must be made in accordance with the state or urban area's homeland security strategy, which each state has submitted to DHS.

agricultural response equipment, and agriculture-related test exercises and training.

Finally, the Homeland Security Act of 2002 created the Information Analysis and Infrastructure Protection Directorate in DHS and transferred intelligence, law enforcement, and vulnerability assessment functions from other agencies into the directorate.²² Congress and the President have tasked DHS, through this directorate, with developing a comprehensive national plan to secure critical infrastructure sectors of the United States. Accordingly, DHS has developed its interim National Infrastructure Protection Plan, which includes strategies for securing the agriculture sector. In addition to developing the plan, DHS is responsible for assessing and identifying the nature and scope of terrorist threats to the homeland based on information received and analyzed by other government agencies. To do so, DHS receives information from the Federal Bureau of Investigations, the Central Intelligence Agency, and other intelligence agencies and assesses whether the combined information indicates a threat to critical infrastructures.

Presidential Directives Define Agency Responsibilities for Protecting against Agroterrorism

Following the creation of DHS, the President issued four directives that further define agencies' roles and responsibilities for protecting against terrorism. The most important of these directives in relation to agriculture is HSPD-9, which was released in January 2004. The directive establishes a national policy to defend the agriculture and food system against terrorist attacks, major disasters, and other emergencies. Specifically, HSPD-9 outlines goals and assigns lead and supporting roles to agencies to achieve these goals. (See fig. 4.) There are seven categories outlined in HSPD-9: awareness and warning; vulnerability assessments; mitigation strategies; response planning and recovery; outreach and professional development; research and development; and budget. Federal agencies, especially DHS, USDA, and HHS, are assigned lead responsibilities to achieve the stated goals. To accomplish the tasks outlined in the seven categories, lead agencies often must coordinate with secondary or supporting agencies and, in some instances, with states and private industry as well. For example, HSPD-9 directs DHS to improve awareness and warning capabilities by coordinating with other agencies to develop a biological threat awareness capacity that will enhance detection and characterization of agroterrorism.

²²Agencies from which functions were transferred include the Departments of Justice, Defense, and Energy.

The directive also designates DHS as the lead agency in ensuring that the combined federal, state, and local response capabilities are adequate to respond quickly to a terrorist attack or other emergencies affecting agriculture or food. HSPD-9 also directs DHS to oversee a national biological surveillance system that will combine surveillance information collected from several agencies with threat and intelligence information to allow DHS to characterize threats more quickly. According to DHS officials, this interagency effort will help them differentiate between natural and intentional outbreaks.

Likewise, HSPD-9 assigns lead tasks to USDA and HHS for agriculture and food matters, respectively. Specific tasks for USDA and HHS include developing safe, secure, and state-of-the-art agriculture laboratories that research and develop diagnostic capabilities for foreign animal and zoonotic diseases.²³ Also under HSPD-9, USDA and HHS, in coordination with EPA and DHS, are the lead agencies responsible for improving existing recovery systems that will stabilize agriculture production and rapidly remove and dispose of contaminated animals, plants, and food products, and decontaminate premises following an agroterrorism attack.

²³HSPD-9 calls for nationwide laboratory networks for food, veterinary, and plant health that integrate existing federal and state laboratory resources and are interconnected.

Figure 4: Federal Agencies' Roles and Responsibilities as Defined by Homeland Security Presidential Directive 9

Agroterrorism attack
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Agency responsibility		Prevention and preparation					Response and recovery					Agency responsibility
		DHS	USDA	HHS	EPA	Other federal	DHS	USDA	HHS	EPA	Other federal	
Awareness and warning	Monitoring and surveillance		Lead	Lead	Lead	Lead	Lead	Secondary	Secondary	Secondary	Secondary	Ensure adequate local response capability
	Intelligence and analysis	Lead	Secondary	Secondary	Secondary	Lead						
	Threat awareness	Lead	Secondary	Secondary	Secondary	Secondary	Lead	Secondary	Secondary	Secondary	Secondary	Develop agriculture component for National Response Plan
Vulnerability assessments	Expand and conduct vulnerability assessments	Lead	Lead	Lead			Secondary	Lead	Lead	Secondary		Enhance agriculture recovery systems
Mitigation strategies	Develop and implement strategies	Lead	Secondary	Secondary	Secondary	Lead						
	Expand screening procedures	Lead	Lead	Lead				Lead				Study development and use of financial risk management tools encouraging self-protection for vulnerable agricultural food enterprises
Outreach and professional development	Information sharing and analysis	Lead	Secondary	Secondary		Secondary						
	Higher education programs	Secondary	Lead	Lead		Secondary	Lead	Secondary	Secondary			Develop a national veterinary stockpile
	Specialized training	Lead	Lead	Lead			Lead	Secondary	Secondary			
Research and development	Develop disease countermeasures	Lead	Lead	Lead	Lead	Lead						
	Develop plan to provide secure diagnostic and research laboratories	Lead	Lead				Secondary	Lead	Secondary	Secondary		Develop a national plant disease recovery system
	Establish university centers of excellence	Lead	Secondary	Secondary				Secondary				

Lead agency responsibility
 Secondary agency responsibility

Sources: GAO, based on analysis conducted for DHS by ANSER (Analytic Services, Inc.).

HSPD-9 builds upon and augments tasks outlined in prior Homeland Security Presidential Directives. HSPD-5 directs DHS to coordinate development of the new National Response Plan that incorporates national prevention, preparedness, response, and recovery plans into a single, all-

hazard plan. USDA, in collaboration with other agencies including DHS, were tasked with writing the sections of the National Response Plan guiding U.S. efforts to respond to an attack on U.S. agriculture. HSPD-5 also directs DHS to consult with other federal agencies, state, and local governments to implement a common National Incident Management System, which standardizes planning, communications, and public information during an incident in which multiple federal and state agencies are involved. A key component of the National Incident Management System is the Incident Command System, which is designed to allow multiple agencies to coordinate the command, operations, planning, logistics, finances, and administration during an incident. HSPD-5 further directs agencies to require the adoption of the National Incident Management System as a condition for states to receive federal preparedness assistance.

HSPD-7 defines USDA and HHS as “sector-specific agencies” with responsibilities for securing the agriculture and food sectors. These agencies, in coordination with DHS, are tasked with collaborating with federal, local, and state governments, as well as private industry and other stakeholders to help protect their respective critical infrastructure sectors, including agriculture. Among other things, HSPD-7 directs DHS to establish systems, mechanisms, and procedures to share homeland security information relevant to threats and vulnerabilities in critical infrastructures with other federal departments and agencies, state and local governments, and private industry in a timely manner.

Finally, HSPD-8 sets out a national preparedness goal for all hazards, including agriculture. The directive calls on federal agencies to establish readiness priorities, to deliver federal assistance to state and local governments effectively and expeditiously, and to ensure that first responders are prepared to respond to major events. The directive outlines criteria for federal preparedness assistance to the states based on assessments of population concentrations, critical infrastructure, and other risk factors such as terrorism threats.

Other Legislation Has Expanded USDA's and HHS's Traditional Responsibilities to Protect against Agroterrorism

The traditional responsibilities of USDA and HHS have been augmented through Congress' passage of the Bioterrorism Act of 2002.²⁴ This act made USDA and HHS responsible for requiring companies, laboratories, and other entities to register materials that could be dangerous to agriculture production and human health. It also required USDA and HHS to develop an inventory of potentially dangerous agents and toxins that cause animal, plant, or human diseases. Furthermore, individuals who possess or use such materials must register with the Secretary of Agriculture or HHS and submit to a background check by the U.S. Attorney General. Also, the act directed USDA and HHS to take a number of steps to improve surveillance for such materials. Specifically, the act directed USDA and HHS to coordinate surveillance activities to detect zoonotic diseases. The act also authorized USDA to conduct and support research into the development of an agricultural bioterrorism early warning system. The system would enhance the capacity of and coordination between state veterinary diagnostic laboratories, federal and state agricultural research facilities, and public health agencies. The act also gave USDA the authority to coordinate with the intelligence community to better identify research needs and evaluate materials or information acquired by the intelligence community relating to potential threats to U.S. agriculture.

Since the Terrorist Attacks of 2001, Federal Agencies Have Taken Steps to Manage the Risks of Agroterrorism

In carrying out their new roles and responsibilities, federal agencies have taken steps to manage the risks of agroterrorism, including the development of a comprehensive national strategy that did not exist before September 11, 2001. As part of this strategy, DHS has overseen the development of national plans and the adoption of standard protocols that will help agencies coordinate in protecting against and responding to agroterrorism. Federal and state officials are also conducting joint exercises to test the new plans and protocols. In addition, federal agencies are taking a number of specific actions to protect against agroterrorism, including those summarized as follows.

²⁴Pub. L. No. 107-188, 116 Stat. 594.

National Plans Are Being Prepared, Emergency Protocols Have Been Adopted, and Test Exercises Are Being Conducted

DHS coordinated with other agencies to create an interim “National Infrastructure Protection Plan” to guide the efforts of federal, state, and local governments and private industry to protect critical infrastructure sectors, including agriculture, against terrorist attacks.²⁵ The overall plan incorporates sector-specific plans that include processes, guidance, and mitigation strategies that address how DHS and other agencies will work with state and local governments, private industry, and foreign governments to safeguard the sectors. Additionally, the plan includes initiatives for sharing warning data with state and local governments and the private sector. (See app. V for more details about these plans.)

To outline how the nation will respond in the aftermath of an emergency or major disaster such as a terrorist attack, DHS released a “National Response Plan” in January 2005. The National Response Plan differs from earlier federal emergency plans in that it describes the roles and outlines the responsibilities for federal, state, and local responders in addressing the national response to outbreaks or other emergencies in the food and agriculture sector. DHS coordinated with USDA, HHS, and EPA to develop the appendixes contained in the plan that pertain to protecting agriculture and the food supply in emergencies, from first detection to the response and recovery phase.²⁶

To further improve the response to emergencies such as agroterrorism, DHS established the “National Incident Management System” in March 2004. A key component of the National Incident Management System is the “Incident Command System,” which is designed to coordinate the communication, personnel, and procedures of different agencies and levels of government within a common organizational structure during an emergency that requires the resources of multiple federal, state, and local responders. HSPD-5 directs federal agencies to require that states become compliant with the National Incident Management System in fiscal year 2005 as a condition for receiving federal grant aid for emergency preparedness. To support this directive, DHS has established a number of minimum requirements for states to implement during fiscal year 2005. A DHS official noted that as of December 2004, most states had already implemented the Incident Command System and other components of the

²⁵DHS released the interim National Infrastructure Protection Plan on February 9, 2005.

²⁶The appendixes in the National Response Plan are referred to as Emergency Support Functions.

Soybean Plant Infected with Soybean Rust



Source: U.S. Department of Agriculture.

Soybean rust is a serious disease, causing crop losses. Wind-borne spores contaminate plants, causing infected tan and reddish brown lesions and yellowing of leaves. Fungicides can be used to control the spread of the disease. However, if left untreated or treated too late, a soybean field's yield losses can surpass 80 percent. Since November 10, 2004, when soybean rust was first discovered in Louisiana, the disease has been discovered in Alabama, Arkansas, Florida, Georgia, Mississippi, Missouri, and South Carolina. The United States produced about 70 billion acres of soybeans in 2002.

National Incident Management System. (See app. V for more information on the National Incident Management System.)

To test response capability, including aspects of the National Incident Management System, federal and state agencies have collaborated in conducting test exercises to simulate outbreaks of foreign animal and plant diseases. For example, USDA, along with numerous other agencies, conducted a 1-day exercise in September 2002 called "Crimson Sky," which simulated the intentional introduction of the FMD virus in five different locations across the United States. Exercises have also been conducted to test response capability to address plant diseases. For example, USDA and Minnesota, with the assistance of Iowa,²⁷ simulated an outbreak of soybean rust using the Incident Command System in September 2004. Two months later, there was an apparently natural outbreak of soybean rust in Louisiana and other southern states, and USDA officials told us that the lessons learned from the test exercise in coordinating their communications were incorporated in response to the real outbreak. Federal, state, and industry officials whom we interviewed said that these test exercises in general have been useful in allowing players to better understand their roles and responsibilities in a real-life event, to uncover shortfalls they had not necessarily foreseen in planning, and to test solutions. For instance, exercises have shown that some areas of agencies' jurisdiction needed to be better defined. Many participants have written unclassified "after-action" reports incorporating the lessons they learned and raising key issues to be resolved. (See app. V for more information on test exercises.)

A Number of Agency-Specific Actions Are Under Way

In addition to the broad national planning efforts discussed, other specific actions that federal agencies responsible for protecting against agroterrorism have taken since 2001 include the following:

- FDA and USDA are in various stages of developing vulnerability assessments of the agriculture and food sectors, as called for in HSPD-9. As part of a continuing effort to anticipate threats to farm products, FDA has conducted vulnerability assessments of different categories of food for which FDA has statutory responsibility, to identify those products most vulnerable to deliberate contamination. Similarly, USDA is assessing vulnerabilities in USDA-regulated products but had not

²⁷Minnesota and Iowa are two of the nation's biggest soybean-producing states.

completed its preliminary assessments at the time of our review. Such assessments are generally not consistent across program areas because different maximum values for the impact of terrorist events are sometimes used. (See app. V for more details about FDA and USDA vulnerability assessments.)

- To increase early warning and monitoring capabilities, USDA and HHS have created laboratory networks to integrate existing federal, state, and university laboratory resources. These networks are intended to link laboratories that screen for animal, plant, and human health diseases across the nation and help to provide diagnostic surge capacity in the event of a disease outbreak. Within each network, the laboratories use standardized diagnostic protocols and procedures to ensure consistent results. For example, USDA provided funding and leadership for two networks that serve the nation: the National Animal Health Laboratory Network, which originally consisted of 12 state and university veterinary laboratories nationwide, and the National Plant Diagnostic Laboratory Network, which consists of 5 laboratories located at land grant universities. By December 2004, the National Animal Health Laboratory Network had expanded to 47 laboratories in 39 states surveying domestic and foreign animal diseases. When these network laboratories find positive test results for foreign diseases, USDA's own federal laboratories in Ames, Iowa; Plum Island, New York; and Beltsville, Maryland, still conduct their own diagnostic tests to confirm results before USDA announces the outbreak of a disease. Meanwhile, FDA, in conjunction with other agencies including USDA's Food Safety and Inspection Service, developed and have continuously expanded, the Food Emergency Response Network to integrate 93 local, state, and federal laboratories for the detection of biological, chemical, and radiological agents in food.²⁸ Likewise, the CDC has expanded its Laboratory Response Network to address public health emergencies. This network now enlists the technology and capacity of 138 laboratories across the United States and abroad in the event of a suspected or known release of biological or chemical agents. These federal laboratory networks have operated during animal, plant, and human health emergencies in the past few years. For example, USDA's animal and plant laboratory networks tested samples in the 2002-2003

²⁸In addition to FDA and the Food Safety and Inspection Service, other federal agencies playing a role in the development of the network are CDC, EPA, and the Department of Energy.

exotic Newcastle disease outbreak in poultry and in the sudden oak death outbreak in California in 2004.²⁹

- Agencies are also working to enhance coordination and communication among multiple stakeholders. In particular, DHS, USDA, and other agencies have established numerous interagency working groups to coordinate their efforts to protect against agroterrorism. These working groups are, in turn, coordinated through a Government Coordinating Council, which DHS finalized in the fall of 2004. DHS, USDA, and HHS alternately chair the Government Coordinating Council on a rotating basis.³⁰ DHS also helped the food and agriculture industry to establish the Food and Agriculture Sector Coordinating Council to facilitate the flow of alerts, plans, and other information between the federal and state governments and industry groups. Through the Food and Agriculture Sector Coordinating Council, DHS has been seeking the expertise of the industry groups to develop national guidance, such as the interim National Infrastructure Protection Plan. In turn, this plan is intended to provide industry with a blueprint to develop strategies to protect their assets. (See app. V for more details about interagency working groups.)
- USDA has established a steering committee, which includes representatives from FDA and CDC, to guide efforts to develop a National Veterinary Stockpile that, among other things, is intended to address vaccines needed to respond to animal diseases most damaging to human health and the economy. The steering committee will also identify such things as reagents, personal protection equipment that would be needed, how to obtain vaccines, as well as prioritizing a stocking schedule for the National Veterinary Stockpile. This stockpile is being developed for foreign animal diseases other than FMD, since there is already a North American FMD Vaccine Bank. USDA is also

²⁹Sudden oak death is a disease affecting oak and tan oak trees, which appeared in California nurseries in March 2004.

³⁰Other official participants in the Government Coordinating Council include EPA, DOD, the Association of State and Territorial Health Officials, the National Association of State Departments of Agriculture, the National Association of County and City Health Officials, and the National Assembly of State Chief Livestock Health Officials. In addition, the council includes ex-officio non-voting participants that possess relevant expertise. Ex-officio members include the Associations of Food and Drug Officials, the Departments of Commerce, Interior, and Justice.

creating a separate vaccine bank for certain strains of avian influenza that will be completed by May 2005.

- DHS, USDA, and HHS are funding research to enhance the nation's protection against agroterrorism. Of note, DHS is providing \$33 million over 3 years to establish two university-based Centers of Excellence to oversee research into post-harvest food protection and diseases that affect livestock and poultry. In addition, as of 2004, USDA is supporting homeland security research, including university-based efforts to evaluate contaminated carcass disposal efforts, assess animal and plant disease test exercises, and analyze pathways by which foreign animal and plant diseases can enter the United States.³¹ CDC has also provided \$1 million in annual funding to a university for developing a center for food security and public health that will support efforts such as online programs to educate veterinarians in foreign animal diseases. (See app. V for more details about research efforts.)
- USDA's Veterinary Services has developed a National Animal Health Emergency Management System that provides comprehensive guidance on mitigating, preparing for, responding to, and recovering from an animal health emergency, including a terrorist attack. USDA officials believe the system's guidance is more efficient than that provided by previous animal health manuals. For example, rather than changing with each disease, the roles of various emergency response personnel change to fit only three scenarios: an outbreak of a highly contagious disease (e.g., FMD); an outbreak of a disease spread by "vectors" such as mosquitoes (e.g., Venezuelan equine encephalomyelitis); or an outbreak of a disease that is not highly contagious (e.g., bovine spongiform encephalopathy). USDA officials believe that this approach will speed response times and be more effective in containing any outbreaks, whether natural or intentional. (See app. V for more details about USDA's National Animal Health Emergency Management System.)

³¹USDA homeland security research is supported by ARS and the Cooperative State Research, Education and Extension Service, which awards grants to universities and other institutions to conduct research in agriculture.

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- Since 2002, USDA has created 14 Area Emergency Coordinator positions across the nation for animal health, and 2 Regional Emergency Coordinator positions for plant health, to coordinate federal and state efforts in the event of an emergency, including agroterrorism.³² Among other duties, these coordinators have assisted states in developing emergency response plans in keeping with federal guidelines, and helped organize test exercises.³³ For example, an Area Emergency Coordinator was involved in developing Wisconsin's Animal Health Emergency Management System, the nation's first statewide plan that parallels the National Animal Health Emergency Management System and outlines tasks and responsibilities of agencies and organizations in an animal health emergency. The USDA emergency coordinators have also responded to recent natural outbreaks of plant and animal diseases, acting in key roles under the Incident Command System. For example, an Area Emergency Coordinator served as the liaison officer to the command staff for the widely reported bovine spongiform encephalopathy case in Washington state in January 2004. The Western Regional Emergency Coordinator helped respond to the soybean rust outbreak in Louisiana in November 2004 and acted as a coach for the incident management team.

The United States Still Faces Complex Challenges and Management Problems in Protecting against Agroterrorism

Although many important steps have been taken to prevent or reduce the impact of agroterrorism, the United States still faces complex challenges that limit the nation's ability to quickly and effectively respond to a widespread attack on animal agriculture. There are also some less complex management problems that impair the effectiveness of federal agencies' efforts to protect against agroterrorism.

³²APHIS also created one National Wildlife Disease Coordinator position to coordinate state and federal surveillance of wildlife diseases.

³³These coordinators also assist in administrating emergency management grants to states; develop communication and training to state and local entities; and serve as technical resources for states, industry, and other stakeholders.

The United States Faces Challenges in Quickly Responding to a Widespread Attack on Animal Agriculture

Experts we spoke with told us that to effectively control the spread of highly contagious foreign animal diseases, such as FMD, it is critical to quickly identify animals that may have the disease, promptly confirm the presence of the disease with diagnostic tools, and rapidly vaccinate animals in the surrounding area. However, the United States faces a shortage of veterinarians trained in foreign animal diseases, does not use rapid diagnostic tools at the site of an outbreak, and has insufficient vaccine stockpiles. These complex challenges impair the nation's ability to contain the spread of animal diseases that are of potential use in agroterrorism.

Many Veterinarians Lack Training in Foreign Animal Diseases

Many U.S. veterinarians lack training to recognize the signs of foreign animal diseases, according to a 2004 report produced for USDA. The report notes that while all U.S. veterinary schools offer information about foreign animal diseases, only about 26 percent of the nation's veterinary graduates have taken a course specifically dedicated to foreign animal diseases.³⁴ According to the report, only 12 of the 28 veterinary schools in the United States offer courses dedicated to foreign animal diseases. Further, among the 12 veterinary schools that offer such courses, 5 offer them as electives rather than as core courses. As a result, when federal or state veterinarians are called to determine whether symptoms suggest the presence of a foreign animal disease, they may not have the training or expertise needed to identify it, and the disease could go undetected. According to USDA officials, however, all veterinary students must take instruction in infectious diseases and pathology which, according to these officials, includes foreign animal diseases. USDA officials also told us they have worked to develop Web and CD-Rom-based training to strengthen veterinary student training in foreign animal diseases.

Another reason for this lack of expertise in foreign animal diseases is that such training is not required to obtain USDA accreditation. More than 80 percent of veterinarians in the United States are USDA-accredited and are intended to be instrumental in maintaining effective disease surveillance

³⁴Wenzel, James G.W. "Assessment of Training for Veterinary Accreditation and Foreign Animal Disease Recognition at US Colleges and Schools of Veterinary Medicine," Auburn University. Contracted Research for USDA-APHIS-VS (2004).

and monitoring by accurately diagnosing and reporting animal diseases.³⁵ To be accredited, an individual must have graduated from an accredited school of veterinary medicine, submitted an application certifying the ability to complete 16 tasks such as recognizing common breeds of livestock, completed a core orientation session, and be licensed or legally able to practice without supervision. USDA officials believe that because an accredited veterinarian must be licensed, this is an indication that they have received basic training in foreign animal diseases. However, this accreditation process does not require veterinarians to demonstrate their ability to recognize or diagnose basic clinical signs of foreign animal diseases.³⁶ Furthermore, once granted, accreditation is valid for life and no continuing education is required.³⁷ The Association of American Veterinary Medical Colleges believes that this process could be more rigorous if, as a condition of accreditation, veterinarians were required to demonstrate an ability to recognize clinical signs of foreign animal diseases at the time of accreditation and also periodically throughout their careers. USDA recognizes the need to modernize its accreditation process and agrees that continuing education is needed. APHIS drafted a rule to modify its current program by developing a two-tiered National Veterinary Accreditation program, which would have requirements for supplemental training in such

³⁵APHIS's Veterinary Services administers the National Veterinary Accreditation Program. This voluntary program certifies private veterinary practitioners to work cooperatively with federal veterinarians and state animal health officials. Producers that export animals rely on the expertise of accredited veterinarians to help ensure that exported animals will not introduce diseases into another state or country. Private practitioners were first used to perform regulatory work in 1907, when a large number of horses were exported to Canada. As there were inadequate numbers of federal veterinarians to meet these demands, the Canadian government agreed to accept health inspections and certifications performed by private practitioners qualified by the Bureau of Animal Industry (now APHIS). The services of practicing veterinarians were used again in 1917, when the Tuberculosis Eradication program was established.

³⁶USDA officials told us that it has a cadre of certified private veterinary practitioners who partner with APHIS to report any suspected foreign animal disease cases to federal officials. These surveillance efforts are further augmented by the work of 450 specially trained foreign animal disease diagnosticians who actively search for FMD and other foreign animal diseases across the country. USDA continues to train 100 foreign animal disease diagnosticians annually.

³⁷A USDA official told us that continuing education is a requirement of every state licensing process. All accredited veterinarians must be licensed by a state and therefore are required to have continuing education to maintain their licenses.

areas as emergency management and foreign animal diseases;³⁸ however, after more than 2 years, it is still not in effect. According to the Chief of Staff of Emergency Management and Diagnostics at APHIS, the draft rule has been undergoing revisions but had to be set aside several times in an effort to pursue the development of other more important draft regulations and emergency regulations. According to this official, the draft rule is now being reviewed by USDA's Office of General Counsel. This official told us that this review can take several months, but if no problems are encountered, it is anticipated that the draft rule will be published as a proposed rule in the *Federal Register* during the first or second quarter of calendar year 2005. USDA officials told us that new efforts are also being made to strengthen APHIS' role in colleges of veterinary medicine to provide information on various aspects of regulatory medicine.

Finally, expertise in foreign animal diseases is lacking because most veterinarians work in private practice where this skill is not required. According to the American Veterinary Medical Association, approximately 74 percent of practicing veterinarians in the United States work in private practice.³⁹ Similarly, the Association of American Veterinary Medicine reports that only about 5,000 veterinarians work in public service,⁴⁰ some of whom play an essential role in the detection, prevention, and control of foreign animal diseases. USDA officials told us they intend to increase the number of veterinarians entering public service by making new efforts to increase veterinary students' awareness of potential careers in public service.

³⁸To maintain accreditation status under the new standards, veterinarians will have to periodically complete supplemental education requirements. These supplemental training modules will be available on-line to the entire accredited veterinarian population. Through a cooperative agreement with Iowa State University, APHIS has already initiated development of 6 supplemental training modules for the new accreditation process. These modules focus heavily on the recognition of the clinical signs of many of the most prominent foreign animal diseases and on how to respond to a potential foreign animal disease outbreak. The new program will institute a 3-year renewal period for veterinary accreditation for all veterinarians. If documented supplemental training is not completed before the 3-year renewal period expires, the accreditation status of the veterinarian will be inactivated.

³⁹The American Veterinary Medical Association reports that there are approximately 61,000 practicing veterinarians.

⁴⁰The Association of American Veterinary Medical Colleges (AAVMC) defines public practice as federal, state (including state, public health, and extension veterinarians, as well as those who inspect meat), and industry. According to AAVMC, there are approximately 4,000 additional veterinarians in academia, most of whom are engaged in research.

USDA Does Not Use Rapid Diagnostic Tools on Site

Foot and Mouth Disease



Source: U.S. Department of Agriculture.

Foot and mouth disease (FMD) is a highly contagious viral disease of cloven-hoofed animals such as cattle, swine, and sheep. Infected animals develop a fever and blisters on their tongue, lips, and between their hooves. Many animals recover from an FMD infection, but the disease leaves them debilitated and causes losses in meat and milk production. FMD does not have human health implications. In 2001, an FMD outbreak occurred in the United Kingdom, resulting in mass slaughtering and burial of animals and a loss of about \$4 billion. Similarly, if an outbreak were to occur in the United States, the current U.S. policy requires all infected and exposed animals to be immediately slaughtered and disposed of by incineration, burial, or rendering, a process that subjects animal tissue to heat and chemicals to separate the fat from the protein and mineral components.



Source: U.S. Department of Agriculture.

Another complex challenge impairing the ability of the United States to quickly contain an outbreak and limit the loss of animals is the inability to rapidly diagnose diseases at the site of an outbreak. Currently, if an animal is suspected of having a foreign disease, a sample would be collected from the sick animal and a federal official would send it by Express Mail to one of USDA's reference laboratories—either the NVSL in Ames, Iowa, or the Foreign Animal Disease Diagnostic Laboratory located on Plum Island, New York.⁴¹ Using traditional techniques, USDA technicians would generally diagnose the disease in 3 to 4 days. During this time, the affected animals and other animals within the vicinity, or those that had recent contact with the sick animal, would be quarantined. Should USDA officially confirm the presence of a disease, such as FMD, the affected herd and all cattle, sheep, goats, swine, and susceptible wildlife—infected or not—within a minimum 10-kilometer zone around the infected farm would be killed. USDA would wait for confirmation before slaughtering animals to avoid causing unnecessary panic among producers and severe market fluctuations.⁴² If the disease were to spread beyond the initial zone, authorities would continue to quarantine and kill animals until the disease was “stamped out.” USDA's “Crimson Sky” test exercise in 2002, estimated that, under the current “stamping out” approach, FMD would spread rapidly, necessitating the slaughter of millions of animals and cause staggering financial losses—precisely the type of high-visibility destruction that some experts told us terrorists seek.

According to the former Associate Administrator for Special Research Programs at USDA's Agricultural Research Service, the impact of a disease such as FMD can be mitigated if rapid diagnostic tools are used on site to speed diagnosis. In 2000, under the direction of this official, USDA developed state-of-the-art, rapid diagnostic tools to detect FMD, classical

⁴¹During the early phase of foreign animal disease surveillance, samples will most likely be sent to NVSL in Ames, Iowa, or the Foreign Animal Disease Diagnostic Laboratory located on Plum Island, New York, depending on the disease agent. Once the disease agent in the outbreak has been confirmed and an emergency response effort has started, samples may be sent to local laboratories, including one of USDA's National Animal Health Laboratory Network laboratories.

⁴²According to USDA officials, confirmatory testing is done for several reasons, including economics and trade relations. USDA officials told us they believe that caution should be used in spending public funds and that the particular virus and strain or type of virus must be known before expending resources. If FMD were officially confirmed in the United States, the international community would be notified and all exports of susceptible animals and animal products would temporarily cease until the scope of the outbreak could be determined. Trading partners would also impose restrictions.

Traditional Diagnostic Techniques Versus Rapid Diagnostic Tools



Source: University of California, Davis.



Source: University of California, Davis.

Traditional methods of diagnosing exotic Newcastle disease involve isolating the virus and can take 6-12 days to obtain results (pictured on top). Rapid diagnostic tools involve a polymerase chain reaction (PCR) process that identifies a piece of a virus' genetic material that acts as a signature and can be identified in a test. The PCR distinguishes the pathogen from near or distant relatives and can find the pathogen in clinical samples. The PCR technology used in California during the 2002-2003 outbreak produced results in 4-6 hours.

swine fever, African swine fever, Rinderpest, avian influenza, and Newcastle disease.⁴³ According to this official, the rapid diagnostic tools are designed to yield results in less than an hour and are intended to be used outside of specialized laboratories, at the site of an outbreak. Importantly, the tools can detect disease before the animal shows clinical signs of infection. According to USDA, symptoms of FMD may take up to 14 days to appear, or even longer in sheep and goats. In fact, animals may show no symptoms at all. USDA's draft guidance for controlling FMD warns that if the first animal infected with FMD does not outwardly show clinical signs, detection may be delayed. The guidance further states that potential delays and difficulty in detection may complicate the decision-making process regarding appropriate disease control measures. According to the former Associate Administrator, rapid diagnostic tools would not only allow for a rapid diagnosis but would also permit the monitoring of nearby herds before symptoms appeared so that only infected herds would have to be killed. Slaughter would, therefore, be based not on proximity but on actual infection, thereby reducing the number of animals lost and lessening the impact of the attack.⁴⁴ Overall, rapid diagnostic tools would be helpful because FMD would be detected in less than an hour, informed control measures could be implemented, and herds in the area would be under regular surveillance.

According to state officials, the use of these rapid tools on site would also help prevent laboratories from becoming overwhelmed with test samples, which would be an advantage if a terrorist attack involved the introduction of disease at multiple locations. In 2003, California state officials used rapid diagnostic tools to test animals for exotic Newcastle disease—a contagious and fatal viral disease affecting birds of all species. (See fig. 5.) These state officials told us that the tools used at the time allowed diagnostic results within 6 hours and enabled them to test up to 1,500 samples per day, many more samples than traditional testing methods. State officials also told us that rapid diagnostic tools would be useful during a widespread outbreak so that individual animals or herds could be tested in a temporary

⁴³USDA officials told us that a tool is being developed for Rift Valley fever as well.

⁴⁴While rapid diagnostic tools can diagnose the presence of FMD, they cannot determine the disease subtype, which must be known to deploy the correct type of FMD vaccine. Therefore, a sample of the suspect virus would still have to be flown to Plum Island Animal Disease Center, where its complete genetic sequence would be determined in order to identify the subtype.

laboratory at the site of an outbreak, rather than waiting for results while samples were sent to laboratories distant from the outbreak.

Figure 5: Game Bird Infected with Exotic Newcastle Disease during the 2002-2003 Outbreak in California



Source: University of California, Davis.

USDA officials believe that rapid diagnostic tools can be useful, but they told us most such technologies are not yet ready to be used at the site of an outbreak.⁴⁵ While USDA has employed some of its rapid diagnostic tools for exotic Newcastle disease and avian influenza, it has done so only in select laboratories within the National Animal Health Laboratory Network.⁴⁶

There are several reasons why USDA is reluctant to use the tools outside of a laboratory setting. One reason is that samples put into the rapid diagnostic tests may contain a live virus. For highly contagious diseases such as FMD and classical swine fever, USDA believes that rapid diagnostic testing must be conducted in a specialized laboratory setting where certain procedures are taken to prevent the virus from escaping and infecting livestock and wildlife. According to the former Associate Administrator for Special Research Programs at ARS, this precaution is unnecessary. Once a sample is taken, it is inserted into a tube containing reagents that inactivate the virus if it is present. The tube, as well as the person who collected the sample, can then be decontaminated using a common solution, such as acetic acid in the case of FMD, and the sample can be tested using the rapid

⁴⁵CDC and FDA officials told us they have not used rapid diagnostic tools outside of a laboratory setting. According to CDC officials, they are concerned about possible cross-contamination as well as the lack of an integrated plan among local, state, and federal officials for responding to reported results. However, resources are being devoted to support the ongoing evaluation of field detection products. FDA officials told us they are also concerned about cross-contamination as well as the sensitivity of reagents to temperature changes. In commenting on a draft of this report, FDA officials told us that a number of different types of rapid diagnostic tools are in use by FDA laboratories and others for the detection of pathogenic microorganisms, biologically derived toxins, and toxic chemicals. Real-time polymerase chain reactions and immunoassays are two examples of such tests; other technologies exist. FDA officials noted that while these can be useful outside a laboratory setting, these techniques generally have several requirements that have limited their field application. FDA officials also commented that in most instances, it is actually more time efficient to rapidly transport samples to one of a series of strategically located regional laboratories where all aspects of the analytical process can be completed. However, FDA officials also told us that resources are being devoted to support the ongoing evaluation of field detection products and the agency plans to use diagnostic tools in its mobile laboratories.

⁴⁶According to USDA, the rapid diagnostic tools for these diseases have been scientifically validated. Tools for the detection of FMD, classical swine fever, and vesicular stomatitis virus are still undergoing validation at the time of our report. Once validated, the rapid diagnostic tools are to be deployed to select laboratories within the National Animal Health Laboratory Network in 2005.

diagnostic tool in a mobile unit at, for example, the entrance to the farm.⁴⁷ USDA officials agree that samples can be taken in this manner but told us that their current technique for collecting samples for the rapid diagnostic tools that USDA uses in its laboratories does not inactivate the sample. For that reason, samples of highly contagious diseases must be processed under special laboratory conditions. USDA uses this sampling technique in order to preserve the “live virus” sample necessary for the traditional method of diagnosing diseases. USDA officials told us they have initiated discussions about sampling using an “inactivation model” such as discussed above, but the sample would still be diagnosed using a rapid diagnostic tool located in a laboratory.

Unlike USDA, agencies within DOD are using rapid diagnostic tools in the field to obtain quick results during emergency situations or when a laboratory setting is not possible, such as in combat zones.⁴⁸ For example, the Army is using various types of rapid diagnostic tools in Iraq to detect pathogens used in biological warfare, such as anthrax. DOD officials told us that for samples that are a “true unknown,” such as chemical substances they encounter in combat, they utilize many safety procedures, such as wearing protective clothing and opening samples in safety cabinets. The officials also told us that the reagents they use to detect agents used in biological warfare will inactivate viruses, allowing the test to be safely conducted without contaminating the surrounding area. A DOD official noted that with animal diseases, if samples are positive for a disease, then contaminating other animals within that herd is not a concern since these animals would have to be destroyed anyway.⁴⁹

Another reason USDA is reluctant to use rapid diagnostic tools at the site of an outbreak is that personnel need training to use the tools. According to the former ARS Associate Administrator, however, the tests are designed to be performed by persons with limited training, using quality-controlled

⁴⁷The mobile unit would be located just off the farm to eliminate contaminating the unit. Procedures would be the same as those for any official taking a sample from a farm suspected of having a highly contagious disease.

⁴⁸Depending on the situation, the rapid diagnostic tools are set up in a tent near the sampling site or, if sampling is required at multiple sites, the tools are set up in a mobile unit and driven to each location.

⁴⁹If an animal tests positive for a foreign animal disease such as FMD, current USDA procedures to contain the outbreak are to slaughter all susceptible animals within a 10-kilometer radius.

Vaccines Cannot Be Rapidly
Deployed to Contain a
Widespread Disease Outbreak

standardized reagents and protocols that are consistent with international standards.⁵⁰ DOD concurs that the tools are not difficult to use, but to ensure that samples are not contaminated and results are rigorous, the U.S. Army Medical Research Institute of Infectious Diseases requires personnel to undergo a 4-week training program and follow strict procedures, such as loading and capping pathogen samples before adding the control samples to help eliminate cross-contamination.⁵¹ To help increase confidence in the accuracy of the results, DOD also uses more than one type of rapid diagnostic tool to test a sample if it comes back positive.⁵²

USDA officials told us that although the rapid diagnostic tools have been developed, these tools still need to be validated before they can be used in order to rule out diseases with similar clinical signs or protein sequences that might result in a false positive result. Therefore, USDA would still make an initial diagnosis using traditional test procedures and confirmatory testing would still be done at NVSL in Ames, Iowa, or at the Foreign Animal Disease Diagnostic laboratory on Plum Island in New York. Once the initial diagnosis is confirmed, USDA believes there may be opportunities to use validated rapid diagnostic tools to evaluate herd health either on site or at a nearby laboratory. USDA further agrees that it is important to evaluate the costs and benefits of developing and validating these tools for use outside of a laboratory setting.

For several reasons, USDA would not be able to deploy vaccines rapidly enough to contain a widespread animal disease outbreak caused by a deliberate attack. First, USDA has very few supplies of vaccines. The only vaccines currently stored in the United States against foreign animal diseases are for various strains of FMD because this disease is so highly contagious. In place of vaccination, USDA generally prefers to immediately slaughter diseased animals because international rules that the United States and other countries have agreed to abide by are designed to prevent trade in infected or vaccinated animals. As a result, vaccine stockpiles have

⁵⁰Results could be reviewed over the Internet by experts in the laboratories, or the tests could be conducted by technical experts at the site of an outbreak.

⁵¹In addition, technicians who are sampling are typically supervised by individuals with clinical laboratory credentials and/or advanced degrees, according to DOD.

⁵²Samples that test positive at the site are shipped back to DOD's reference laboratory for further analysis, but personnel in the field will make medical decisions based on these rapid diagnostic tools. For example, if anthrax is detected, then medicine would be distributed.

traditionally not been needed to control natural outbreaks. Also, vaccines have not yet been developed for all foreign animal diseases that USDA considers to be of primary concern.⁵³ For example, worldwide, there is no vaccine currently available for African swine fever. USDA's ARS is researching new vaccines, but it is unlikely that vaccines will ever be developed for all strains of these diseases because of the vast number of strains and subtypes for each disease. For example, there are 7 different types of FMD with more than 60 different subtypes. According to an expert we consulted, it is not realistic to develop vaccines for all of these subtypes. It is also conceivable that a terrorist could genetically engineer a new strain.

Second, the only vaccines that are stockpiled in the United States—vaccines for FMD—cannot be rapidly deployed because they are not stored in a “ready-to-use” state. Although HSPD-9 states that vaccines should be capable of deployment within 24 hours, USDA's stockpiles are concentrates that require additives to become a vaccine. Because the additive for the FMD vaccine is manufactured in the United Kingdom, USDA must first ship the stock there for bottling and subsequent testing. It can take up to 3 weeks to transform the stock into a vaccine once the concentrate arrives in the United Kingdom. Vaccines are not stockpiled in a ready-to-use state because vaccines generally have a shelf life of only 1 or 2 years before they must be used or destroyed, and replacing stocks on a regular basis would be expensive.

Yet until animals are vaccinated, USDA will have no recourse but to slaughter animals in a systematic manner to contain the spread of the disease. While this approach may be adequate for containing a limited outbreak, the recent USDA test exercise of an intentional introduction of FMD in multiple locations suggests that this approach would have catastrophic results.⁵⁴ Although USDA officials raise concerns about the use of vaccination to control an outbreak, such as the limited number of fully trained personnel to administer the vaccine, it is now acknowledged that the ability to vaccinate, in conjunction with culling, may be a necessary measure to contain an FMD outbreak. A recent evaluation by the National Audit Office in the United Kingdom reports that the government has

⁵³See appendix III for a list of these diseases.

⁵⁴We reported in 2002 that an outbreak of FMD could range up to \$24 billion in current dollars, depending, among other things, on the extent of the outbreak.

substantially increased stocks of vaccines for FMD to better contain the spread of FMD should another outbreak occur.⁵⁵ Furthermore, USDA's draft response plan for an outbreak of FMD disease or other highly contagious animal disease notes that vaccines may be used strategically to create barriers between infected zones and disease-free zones.

The Centers for Disease Control and Prevention faces similar challenges in stocking vaccines used to protect humans. Because many animal diseases can affect humans, CDC is participating in the steering committee to help USDA create its National Veterinary Stockpile.⁵⁶ An expert suggests, and CDC officials agree, that USDA could contract with pharmaceutical companies to supply a stockpile of ready-to-use vaccines. Once the shelf life for those vaccines neared expiration,⁵⁷ the contractor could replenish the stock and then sell the supply of vaccines nearing expiration in the commercial marketplace to countries that routinely vaccinate livestock. Where the market would not support such sales, USDA could donate the old, yet still effective, vaccines to other countries where the disease is endemic and there is still a demand.⁵⁸ USDA officials agree that it would be useful to have the FMD virus vaccine available within 24 hours.⁵⁹ They also told us they have plans to consider options to cut some of the time delay for obtaining finished, ready-to-use vaccines. One option could be storing the frozen bulk antigen concentrate needed to produce the vaccine at the site of the foreign manufacturer. While it is the responsibility of the steering committee to consider options and recommend specific processes for each of the foreign animal diseases of concern to the United States, it is not clear if the steering committee will address the costs and benefits of developing ready-to-use vaccines that can be quickly deployed against diseases of primary concern.

⁵⁵The Department for Environment, Food and Rural Affairs. Foot and Mouth Disease: Applying the Lessons. Report by the Comptroller and Auditor General (HC 184 session 2004-2005). February 2, 2005.

⁵⁶This participation includes senior representatives from CDC's Strategic National Stockpile. Their participation also supports HSPD-9.

⁵⁷CDC officials also noted that if testing indicates a vaccine is still efficacious, USDA could potentially extend the shelf life of the vaccine.

⁵⁸For those diseases where there is no market for a vaccine, the vaccine would simply have to be disposed and restocked.

⁵⁹According to USDA officials, the extent to which the vaccine could be applied would be limited to the number of available trained personnel, and these personnel are limited.

Finally, even if USDA were to overcome the difficulties discussed above and develop adequate stockpiles of ready-to-use vaccines, current USDA policy would require a complex decision-making process to determine if vaccines would be deployed in an outbreak. In 2000, USDA decided to use a decision tree flowchart combined with decision matrices that evaluate multiple factors to determine when and if to use vaccines to control an outbreak. Because the use of vaccines would affect trade and have major consequences for both USDA and producers, the decision tree is complex and may not be designed for rapid decision-making, such as would be needed during a terrorist attack.⁶⁰ For example, it requires information on the availability of human resources, public opinion and perception of government, industry acceptance, and vaccination costs, as well as slaughter and disposal capacity. USDA officials agree that this process is lengthy, but this is because of the many variables, including the location of the outbreak in relation to susceptible animal populations as well as trade concerns and restrictions that impact this decision-making process. As previously noted, HSPD-9 requires that vaccines be deployed within 24 hours of an outbreak, but such rapid deployment may not be achievable under the current, complex decision-making process. USDA officials told us they can explore the possibility of designing a more rapid decision-making process; however, they noted that it would take additional time to select, deploy, equip, and direct vaccination crews in a manner that would be advantageous to disease eradication and not cause the virus to spread from farm to farm due to the vaccination process. Hastily applied vaccination programs could prove detrimental. A USDA official also told us that it is not possible to estimate how long it would take to determine whether to use FMD vaccines based on the decision tree flow chart, due to the many variables involved in the process.

Federal Agencies Have Not Addressed Several Management Problems

In addition to the complex challenges discussed above, federal agencies are encountering management problems that further impair the effectiveness of their efforts to protect against agroterrorism. First, since the transfer of agricultural inspectors to DHS, inspections and interceptions of prohibited agricultural products and pests have declined nationally, and inspectors are less available to respond to agricultural emergencies. Second, there are weaknesses regarding the flow of critical

⁶⁰USDA officials noted that there is a need to develop “marker” vaccines to differentiate vaccinated animals from those infected with live agents, as this would have a large impact on trade.

Agricultural Inspections and Interceptions Have Declined, and Fewer Inspectors Are Available to Respond to Agricultural Emergencies since the Transfer of USDA Inspectors to DHS

information among key stakeholders. Third, USDA has not hired a sufficient number of Area and Regional Emergency Coordinators to help states prepare for an agricultural emergency. Fourth, DHS has not developed controls to avoid duplication of effort among agencies. Finally, federal agencies' diagnostic laboratory networks are not yet integrated for diseases of common concern.

Since the transfer of most USDA Plant Protection and Quarantine (PPQ) inspectors to DHS in March 2003,⁶¹ government officials, reports, and data indicate that the nation may be more vulnerable to the introduction of foreign animal and plant diseases through ports of entry into the United States.⁶² In addition, the transfer of inspectors has reduced USDA's ability to respond to agricultural emergencies.

Inspectors Have Performed Fewer Agricultural Inspections and Made Fewer Interceptions of Prohibited Plant and Animal Products and Pests

USDA officials, as well as agricultural inspectors who now work at DHS, told us that inspections of agricultural products have decreased at some land border crossings, airports, and maritime ports—including three major ports that receive a high percentage of the nation's agricultural imports and international flights. USDA provided us with data showing an overall

⁶¹DHS and USDA-APHIS-PPQ inspect imports of plants, (dead) animal products, seeds, farm instruments, and other items of agricultural interest, including packing materials that could contain pests. USDA-APHIS' Veterinary Services retains sole authority over inspections of live animals.

⁶²See the Congressional Research Service's *Border Security: Inspections Practices, Policies, and Issues*, May 26, 2004, and *Agroterrorism: Threats and Preparedness*, August 13, 2004, both of which are available at <http://www.crs.gov>; and *America at Risk: Closing the Security Gap* by the Democratic Members of the House Select Committee on Homeland Security, February 2004, available at <http://www.house.gov/hsc/democrats>.

decline in the number of inspections nationwide since 2002⁶³—the last year when USDA had sole responsibility of agricultural inspections. This decrease occurred at a time when imports and international air traffic have increased. In fiscal year 2002, there were 40.9 million agricultural inspections at ports of entry; in fiscal year 2003, the year when USDA inspectors transferred to DHS, 35.0 million inspections were conducted; and in fiscal year 2004, there were 37.5 million agricultural inspections. USDA data also show that inspections have decreased at certain types of ports and by certain modes of entry nationwide, such as passenger baggage and cargo.⁶⁴ In particular, USDA officials and DHS inspectors told us that the number of agricultural inspections has declined at three specific air and sea ports that receive a large proportion of international cargo and passenger baggage. For example, at one of these ports, former and current DHS agricultural inspectors told us they had cut their inspections in late 2004 by more than 50 percent, from an average of about 1,200 cargo containers per week to 500 per week. These inspectors said they reduced inspections, in part, because of an instruction by the DHS port director to cut their “holds” of agricultural cargo and conduct fewer inspections of tile, which are often packed in a regulated material that can contain pests such as snails and beetles.⁶⁵ In August 2004, this port intercepted a species of live, wood-boring beetles as a result of holding and inspecting cargo tile shipments. However, another shipment at this port that was not inspected

⁶³USDA has retained responsibility for maintaining agricultural inspections data, including data on interceptions. The agency provided us with the total number of agricultural inspections and interceptions for fiscal years 2002 through 2004 as of December 22, 2004. These numbers came from USDA-APHIS-PPQ’s Work Accomplishment Data System (WADS), the primary database both USDA and DHS agricultural inspectors use to record inspections of plant and animal products and interceptions of prohibited agricultural items, and the Port Information Network (PIN) 309 database, which USDA uses to track interceptions of reportable insects and pests. These databases do not include inspections data from USDA-APHIS-Veterinary Services, which still maintains authority over inspections of live animals, nor does it include inspections of food items performed by USDA’s Food Safety and Inspection Service or FDA. For a comprehensive review of the entire food and agricultural sector, those agencies’ inspections would have to be included. We did not independently assess the reliability of the WADS data provided to us by USDA.

⁶⁴USDA and DHS refer to the different types of ports of entry—land border crossings, airports, and maritime (sea) ports—as “pathways.” Within those pathways, agricultural items can enter the United States through different means: ships, aircraft, vehicles, buses, rail cars, passenger and crew baggage, regulated cargo, miscellaneous cargo, pedestrians, and international mail.

⁶⁵An inspection team that reviews the paperwork accompanying foreign cargo can decide to “hold” an item for further review, which may result in an inspection, fumigation, or other appropriate action.

was later found to contain the same beetles, which belong to the Asian longhorned beetle family and are costly to treat. These inspectors were concerned that if DHS continued to decrease agricultural inspections at that port, importers would direct more illegal shipments there. DHS officials acknowledged that, since the transfer of inspectors, inspections have declined overall. However, they also pointed out that some ports have increased their inspections in the past 2 years. For example, USDA data show that inspections at land border crossings increased from 21.2 million agricultural inspections in fiscal year 2002 to 22.5 million such inspections in fiscal year 2004.

USDA data also indicate a decline in the number of agricultural interceptions—seizures of prohibited plant and animal products, and agricultural pests—at ports of entry nationwide since the transfer of inspectors to DHS. Interceptions dropped from 1.8 million in fiscal year 2002, when USDA had sole responsibility for inspections, to 1.6 million in 2004, when DHS had primary responsibility for agriculture inspections. However, in 2003, a transitional year, interceptions totaled 1.8 million. Interceptions of reportable pests in particular have declined each fiscal year—from 77,886 in 2002, to 72,988 in 2003, and to 54,109 in 2004. USDA officials told us that interceptions are a meaningful indicator of effective inspections because the purpose of inspecting agricultural products is to intercept prohibited items and pests. USDA is concerned that the decrease in interceptions may indicate a decline in the quality of inspections or a switch to less effective methods. For example, USDA and DHS officials told us that while agricultural inspectors rove several ports of entry with sniffing dogs—an effective method for detecting and therefore intercepting prohibited items—they are now used less frequently. DHS and USDA officials also noted that the number of interceptions can vary based on a number of factors aside from inspection quality, including changes in the amount or type of agricultural products entering the country and in international passenger travel patterns. However, we found that both agricultural imports and international air passengers entering the United States had increased over the past 2 fiscal years.⁶⁶ USDA officials told us that the number of interceptions should generally increase accordingly. At the time of our report, DHS officials told us they were not aware of changes

⁶⁶USDA's Economic Research Service reports that the total value of agricultural imports was \$41.0 billion in fiscal year 2002, \$45.7 billion in fiscal year 2003, and \$51.5 billion in fiscal year 2004. Meanwhile, USDA's inspections data show that international air passenger and crew arrivals at U.S. airports increased from 64.9 million to 67.1 million to 72.6 million over the same time frame.

in inspection methods or the risk management approach used at ports that could account for the decline in agricultural inspections and interceptions. According to agency officials, neither USDA nor DHS has analyzed the inspections and interceptions data to identify trends and potential areas for improvement, but headquarters officials at both agencies told us they would analyze the data in early 2005.⁶⁷

Although USDA and DHS officials have not begun an analysis to determine the reasons for declining agricultural inspections, they believe that several factors are responsible for the decline in agricultural inspections and interceptions. First, there is a shortage of agricultural inspectors nationwide. In March 2003, USDA transferred 1,517 full-time inspectors, according to DHS officials.⁶⁸ Recently, DHS has been able to hire new agricultural inspectors, but numerous departures left DHS with 1,446 agricultural inspectors and 426 vacancies as of mid-October 2004.⁶⁹ DHS told us that the agency intends to hire more than 500 additional agricultural inspectors by February 2006. However, DHS officials said the agency's ability to quickly hire new inspectors is impeded by the length of time needed for conducting security background checks. These background checks, which are required before a newly hired inspector can report for duty, can take more than a year to process, by which time applicants might find other work. Agricultural inspectors working at the ports suggested to us that DHS could allow new inspectors to perform nonsensitive procedures while background checks are pending. According to a DHS headquarters official, the agency is allowing some new inspectors with modified background checks to start work under certain circumstances while their full background investigations are pending.

Second, DHS agricultural inspectors are sometimes used for other purposes, such as helping reduce immigration lines at airports. For

⁶⁷Under the memorandum of agreement between the two agencies, USDA is responsible for providing risk analysis guidance to DHS, and DHS is responsible for targeting high-risk agricultural passenger and cargo shipments for inspections, using USDA data.

⁶⁸During our audit, DHS officials told us USDA transferred 1,872 full-time agricultural inspector positions, of which 355 were vacant in March 2003, including supervisors. However, in commenting on a draft of this report, DHS officials stated that USDA transferred 1,507 agricultural inspectors to DHS in June 2003 and that by October 2004 the number of inspectors had decreased to 1,452, including supervisors.

⁶⁹According to DHS officials, the personnel vacancies also include agricultural specialists assigned to K-9 units, resulting in fewer inspections of this nature. DHS officials told us that they are in the process of assessing K-9 needs and filling vacancies.

example, a DHS supervisor of agricultural inspectors at a capital city airport told us that his inspectors are regularly pulled from their agricultural duties to inspect other types of cargo or to assist in clearing passengers through immigration. DHS officials told us that they need the flexibility to occasionally shift inspectors' duties to respond to different priorities and needs, such as searching for drugs rather than inspecting agricultural products for diseases or pests. For this reason, all customs, immigration, and agricultural inspectors are cross-trained to perform aspects of each other's work.

Third, DHS agricultural inspectors do not always receive timely information about high-risk cargo that should be held for inspection. For example, after Canada confirmed a case of bovine spongiform encephalopathy in 2003, inspectors at one border crossing did not receive a warning from USDA to hold shipments of Canadian beef in time to intercept it, and let the shipment through. In another instance, DHS inspectors at a sea port in a major agricultural state told us they did not receive an alert in late 2004 about an outbreak of a strain of avian influenza that can cause death in humans, until a week after the warning was released. DHS headquarters officials told us that while some cargo alerts issued by USDA do not get to every agricultural specialist in a timely manner, these instances represent a small fraction of inspections. However, these officials agreed that improvements can be made to improve the flow of information. Agricultural inspectors and other port officials attributed the delay in receiving information to the transfer of some inspection roles and responsibilities from USDA to DHS. This transfer has created additional layers of communication that have impeded the rapid delivery of critical information to port inspectors. Whereas USDA used to communicate critical information directly to its agricultural inspectors, DHS inspectors told us that now they receive information indirectly through DHS headquarters. While DHS officials told us this practice is not the agency's policy, they acknowledged that some ports follow a hierarchical chain of command. The memorandum of agreement between the two agencies, which is designed to delineate new roles and responsibilities, does not detail how DHS should convey alerts, warnings, directives, or guidelines that come from USDA.

Finally, DHS and USDA have different databases and information technology systems, including email, which has further hindered their ability to share information. For example, agricultural inspectors who transferred to DHS have experienced difficulty in accessing USDA's intranet site, where the Work Accomplishment Data System, the primary

agricultural inspections database, can be viewed. DHS agricultural inspectors told us they still cannot enter USDA's electronic Emergency Action Notification System, which was created after September 11, 2001, to track problematic or prohibited imported goods at ports of entry. DHS officials acknowledged technical problems in the integration of the two agencies' systems, but said that they are working with USDA to address these problems.⁷⁰

As a related matter, some DHS inspectors we spoke with expressed concern that the cross-training for "legacy" customs and immigration inspectors on agricultural laws, policies, and inspection procedures is insufficient—and that these legacy inspectors are thus not able to increase the number of items they refer to agricultural inspectors for further examination.⁷¹ For example, while legacy customs inspectors receive weeks of cross-training on immigration functions, they receive only 3 hours of computer-based training on agriculture. Inspectors told us that while the computer-based training raises awareness of the importance of agriculture, it has not enabled legacy customs and immigration inspectors to increase the amount of prohibited items they refer to agricultural inspectors. Furthermore, the training is not always supervised by an agricultural inspector who could answer questions.⁷² DHS officials agree that training for legacy customs and immigration inspectors should be enhanced, and told us that much training enabling legacy officers to make referrals to agriculture specialists has been accomplished. These officials also told us that all inspectors will be required to take a new course on agriculture procedures that will be launched in fiscal year 2005. This course, which will combine 16 to 24 hours of classroom and on-the-job training, is intended to

⁷⁰At the time of our report, DHS and USDA officials told us they were drafting another memorandum of agreement between the two agencies on data and information-sharing. However, we have not seen this document and some officials told us it may not address the information-sharing issues we have raised concerning agriculture inspections.

⁷¹DHS refers to inspectors who transferred from the U.S. Customs Service and the Immigration and Naturalization Service as "legacy" customs and immigration officers. All DHS inspectors are cross-trained on immigration, customs, and agriculture laws, policies, and procedures in order to assist each other and make appropriate referrals to each other regarding specialized inspections.

⁷²USDA is responsible for the supervision and development of educational support and systems to ensure that DHS employees receive the training necessary to carry out the USDA functions transferred to DHS, as specified in Article 4 of the memorandum of agreement between USDA and DHS.

help customs and immigration inspectors better screen and refer suspicious items to agricultural inspectors.⁷³

Fewer Inspectors Are Available to Help USDA Manage Agricultural Emergencies

In addition to the decline in inspections and interceptions, DHS has not been able to loan sufficient numbers of inspectors to respond to agricultural emergencies managed by USDA, according to USDA officials.⁷⁴ Since the transfer of agricultural inspectors to DHS, the memorandum of agreement between the two agencies implementing the transfer provisions of the Homeland Security Act of 2002 states that DHS and USDA agreed to develop procedures for USDA use of DHS employees, but it does not detail how many employees DHS must loan, or for what time period. While DHS has dispatched some agricultural inspectors on temporary duty, USDA officials said that compared to the assistance available prior to the transfer to DHS, the number of such personnel and the length of time they were available have been inadequate. For example, USDA's Western Regional Office requested 83 agricultural inspectors from DHS to help control and contain the exotic Newcastle disease outbreak in California over 2 months in 2003. DHS provided 26 employees, but declined USDA's requests for further assistance. As a result, USDA officials are concerned that DHS will not loan a sufficient number of specialists to help treat and contain future agricultural emergencies, including the likely infection of the 2005 soybean crop with soybean rust—a plant disease identified by USDA pursuant to the

⁷³DHS officials told us that some ports of entry provide agriculture-related information to customs and immigration inspectors. Although this training is not officially certified by DHS or USDA, the training does provide an overview to the inspectors of agriculture-related items and pests such as wood borers, "hitchhiker" pests such as snails, and prohibited packing material and contaminants. According to DHS, this unofficial training has led to some referrals by these legacy inspectors to DHS agricultural specialists and has resulted in some interceptions.

⁷⁴Some recent, naturally occurring disease outbreaks since the transfer to DHS include sudden oak death, Sapote and Mexican fruit flies, exotic Newcastle disease, and karnal bunt.

Bioterrorism Act of 2002 as having the potential to pose a severe threat.⁷⁵ DHS officials told us they have not been able to loan greater numbers of inspectors to USDA to respond to agricultural emergencies because of the staff shortage. DHS officials also said their policy is to loan agricultural inspectors with specific expertise, but the agency's first priority is to clear ports of entry. Once DHS feels the ports are adequately staffed with agricultural inspectors, the agency will be in a better position to dispatch agricultural inspectors to USDA for emergency purposes.

Experts say that routine inspections at ports of entry cannot, by themselves, prevent the accidental or intentional introduction of diseases. However, experience has shown that inspections can be successful in intercepting harmful diseases. In 2004, for example, DHS and USDA agricultural inspectors at a California mail facility prevented an outbreak of citrus canker when they successfully intercepted an illegal package of branch cuttings from Japan that were intended to start a new variety of citrus groves. An outbreak of citrus canker—a highly contagious bacterial disease—would threaten the state's crop and billion-dollar citrus industry, the second-largest in the nation.⁷⁶ The state of Florida, for example, has lost 2.1 million citrus trees due to the spread of the disease since 1995.

There Are Weaknesses Regarding the Flow of Critical Information Among Key Stakeholders

Federal agencies face barriers to promptly and effectively sharing critical guidance that is important to state and industry stakeholders to better protect the agriculture sector. State and industry officials told us they did not receive draft national guidance in a timely fashion; DHS may not be providing states sufficient guidance to allocate homeland security grant funding for agriculture; and after-action reports on test exercises and real outbreaks are not routinely shared with many stakeholders who could benefit from the lessons learned.

While efforts have been made to include agricultural stakeholders in the development of national guidance through various working groups, state and industry officials told us they were not given sufficient time to review and comment on key draft national guidance from DHS pertaining to

⁷⁵As a result of the outbreak of soybean rust in late 2004 in multiple southern states, USDA expects the 2005 crop to be infected and anticipates the need for emergency response personnel to control the disease.

⁷⁶According to USDA's 2002 agriculture census, California has 342,053 acres of citrus fruit, compared with #1 Florida's 871,733 acres. Florida's industry has an approximate \$9 billion economic impact on the state.

protecting infrastructure and preparing for emergencies. Specifically, officials said that they had as little as 3 days to review and submit comments on both the draft National Response Plan and the draft National Infrastructure Protection Plan, even though they will be expected to implement critical sections of these plans. As a result, state and industry officials we spoke with are concerned that these plans may set unrealistic expectations. Although we asked, DHS officials did not explain to us how they distributed the National Response Plan to stakeholders. When distributing the National Infrastructure Protection Plan, DHS officials sent the plan to the offices of State Homeland Security Advisors, which had the responsibility to solicit comments from appropriate stakeholders within a 2-week period. DHS officials told us that they had no input over which state agencies received the draft plan, and they believe that in some instances state officials may have delayed distribution to state departments of agriculture. DHS also distributed the draft plan for review through the Government Coordinating Council and the Food and Agriculture Sector Coordinating Council. DHS officials told us that limiting the comment period to 2 weeks was necessary in order to meet the timelines set by HSPD-7. DHS officials further noted that because of the limited time allowed for initial review of the National Infrastructure Protection Plan, they released the plan as an interim document, allowing public and private stakeholders to have more input in the final plan. DHS officials acknowledged that in the future, they will use different procedures to distribute drafts for state and industry comments.

Furthermore, DHS may not be providing sufficient guidance to the states on how to use the Homeland Security Grant Program to obtain federal emergency preparedness assistance to support the agricultural sector.⁷⁷ Although states must fulfill a number of requirements to receive DHS emergency preparedness grants, DHS gives leeway regarding which disciplines—such as fire, law enforcement, or agriculture—states choose to fund with DHS grants. However, according to federal and state officials, in the past, states used grant funding mainly for “traditional” emergency disciplines such as law enforcement. Prior to 2004, DHS grant application kits did not refer to agriculture as a sector eligible for emergency assistance. DHS grant program officials told us that, based on feedback

⁷⁷The FY 2005 Homeland Security Grant Program combines six separate grant programs into one application. These programs are the State Homeland Security Program, the Law Enforcement Terrorism Prevention Program, the Citizen Corps Program, Emergency Management Performance Grants, the Metropolitan Medical Response System Program, and the Urban Areas Security Initiative.

from the states, in 2004 they included agriculture as an emergency discipline toward which states can apply DHS funding. However, despite the inclusion of agriculture in the application guidance, state officials told us that they have received limited funding from DHS relative to other emergency disciplines. For example, one official from a major agriculture state told us that in fiscal year 2004 the state had set aside less than \$600,000 for agroterrorism projects out of a total of over \$20 million that DHS had allocated to the state.⁷⁸ The same state had received a \$2-million grant to head a multistate partnership to protect against agroterrorism in fiscal year 2003, but because this amount was in the form of a directed grant, it could not be used to purchase equipment or training for state or local responders. Federal officials believe that agriculture continues to receive limited emphasis in the fiscal year 2005 grant kit relative to other funding priorities. For example, in several instances throughout the fiscal year 2005 grant kit, agriculture does not appear in lists of other disciplines that are eligible for funding. Federal officials told us that without additional guidance or emphasis, state governments would continue to fund traditional emergency preparedness disciplines without considering agriculture.

Finally, state and industry officials told us that there is no mechanism to share lessons learned from federal and other state or industry test exercises or from real-life animal and plant disease outbreaks—such as the exotic Newcastle disease outbreak in California or from the karnal bunt outbreak in Texas. Several state and industry representatives expressed interest in receiving after-action reports so they could benefit from lessons learned. They also believe that lessons learned do not have to be industry-specific. For example, one crop industry group official told us it would be helpful to learn from FMD exercises, as well as the real-life bovine spongiform encephalopathy outbreak, about ways to better communicate during an outbreak. DHS officials told us that they will soon deploy a secure Web site for the food and agriculture sector as a component of DHS' Homeland Security Information Network. According to these officials, this new Web site, now in development, will provide government and industry the capability for information sharing; disseminating alerts and warnings; sharing best practices; and coordinating efforts between the states,

⁷⁸The \$20 million is the allocation available through one component of the Homeland Security Grant Program, the State Homeland Security Program. All of the funding for the state's agroterrorism projects for FY 2004 came through the State Homeland Security Program.

industry, and federal agencies in a protected environment. However, this effort is still in its early stages, and to date the proposed Web site does not include after-action reports. In addition, federal, state, and industry officials we spoke with were apparently unaware of the Web site's development.

USDA Currently Has an Inadequate Number of Area and Regional Emergency Coordinators, Resulting in Insufficient Technical Assistance to the States

USDA faces another management challenge in helping states prepare for animal and plant emergencies because of an insufficient number of Area and Regional Emergency Coordinators. As a result, states are not receiving sufficient federal assistance in developing emergency response plans and other activities. In 2002, USDA created 14 Area Emergency Coordinator positions for animal health issues, and 1 Regional Emergency Coordinator position for each of the eastern and western regions for plant disease outbreaks. By the time of our report, USDA had filled 13 of the 14 coordinator positions on the animal side, and both of the plant health positions. However, 2 of the animal health emergency coordinator positions—which together span six states, including the two biggest agricultural states—were vacant until late 2004. Federal officials also told us that the current number of emergency coordinator positions is insufficient to cover their areas or regions, even if all the positions were filled. This is because the emergency coordinators are responsible for large geographic areas. On average, Area Emergency Coordinators cover 3 states, while Regional Emergency Coordinators are responsible for up to 27 states, plus territories. As a result of this heavy workload, USDA officials said, states are not receiving the maximum benefit of a coordinator's guidance and assistance in preparing state emergency response plans and other preparedness activities. For example, 10 states had not completed their required planning documents to identify resources needed in a plant health emergency, by the September 30, 2004, deadline.⁷⁹ And of those plans submitted, USDA found some to be of unsatisfactory quality. USDA officials attributed these delays and deficiencies, in part, to the fact that the Regional Emergency Coordinators cannot spend adequate time with state and federal agricultural officials in each state. They added that if there were a greater number of emergency coordinators, each coordinator would have fewer states to cover and thus more time to devote to their advisory responsibilities.

⁷⁹This was required for USDA's Standards for Plant Health Emergency System. In addition, the District of Columbia and the American Virgin Islands did not complete their plant health emergency planning documents by the September 30, 2004, deadline.

USDA is also struggling to attract an adequate number of qualified applicants due to the heavy travel involved to cover their areas or regions.⁸⁰ In addition, the job requires traveling to animal or plant health emergency locations anywhere in the United States with as little as 24 hours notice, and for several weeks or more at a time. For example, one animal health emergency coordinator made 29 trips away from his duty station in 14 months on the job, not including other meetings in his three-state area. These trips were necessary for test exercises, conferences, regional FEMA meetings, USDA meetings, and the exotic Newcastle disease outbreak, which occurred in a state outside his area. USDA officials say that APHIS' goal is to put an Area Emergency Coordinator in each of the 43 states where there is an Area Veterinarian in Charge, and to increase the Regional Emergency Coordinators for plant disease outbreaks.

Shortcomings Exist in DHS' Coordination of Federal Working Groups and Research Efforts

Government and industry officials have expressed concern about shortcomings in DHS' coordination of national efforts to protect against agroterrorism. Since the issuance of HSPD-9 in January 2004, DHS and other federal agencies established several interagency working groups to address the tasks set out in the directive. To oversee these working groups, DHS recently established a Government Coordinating Council for agriculture. According to DHS officials, the council's charter outlines the specific tasks for federal agencies and the numerous working groups that have been established to address HSPD-9.⁸¹ However, other federal officials have expressed concern that because the working groups were established prior to the development of the council, activities under way are not well coordinated. For example, according to agency officials, the task list developed by the Government Coordinating Council Charter does not correspond to the tasks outlined in other important national guidance documents, such as the National Response Plan. This discrepancy could lead to confusing implementation of national guidance. Furthermore, state and industry officials we interviewed said they did not understand the roles and responsibilities of these various groups and that no one seemed to be tracking the specific purpose of various efforts.

⁸⁰The USDA job announcement for these positions warns the job is trying, involving long hours at a computer or on the phone, and up to 10 days of travel per month regionally, nationally, or internationally—not including emergencies.

⁸¹DHS officials did not provide us with a copy of the Government Coordinating Council Charter during the course of our engagement.

In addition, DHS lacks controls to coordinate research efforts with other agencies, even though HSPD-9 specifically designates DHS as the agency responsible for coordinating research efforts to protect against agroterrorism. For example, some of the DHS-supported activities at the Centers of Excellence appear to duplicate research conducted by USDA's Agricultural Research Service and the Cooperative State Research, Education, and Extension Service. Specifically, one center is developing rapid diagnostic tools for FMD and other foreign animal disease research that is apparently already under way at USDA. DHS officials told us that while program staff at DHS, HHS, USDA, and other agencies have engaged in some preliminary discussions, there is no overall departmental coordination of policy and budget issues concerning agriculture and food security within DHS and with other departments and agencies. USDA officials stated that while they are not aware of any overlap in the programs supported by USDA and DHS, they are also not aware of the full scope of the activities of the Centers of Excellence.⁸² USDA officials agree that more coordination and cooperation is needed between USDA and DHS regarding research activities.

Agencies' Diagnostic Laboratory Networks Are Not Yet Integrated

While the development of USDA and HHS national diagnostic laboratory networks is a positive step, their effectiveness in sharing diagnostic information about diseases is compromised because their databases are not yet integrated. At the time of our review, USDA had not integrated the databases of its own national laboratory networks due to compatibility and confidentiality issues. Because the USDA-affiliated laboratories operated independently prior to the creation in 2002 of the National Animal Health Laboratory Network and the National Plant Diagnostic Network, the member laboratories are still using their individual databases. USDA officials say these individual databases use different codes and messaging systems and thus do not communicate well with each other. For example, each National Animal Health Laboratory Network facility enters animal disease diagnostic information into its own database, but neither of the other laboratories in the network nor USDA's NVSL—which is responsible for officially testing foreign animal diseases—can read that information. Instead, USDA relies on traditional communication channels, such as

⁸²In commenting on a draft of this report, DHS officials noted that since the summer of 2003, the agency has been working with USDA's Agricultural Research Service and with APHIS to develop a joint strategy for foreign animal disease research and diagnostic programs, and that a report summarizing this strategy was submitted to the House of Representatives Appropriations Subcommittee for Homeland Security in January 2005.

emails and phone calls, to relay test results and the recipients do not have electronic access to the detailed data. This approach limits USDA's ability to look at diagnostic data from across the country, detect trends, and implement a response as quickly as it could with an integrated, real-time system. USDA officials told us that if their laboratories' diagnostic databases were linked to each other nationally, the agency would be able to better monitor and respond more quickly to disease outbreaks. USDA stresses that the ability to share diagnostic information quickly is particularly important for diseases that spread rapidly, such as FMD, because response time is critical in controlling the spread of the disease and reducing the economic impact.

In addition, the Food Emergency Response Network, CDC's Laboratory Response Network, and USDA's National Animal Health Laboratory Network and National Plant Diagnostic Network have not yet linked their databases to each other for diseases of common concern. USDA and HHS officials say it is important for their agencies to rapidly share complete diagnostic test results with each other regarding diseases of concern to all of the agencies involved. For example, if USDA found a chicken with a strain of avian influenza that is transferable to humans, it would be important for CDC to immediately become aware of this information so that it could take appropriate measures to protect human health. Similarly, if USDA confirmed a cow with bovine spongiform encephalopathy, it would be important for FDA to know quickly so that it could investigate whether the infected products had entered the food chain and take any necessary action. In addition, USDA officials say that an integrated diagnostic information system would aid federal agencies' ability to gather evidence in investigations, including criminal ones, of disease outbreaks.

Federal agencies are aware of the importance of integrating databases and are taking steps to link their networks. As authorized by the Bioterrorism Act of 2002, USDA is currently working on integrating all of the National Animal Health Laboratory Network facilities so that they are able to send diagnostic information in real-time to a national, electronic database. This new database will allow diagnostic information to be sorted and analyzed by USDA's Centers for Epidemiology and Animal Health to track animal diseases across the United States and detect any trends. If a positive test result from any of the laboratories enters this new database, it will automatically trigger a series of events to notify relevant parties. USDA officials say that while they will still rely on phone calls and other communication channels, this integrated, real-time database will improve accuracy and speed in the event of an emergency. So far, USDA has piloted

the integration of some of the National Animal Health Laboratory Network facilities' databases for two foreign animal diseases, and it plans to launch the national database for one of those diseases in February 2005. By the end of 2005, USDA plans to integrate information from 12 pilot National Animal Health Laboratory Network laboratories into the database for the eight diseases of highest concern if this project is fully funded.⁸³ In addition, USDA is planning to integrate its plant disease and pest databases for use in the National Plant Diagnostic Network to monitor outbreaks nationwide.⁸⁴

USDA officials told us that integrating the different laboratories' databases is a challenge because of the concern for the leak of information. This concern arises because in the event of an outbreak, there would be international trade repercussions, and USDA would be responsible for reimbursing producers for animals that would have to be destroyed. Other laboratories face similar security concerns. However, the member laboratories within CDC's Laboratory Response Network, which has been in place since 1999, are able to securely share diagnostic results with each other, and officials told us it is important for USDA to overcome this problem. Similarly, FDA uses a secure data exchange vehicle to share information across its diagnostic laboratory network. In an effort to address security concerns, USDA has begun building firewalls and developing a set of protocols to protect data and ensure confidentiality in such an environment.

As called for in HSPD-9, USDA and HHS created an interagency working group in late 2004 to begin the process of coordinating their networks for zoonotic disease surveillance.⁸⁵ For example, USDA and FDA are looking at

⁸³Those diseases, as identified by the National Animal Health Laboratory Network's steering committee, are bovine spongiform encephalopathy, FMD, classical swine fever, exotic Newcastle disease, avian influenza, scrapie, chronic wasting disease, and vesicular stomatitis virus.

⁸⁴USDA officials told us that a memorandum of agreement was drafted in late 2004 between USDA, HHS, DHS, and other agencies to work collaboratively to provide timely, high-quality, and interpretable results for early detection and effective consequence management of acts of terrorism and other events requiring an integrated laboratory response.

⁸⁵HSPD-9 calls for nationwide laboratory networks for food, veterinary, and plant health that integrate existing federal and state laboratory resources and are interconnected. Specifically, HSPD-9 requires USDA and HHS to develop robust, comprehensive, and fully coordinated surveillance and monitoring systems that provide early detection and awareness of disease, pest, or poisonous agents.

how they can share animal disease and food pathogen test results through a secure data exchange. However, the agencies must also work out common testing benchmarks and protocols in order to interpret each other's diagnostic information accurately. For instance, if CDC was aware of the type of diagnostic tools that USDA was using, the agency would be better able to interpret results and take appropriate action. Agency officials added that DHS' planned National Biosurveillance Integration System intends to use information from the various federal laboratory networks and combine this with threat and intelligence data to further improve surveillance efforts for potential terrorist activity. DHS officials indicated that the National Biosurveillance Integration System would have an initial capability for integrating data from these laboratories by spring 2005.

Conclusions

Prior to the terrorist attacks of 2001, relatively little attention had been focused on agroterrorism. Recently, however, agriculture is receiving more attention as experts and government officials increasingly recognize the need to reduce the vulnerability of this sector to the deliberate introduction of animal or plant diseases. Federal and state agencies are investing considerable resources to better identify and manage the risks of agroterrorism and have ramped up planning and coordination efforts to respond to such an event. There are still, however, several important challenges that should be addressed to better equip our nation to manage agroterrorism. First, the United States must enhance its ability to quickly identify and control diseases. Until USDA requires accredited veterinarians to be trained to recognize the clinical signs of foreign animal diseases, such diseases may not be detected and confirmed as early as possible, wasting valuable time that could be spent containing them. Similarly, until USDA evaluates the costs and benefits of using rapid diagnostic tools at the site of an outbreak, the agency may be missing an opportunity to reduce the impact of agroterrorism. Without on-site diagnosis to help monitor neighboring herds, animals would likely be slaughtered based on proximity rather than confirmed infection, unnecessarily magnifying the impact of an attack. Once diseases have been accurately diagnosed, the United States needs to quickly decide whether vaccines should be used to control an outbreak and have the ability to deploy ready-to-use vaccines within 24 hours. Otherwise, during an emergency, valuable time could be lost while deliberating whether to use vaccines and waiting for vaccines to be transformed into a ready-to-use state.

Several less complex managerial problems should also be addressed in the short term to improve the nation's ability to protect against agroterrorism.

Our nation's ports could be unnecessarily vulnerable to the intentional introduction of a disease or pest, unless agencies analyze the reasons for declining agricultural inspections and streamline the flow of information between USDA and DHS inspectors at ports of entry. Furthermore, states and industry may not have the ability and information to fulfill their assigned roles in protecting agriculture unless DHS provides them with meaningful opportunities to comment on national guidance; agencies share after-action reports of test exercises and real-life emergencies with these stakeholders; and USDA identifies ways to fill and expand Area and Regional Emergency Coordinator positions. Finally, until DHS ensures that tasks outlining agency responsibilities are consistent with national plans and guidelines and DHS develops a method to adequately track federally funded research efforts, the United States will lack a coordinated national approach to protect against agroterrorism, possibly resulting in gaps or needless duplication of effort. By overcoming these challenges, the United States will be in a better position to protect against and respond to a disease outbreak, whether natural or intentional.

Recommendations for Executive Action

To address significant and complex challenges that limit the United States' ability to quickly and effectively respond to a widespread attack on animal agriculture, we recommend that the Secretary of Agriculture address the following four challenges in the context of the agency's overall risk management efforts:

- expedite the review and issuance of the draft rule on USDA's accreditation process for veterinarians, which would require training in recognizing foreign animal diseases;
- evaluate the costs and benefits of using rapid diagnostic tools at the site of an outbreak;
- examine the costs and benefits of developing stockpiles of ready-to-use vaccines that can be quickly deployed against animal diseases of primary concern; and
- simplify the decision-making process for determining if and/or when to use vaccines to control an outbreak to ensure that rapid decisions can be made in the event of a terrorist attack.

To address management problems that reduce the effectiveness of agencies' routine efforts to protect against agroterrorism, we recommend the following seven actions:

- the Secretaries of Homeland Security and Agriculture work together to identify the reasons for declining agricultural inspections and to identify potential areas for improvement;
- the Secretaries of Homeland Security and Agriculture streamline the flow of information between USDA and DHS agricultural inspectors, and expedite the integration of the two agencies' databases and information technology systems at the port level;
- the Secretary of Homeland Security develop a mechanism to promptly and effectively seek input from key stakeholders on national guidance that affects their roles in protecting agriculture and responding to an emergency;
- the Secretaries of Homeland Security, Agriculture, and Health and Human Services, and the Acting Administrator of the Environmental Protection Agency compile relevant after-action reports from test exercises and real-life emergencies and disseminate the reports through the Homeland Security Information Network that DHS is developing;
- the Secretary of Agriculture develop a strategy to increase the number of Area and Regional Emergency Coordinator positions so that the agency faces less difficulty filling these positions and is better able to assist states in preparing for an agriculture emergency, including a terrorist attack;
- the Secretary of Homeland Security work to ensure that task lists for the various agencies and working groups engaged in securing agriculture are consistent with national plans and guidelines; and
- the Secretary of Homeland Security develop controls to better coordinate and track federally funded research efforts with other agencies to protect against agroterrorism.

Agency Comments and Our Response

We provided USDA, DHS, HHS, EPA, and DOD with a draft of this report for their review and comment. We received written comments on the report

and its recommendations from USDA, DHS, and HHS. EPA and DOD provided minor technical clarifications.

USDA commented that the report provided a number of appropriate and insightful recommendations. In several instances, USDA said it could take actions that relate to our recommendations. For example, USDA said that the department could explore the possibility of speeding up its process for deciding when to use vaccines and that it will consider options to cut some of the delay in obtaining ready-to-use vaccines. The department also raised some concerns regarding various aspects of our report. For example, as we recommend, USDA noted that there may be opportunities to use rapid diagnostic tools to help with diagnosis of animal diseases, but said that the tools need to be validated. Further, USDA commented that the agency would in all cases still require confirmation that relies on traditional testing procedures. As stated in our report, we continue to believe that use of these tools at the site of an outbreak would help reduce the impact of a terrorist attack because, among other things, these tools would help prevent laboratories from becoming overwhelmed with test samples. USDA's written comments and our detailed responses to their concerns appear in appendix VI. USDA also provided technical comments that we incorporated, as appropriate, throughout the report.

DHS generally concurred with the report's recommendations and indicated that the agency is in the process of taking several corrective actions addressing two of our recommendations. For example, as we recommend, DHS is working with USDA to identify the reasons for declining agriculture inspections and to identify potential areas for improvement. Regarding our recommendation that DHS and USDA streamline the flow of information between the two agencies' agricultural inspectors, DHS stated that it is already working with USDA to enhance communication; that is, the two agencies are working to finalize the section in the Memorandum of Agreement governing the sharing of information. DHS also provided technical comments that we incorporated as appropriate. DHS's written comments and our detailed responses appear in appendix VII.

Overall, HHS agreed with the report's recommendations. In commenting on our recommendation that the agencies compile relevant after-action reports from test exercises and real-life emergencies and disseminate the reports through the Homeland Security Information Network that DHS is developing, HHS officials noted that CDC already has standardized after-action reporting procedures in place. HHS officials also noted that another challenge in protecting the nation against agroterrorism is the shortage of

laboratory space to conduct trials for vaccine development. HHS's written comments appear in appendix VIII. HHS also provided technical comments that we incorporated, as appropriate, throughout the report.

We are sending copies of this report to the Secretaries of Agriculture, Homeland Security, Health and Human Services, and Defense; the Acting Administrator of the Environmental Protection Agency; and interested congressional committees. In addition, this report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions concerning this report, I can be reached at (202) 512-3841 or robinsonr@gao.gov. Major contributors to this report are included in appendix IX.



Robert A. Robinson
Managing Director, Natural Resources and Environment

Scope and Methodology

To determine what changes have taken place since September 11, 2001, in federal agencies' roles and responsibilities to protect against agroterrorism, we reviewed the relevant laws and presidential directives in force before and after September 11, 2001. Specifically, our Office of General Counsel reviewed the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1974,¹ the Agriculture Risk Protection Act of 2000,² the Farm Security and Rural Investment Act of 2002,³ the Public Health Security and Bioterrorism Preparedness and Response Act of 2002,⁴ and the Homeland Security Act of 2002.⁵ We also reviewed presidential directives that define agency roles in emergencies such as acts of agroterrorism, including Homeland Security Presidential Directives 5, 7, 8, and 9. Finally, we interviewed numerous agency officials from the U.S. Department of Agriculture (USDA), the Department of Homeland Security (DHS), the Department of Health and Human Services (HHS), the Environmental Protection Agency (EPA), the Department of Defense (DOD), and the Department of Justice.

To determine what steps the federal government has taken to protect against agroterrorism, we examined (1) steps taken at the federal level, (2) federal action to prepare the states, and (3) coordination with industry. To determine what steps have been taken at the federal level, we reviewed classified and unclassified agency documents, including vulnerability assessments conducted by USDA and HHS for agricultural and food products; the draft of the interim National Infrastructure Protection Plan and the final version of the National Response Plan; and lists of interagency working groups and coordinating committees. We also interviewed agency officials involved in creating and enforcing U.S. policy concerning agroterrorism, including officials from USDA's Office of Homeland Security, Animal and Plant Health Inspection Service (APHIS), Agricultural Research Service, and the Cooperative State Research Education and Extension Service; DHS' Information Analysis and Infrastructure Protection directorate, Emergency Planning and Response directorate,

¹Pub. L. No. 93-288, 88 Stat. 143.

²Pub. L. No. 106-224, 114 Stat. 358.

³Pub. L. No. 107-171, 116 Stat. 134; portions of this law are referred to as the Animal Health Protection Act.

⁴Pub. L. No. 107-188, 116 Stat. 594.

⁵Pub. L. No. 107-296, 116 Stat. 2135.

Border and Transportation Security directorate, Science and Technology directorate, and Office for Domestic Preparedness; HHS' Food and Drug Administration and Centers for Disease Control and Prevention; and EPA. In addition, we contacted USDA's Inspector General and state governments to determine what prior work had been done in this area. To identify federal actions to strengthen surveillance at the borders we visited or spoke with officials at three maritime ports, three airports, one border-crossing, and one international mail facility, where we interviewed inspectors in DHS' Customs and Border Protection, USDA's Plant Protection and Quarantine, and USDA's Veterinary Services. We also reviewed documents obtained from officials and inspectors, including samples of inspection records, training schedules, as well as interagency agreements that clarify agency roles and responsibilities, such as the Memorandum of Agreement between DHS and USDA.⁶ Finally, we spoke with officials at DHS' Customs and Border Protection headquarters in Washington, D.C. To assess the federal government's coordination of its efforts to protect against agroterrorism, we considered the Office of Management and Budget Circular A-123, *Management Accountability and Control*,⁷ and the standards in GAO's *Internal Control: Standards for Internal Control in the Federal Government*.⁸

To determine how the federal government is helping states to protect against agroterrorism, we used structured interviews of state and federal officials in three major agriculture states we visited between July and October 2004. We selected these states in part because of their status as the top three producers of agricultural commodities sold before processing, according to data that we obtained from USDA's Economic Research Service. Additionally, prior to our visit to the major agricultural states, we visited officials in another state to test our structured interview methodology. In these four states, we interviewed officials from state agencies overseeing agriculture, homeland security, and emergency

⁶DHS Agreement Number BTS-03-0001.

⁷Office of Management and Budget, OMB Circular A-123 *Management Accountability and Control* (Washington, D.C.: 1995). This document provides the specific requirements for assessing and reporting on controls within the executive branch.

⁸U.S. Government Accountability Office, *Internal Control: Standards for Internal Control in the Federal Government*, GAO/AIMD-00-21.3.1 (Washington, D.C., November 1999). The Federal Managers' Financial Integrity Act of 1982 (FMFIA) requires us to issue standards for internal controls in government. Among other things, the standards provide the overall framework for establishing and maintaining internal controls.

services; personnel from federal and state diagnostic laboratory networks and research centers; and officials from the regional or state offices of USDA and the Food and Drug Administration. In addition to the three top producing agriculture states, we had selected a fourth state to visit to get a wider geographic distribution, but due to severe weather during the fall of 2004, we were only able to interview officials from the state department of agriculture by phone. We also reviewed documentation from state and federal officials, including state agricultural emergency response plans, after-action reports from disease outbreaks and test exercises, and federal guidance to the states.

To determine how the federal government is coordinating with industry to protect against agroterrorism, we reviewed federal guidance to industry. We also interviewed officials from organizations representing agriculture interests in Washington D.C., and officials from DHS, USDA, and HHS who are involved in coordinating with industry. Finally, we attended coordinating meetings in Washington, D.C., involving representatives from the food and agriculture sector and federal agencies.

To determine what challenges remain to protect against agroterrorism, we used knowledge gained in addressing our other objectives. Using structured interviews, we consulted with nongovernment experts in the fields of agricultural security and counterterrorism. We selected our experts based on their professional and research qualifications and experience in the field of agroterrorism. We then analyzed the content of the experts' responses to identify common themes. Finally, we analyzed the content of relevant peer-reviewed journal articles to identify common themes.

We conducted our work from February 2004 through January 2005 in accordance with generally accepted government auditing standards.

List of Experts GAO Consulted and Summary of Observations

This appendix provides the names and affiliations of nongovernment experts from academia and other research organizations that we interviewed during our work and summarizes key observations they made. The information presented in this appendix does not reflect absolute consensus of opinion among the experts on each topic; however, it summarizes their observations on issues where many of the experts held similar views. The information contained in this appendix should not be considered to be the views of GAO.

List of Experts Interviewed

- Roger Breeze, B.V.M.S., Ph.D., M.R.C.V.S., CEO, Centaur Science Group, Former Director, Plum Island Animal Disease Center;¹
- Corrie Brown, D.V.M., Ph.D., Professor and Coordinator of International Activities, Department of Veterinary Medicine, University of Georgia;²
- Rocco Casagrande, Ph.D. in Biology, Director, The Center for Homeland Security, Abt Associates;
- Peter Chalk, Ph.D. in Political Science, Security and Political Analyst, the Rand Corporation, Santa Monica, California;
- R. James Cook, Ph.D., Interim Dean, College of Agricultural, Human, and Natural Resource Sciences, Washington State University, Pullman, Washington;
- Radford Davis, D.V.M., M.P.H., Assistant Professor of Public Health, College of Veterinary Medicine, Department of Veterinary Microbiology and Preventive Medicine, Iowa State University;³
- Jacqueline Fletcher, Ph.D., Past President of the American Phytopathological Society, Currently Sarkeys Distinguished Professor, Department of Entomology and Plant Pathology, Oklahoma State University;

¹B.V.M.S., is a Bachelor of Veterinary Medicine degree. M.R.C.V.S., is a Member of the Royal College of Veterinary Surgeons. Ph.D. is a Doctorate of Philosophy degree.

²D.V.M., is a Doctorate of Veterinary Medicine degree.

³M.P.H., is a Master in Public Health degree.

Appendix II
List of Experts GAO Consulted and Summary
of Observations

- David R. Franz, D.V.M., Ph.D., Director, National Agricultural Biosecurity Center, Kansas State University;
- Brian Jenkins, Senior Advisor to the President of the Rand Corporation, Member of the Comptroller General of the United States' Advisory Board;
- Harley Moon, D.V.M., Ph.D., Chair, National Research Council Committee on Biological Threats to Agricultural Plants and Animals, Veterinary Medical Research Institute, Iowa State University;
- James A. Roth, D.V.M., Ph.D., Distinguished Professor of Immunology, Assistant Dean, International Programs and Public Policy; Director, Center for Food Security and Public Health, College of Veterinary Medicine, Iowa State University;
- John L. Sherwood, Ph.D., Chair, American Phytopathological Society Public Policy Board, Professor and Department Head, Department of Plant Pathology, University of Georgia;
- Mark C. Thurmond, D.V.M., Ph.D., Professor, Department of Medicine and Epidemiology, University of California, Davis;
- Alfonso Torres, D.V.M., MS, Ph.D, Executive Director, New York State Animal Health Diagnostic Laboratory, and Associate Dean for Veterinary Public Policy, College of Veterinary Medicine, Cornell University;⁴ and
- Mark Wheelis, Senior Lecturer in Microbiology, University of California.

Summary of Experts'
Observations

We conducted structured interviews with nongovernment experts in the fields of animal and plant diseases, terrorism, bioterrorism, and agroterrorism. Before conducting our interviews, we reviewed the experts' relevant studies and publications and provided them with a list of questions. We sought their views on a range of topics, including the vulnerability of U.S. agriculture, government agencies' roles and responsibilities, and agencies' efforts to protect against agroterrorism.

⁴MS is a Master of Science degree.

Vulnerability of U.S. Agriculture

- In general, experts agree that U.S. agriculture is vulnerable to agroterrorism because of the relative ease with which highly contagious diseases can be introduced in livestock and crops. An agroterrorism event could not only cause severe economic losses to farmers and rural communities, it could also halt or slow down international trade, and negatively impact consumer confidence in the government's ability to ensure the safety of our food supply. For these reasons, many experts believe that agriculture is an attractive target for terrorists. Some experts note that the methods for containing the spread of highly infectious animal diseases—the highly visible and costly slaughter, incineration, and/or burial of large numbers of animals—creates the incentive for terrorists to attack.
- Most experts note that livestock presents a more attractive target for terrorists than crops, although both are vulnerable. The biggest threat at the farm level would be the deliberate introduction of FMD, a highly contagious animal disease that has been eradicated in the United States. Highly contagious animal diseases can spread more quickly than plant diseases, and the concentration of animals in feedlots and livestock markets would contribute to the rapid spread of infection. Experts remarked that an attack of this sort would be cheap, requires no technical expertise, and would not harm the perpetrator. Some experts remark that transportation of live cattle, hogs, and poultry, across the country further enables diseases to spread quickly and easily over large areas. On the other hand, some of the experts state that plant diseases often need particular weather and environmental conditions for them to take hold and flourish, making them a less attractive target.
- Most experts identify the same group of animal diseases as the most likely to be used against agriculture—those include FMD, avian influenza, classical and African swine fevers, and exotic Newcastle disease. However, there is wide consensus among experts that FMD poses the highest risk because it is highly contagious, it results in the need to destroy large numbers of animals which, in turn, generates a great deal of media attention, and can inflict severe economic losses. Some of the experts also raise concerns about zoonotic diseases such as Rift Valley fever, Nipah Virus, and highly pathogenic avian influenza, but not all experts agree that zoonotic diseases pose a significant threat. On the plant side, some experts identify soybean rust as the disease of most concern because it is easy to introduce and can spread by wind-borne spores. Another expert raises concerns about the threat of contamination with genetically engineered seeds and observes that it

would only take one or two seeds to contaminate an entire cargo of product.

Government Agencies' Roles and Responsibilities

- Some experts we interviewed agree that the federal government is undertaking significant initiatives to protect against agroterrorism. They have generally favorable comments regarding the role that DHS plays in protecting against agroterrorism. Some see the emergence of DHS as a coordinator for agroterrorism activities within the federal government as a major change that signals the importance of the agriculture sector. Some experts also indicate that there was initial confusion about DHS' role and that, because the agency is still very new, their role is still evolving.
- Many experts identify the lack of communication at the federal level as their biggest concern and observe that within the federal government there is no clear understanding of the initiatives that are in place to protect against an attack and that there appears to be a duplication of efforts. Some experts believe that there is little coordination between federal and state agencies, or between states, and that federal agencies are not sufficiently sharing information with state and local officials. Also, there is insufficient coordination and communication with industry groups.

Agencies' Efforts to Protect against Agroterrorism

- In terms of planning efforts, several experts indicated that the development of a National Response Plan and associated Emergency Support Functions is exactly what was needed. They believe that it is important to include the states' input in the preparation of those documents since the states will be the first responders. Several experts state that preparing a response plan for dealing with an unintentional outbreak would also be useful in preparing for an agroterrorism event. Many experts note that test exercises can help identify potential problems in response plans that may arise in application.
- Many experts agree that focusing the majority of efforts on preventing agroterrorism is not the answer because it is impossible to prevent all disease introductions, whether accidental or intentional. Instead, several experts note that agencies need to focus more on rapid detection and identification of diseases and in establishing quick response mechanisms.

- Most experts agree that USDA's creation of the National Animal Health Laboratory Network and the National Plant Diagnostic Network is a positive development. However, some experts disagree as to whether the networks can provide sufficient surge capacity or if they need to be expanded.
- Some experts recommend additional research and development to create FMD vaccines that contain markers to differentiate animals that are merely vaccinated from those that are infected.
- While some experts agree that training of veterinarians in foreign animal diseases is inadequate, others note that actual training and awareness of the importance of such training has improved. Some experts explain that foreign animal disease training is not required in all veterinary schools. This training is also not a prerequisite to become a USDA-accredited veterinarian. On the plant side, some experts note that the United States does not have an adequate number of people trained in plant pathology. Many experts agree that more federal funding should be dedicated to plant pathology research and job creation.
- Some experts recommend using rapid diagnostic tools at the site of an outbreak, rather than shipping samples to USDA reference laboratories. They state that this would save valuable time in containing diseases, whether naturally occurring or resulting from agroterrorism. The use of these rapid tools on site would also help prevent laboratories from becoming overwhelmed with samples, particularly if a terrorist attack involved the multi-focal introduction of a disease or if diseases were repeatedly introduced over long periods of time.

Animal and Plant Diseases that Pose a Severe Threat to Agriculture

Table 1: List of Select Animal Diseases Identified by USDA Pursuant to the Bioterrorism Act of 2002 as a Severe Threat to the Livestock Industry and Human Health

Diseases and agents	Animals affected	Route of transmission	Availability of vaccine	Can affect humans
Avian Influenza (highly pathogenic)	Chicken, turkey, wild birds, water fowl	Body fluids; aerosols; fomites	Yes	Yes
Exotic Newcastle Disease	Poultry, other avian species	Direct contact with body fluids; aerosols; feces or respiratory droplets	Yes	Yes
Nipah	Pigs, horses, cats, dogs	Close direct contact with contaminated tissue or body fluids	No	Yes
Hendra	Horses, cats, guinea pigs	Direct contact; oranasal; ingestion of contaminated material; fruit bats	No	Yes
Eastern Equine Encephalitis	Horses	Vectors infected with virus	Yes	Yes
Venezuelan Equine Encephalomyelitis	All equine, bats, birds, rodents	Mosquito (vectors) infected with virus	Yes	Yes
Foot and Mouth Disease	All cloven hoofed animals including cattle, sheep, goats, pigs	Aerosol; direct contact; ingestion; fomites	Yes	Yes, but rarely infects humans
Rift Valley Fever	Cattle, sheep, goats, dogs, cats, camels, monkeys	Insect vectors (mosquitoes); direct contact with blood or tissue	Yes	Yes
Rinderpest	Cattle, sheep, goats	Direct or close contact with body fluids	Yes	No
African Swine Fever	Domestic and wild pigs; wart hogs	Direct contact with body fluids, especially blood; fomites; tick vectors	No	No
Classical Swine Fever	Domestic pigs	Ingestion (uncooked garbage); fomites; aerosol; direct contact	Yes	No

Sources: GAO analysis and 9 CFR §121.3.

Note: Other animal diseases identified by the Bioterrorism Act of 2002 that have the potential to pose a severe threat to livestock and human health include bacillus anthracis, brucella abortus, brucella melitensis, brucella suis, burkholderia mallei, burkholderia pseudomallei, clostridium botulinum, coccidioides immitis, francisella tularensis, botulinum neurotoxins, clostridium perfringens epsilon toxin, shigatoxin, staphylococcal enterotoxins, T-2 toxin, African horsesickness, contagious bovine pleuropneumonia, peste des petits ruminants, vesicular stomatitis virus, swine vesicular disease virus, lumpyskin disease virus, bluetongue virus, and sheep pox and goat pox.

**Appendix III
Animal and Plant Diseases that Pose a Severe
Threat to Agriculture**

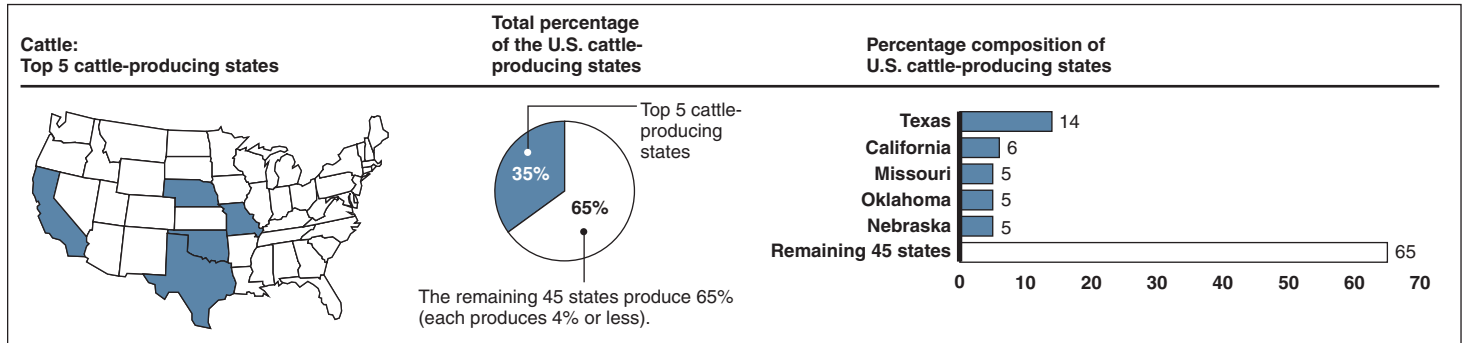
Table 2: List of All Plant Diseases Identified by USDA as Severe Threats to Plants Pursuant to the Bioterrorism Act of 2002

Diseases and agents	Plants affected	Route of transmission
Soybean Rust	Soybeans	Wind-borne spores
Southern Bacteria Wilt	Potatoes, geraniums, tomatoes, peppers, eggplants, beans, bitter gourds, beets, and tobacco	Soil, contaminated water, equipment
Plum Pox	Peaches, plums, apricots, almonds	Grafting from infected trees or aphid vectors
Downy Mildew of Corn	Sugarcane, corn	Wind-borne, seedborne, infected soil
Brown Stripe Downy Mildew of Maize	Corn	Wind, rain, water, and physical contact between plants
Synchytrium Endobioticum (potato wart)	Potatoes	Soil, on tubers grown in infected soil, machinery and implements used in potato cultivation, on footwear and manure from animals that have fed on infected tuber
Bacterial Leaf Streak of Rice	Rice	Wind-borne, seeds, infected soil and water, irrigation, rain
Citrus Greening	Citrus fruit trees	Insect vector, grafting from infected trees
Pierce's Disease	Grapes, almonds, peaches, pears, citrus, alfalfa, coffee, oleander, oak, sycamore, maple, elm, mulberry, ornamental grasses	Insect vector

Sources: GAO analysis and 7 CFR §331.3.

U.S. Concentration of Cattle, Chicken, and Corn Production in 2002

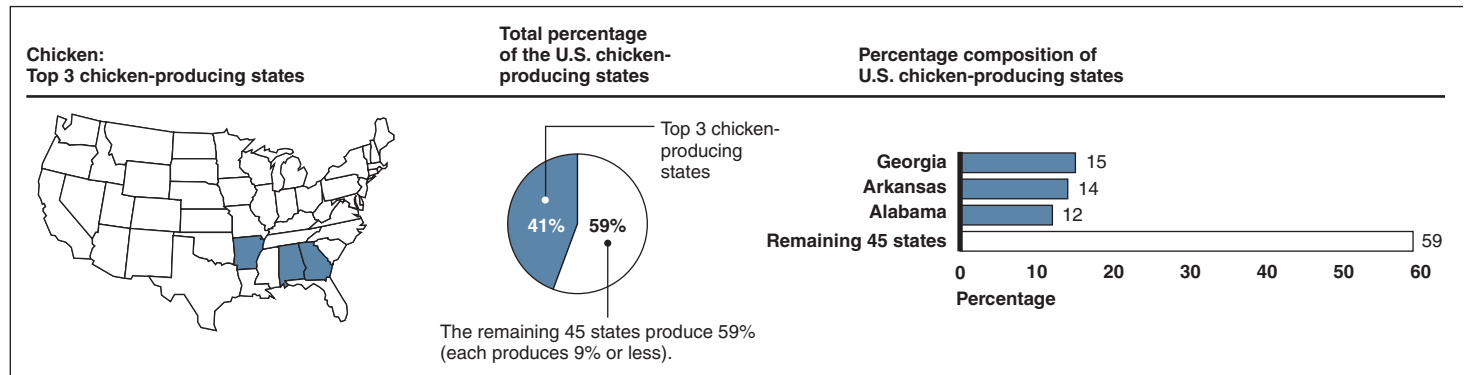
Figure 6: Top Cattle-Producing States in 2002



Source: U.S. Department of Agriculture, 2002 Census of Agriculture.

Note: Cattle production consists of milk and beef cattle.

Figure 7: Top Chicken-Producing States in 2002

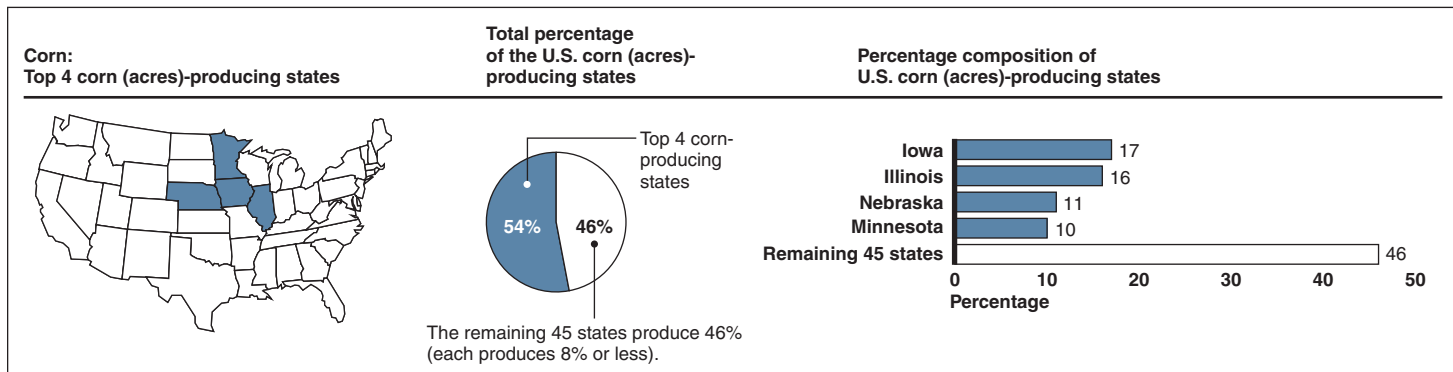


Source: U.S. Department of Agriculture, 2002 Census of Agriculture.

Note: Chicken production consists of broilers and layers. Two states did not disclose their information.

Appendix IV
U.S. Concentration of Cattle, Chicken, and
Corn Production in 2002

Figure 8: Top Corn-Producing States in 2002



Source: U.S. Department of Agriculture, 2002 Census of Agriculture.

Note: One state did not produce corn.

Additional Information on National and Agency-Specific Steps Taken to Protect against Agroterrorism

National Infrastructure Protection Plan

DHS worked jointly with other federal agencies to develop the interim National Infrastructure Protection Plan, a standardized plan to safeguard the nation's critical infrastructure, including agriculture, before a terrorist attack occurs. USDA and HHS, in consultation with DHS, developed sector-specific plans for agriculture and food, which were incorporated into the interim National Infrastructure Protection Plan. These sector-specific plans outline activities including:

- Identifying the sector's assets;
- Identifying and assessing the vulnerabilities and interdependencies among assets, and analyzing potential risks based on threats and consequences;
- Prioritizing assets based on an analysis and normalization of vulnerability data;
- Developing sustainable programs to protect assets and implementing these programs when necessary; and
- Using metrics to measure and communicate the effectiveness of the sector-specific plans.

The National Infrastructure Protection Plan outlines roles and responsibilities for federal, state, and local governments to safeguard agriculture. The plan includes a description of coordination activities to reduce the vulnerability of critical infrastructures. According to DHS officials, the department—along with other federal departments and agencies—will work with state and local governments and the private sector to further refine stakeholder roles and responsibilities in order to implement the National Infrastructure Protection Plan. In addition, these entities will work together to implement sector-specific plans that will support the National Infrastructure Protection Plan. The results of these implementation efforts will be reflected in the next version of the National Infrastructure Protection Plan, which according to DHS officials, will be issued within 270 days of issuance of the current interim plan.

National Response Plan

In addition to the National Infrastructure Protection Plan, DHS coordinated the integration of various interagency and agency-specific incident management plans into a single all-hazard National Response Plan that

would be used in the event of a terrorist attack. The National Response Plan includes appendixes, known as Emergency Support Functions, that detail the responsibilities of federal agencies for coordinating resources during national emergencies. One of these appendixes, Emergency Support Function-11, outlines the roles and responsibilities of local, state, and federal responders in addressing the national response to outbreaks or other emergencies in the food and agriculture sector. For example, Emergency Support Function-11:

- Assigns USDA, through APHIS, as the lead agency for responding to a disease outbreak, and outlines USDA's role in supporting such activities as detection, control, and eradication;
- Assigns state agencies, along with USDA's Area Veterinarian-in-Charge, the task of establishing a Joint Operations Center, which will serve as the focal point for coordinating the disease management and decision-making process; and
- Assigns local or county governments with the task of activating an Emergency Operations Center to provide a local base of operations.

National Incident Management System

As directed by HSPD-5, DHS is overseeing the adoption of a National Incident Management System by federal and state agencies that will be used in an agroterrorism event. According to HSPD-5, the National Incident Management System, released in March 2004, is intended to provide a consistent nationwide approach for federal, state, and local governments to work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size, and complexity. The National Incident Management System is a management framework rather than a plan. It is intended to ensure coordinated responses to disasters and terrorist attacks by outlining common standards for preparedness training, exercises, and certification. A key component of the National Incident Management System is the Incident Command System, which is designed to coordinate the communications, personnel, and procedures of different agencies and levels of government within a common organizational structure during an emergency. The Incident Command System, which was initially developed by the USDA Forest Service and the state of California to help fight forest fires, has already been adopted by a number of agencies and state governments. According to USDA and state officials, the Incident Command System has already been used in two natural animal disease outbreaks—an outbreak of low-

pathogenic avian influenza among turkeys in Virginia and an exotic Newcastle disease outbreak among chickens in California.

Test Exercises

Since 2001, exercises have simulated animal and plant disease outbreaks and have tested aspects of the new National Incident Management System protocols and the latest federal and state emergency response plans. These exercises are in line with HSPD-9's goal of ensuring that the combined federal, state, and local response capabilities are adequate to respond quickly and effectively to a terrorist attack. For example, in July 2004, Kansas State University sponsored "Exercise High Plains Guardian," a 2-day exercise to test the ability of federal and state military and civilian first responders to cooperate in responding to an outbreak of FMD. The scenario addressed quarantines, highway closings, elapsed time waiting for federal lab results to confirm the suspicions of state veterinarians, and, after positive confirmation, massive euthanizing and carcass disposal efforts. As a result of these exercises, federal, state, and industry officials told us that in general, the exercises have been useful in allowing players to better understand their roles and responsibilities in a real-life event, uncover shortfalls they had not necessarily foreseen in planning, and test solutions. For example, the 2002 FMD exercise "Crimson Sky" made it clear that USDA would be the lead federal department in providing policy and direction for detecting, controlling, and eradicating an animal disease outbreak. At the same time, the exercise indicated the importance of interdependence between federal, state, and industry stakeholders in carrying out emergency management and logistical response functions. Furthermore, the exercise raised key issues concerning information-sharing between these players and the public, stopping and resuming movement of animals, mobilizing federal resources, indemnity, vaccination of herds, and decontamination policy.

Vulnerability Assessments

FDA's initial vulnerability assessment utilized an analytical framework called Operational Risk Management that considered both the severity of the public health impact and the likelihood of such an event taking place. FDA incorporated threat information received from the intelligence community. To validate the findings, FDA contracted with the Institute of Food Technologists to conduct a review of the initial assessment and provide a critique of its application to food security. This review validated FDA's vulnerability assessment and provided additional information on the public health consequences of a range of scenarios involving various products, agents, and processes. FDA also contracted with Battelle

Memorial Institute to conduct a “Food and Cosmetics, Chemical, Biological, and Radiological Threat Assessment.” This assessment provided another decision-making tool and validated previous findings.

FDA updated and refined these assessments using a process developed by DOD for use in assessing the vulnerabilities of military targets. This assessment tool is known as “CARVER + Shock” and takes into consideration information such as accessibility, vulnerability, and shock (the shock value of an attack on a target due to the heinous nature of terrorist events).¹ FDA plans to use the results of these updated assessments to develop technology interventions and countermeasures, identify research needs, and provide guidance to the private sector. Similarly, USDA is using the CARVER + Shock tool for assessing vulnerabilities in USDA-regulated products, based on subject matter experts and intelligence information. USDA was still developing the assessment at the time of our review.

Interagency Working Groups

In addition to the Government Coordinating Council and the Food and Agriculture Sector Council, federal agencies have established a number of interagency working groups. One such interagency working group composed of DHS, USDA, and CDC, is overseeing the development of a national disease surveillance system. This system, when established, will allow DHS to incorporate information on disease outbreaks from other agencies to determine whether an outbreak is natural or intentional. USDA, with support from DHS and EPA, is leading another working group that is preparing a plant disease recovery system that is intended to allow U.S. crop production to quickly recover from an attack. A final example of one of the interagency working groups is one led by EPA and supported by USDA, HHS, DHS, and DOD that has laid out interagency roles in supporting state and local governments in decontamination and disposal of infected plants and diseased animals following a major disease outbreak.

Research Efforts

DHS, USDA, and other agencies are funding research to protect agriculture. Of note, DHS has established two Centers of Excellence that, along with partner institutions, will oversee research to protect agriculture and the

¹CARVER is an acronym for Criticality, Accessibility, Recuperability, Vulnerability, Effect, and Recognizability.


food supply. DHS is providing \$15 million in funding to the University of Minnesota to oversee research into post-harvest food protection and \$18 million to Texas A&M University to oversee research into diseases that affect food animals. This funding is for a 3-year period of time. For example, the Center of Excellence at Texas A&M will support efforts to model the outbreak of FMD, which will allow responders to develop accurate plans to counter an outbreak. The center will also support research into the development of real-time diagnostic equipment and vaccines against foreign animal and zoonotic diseases. Furthermore, the center will develop training curricula for first responders, industry officials, and production workers to increase response capability and awareness of possible threats. USDA is also funding efforts to increase agricultural security through the ARS, the research arm of USDA, and the Cooperative State Research Education and Extension Service, which supports research at universities and other institutions. USDA funding supported research at facilities such as the National Agricultural Biosecurity Center at Kansas State University, which will conduct projects including the evaluation of contaminated carcass disposal efforts, assessments of animal and plant disease test exercises, and the analysis of pathways by which foreign animal and plant disease can enter the United States. Finally, other agencies are supporting research into agricultural security. For example, CDC provided \$1 million per year to Iowa State University to fund a center for food security and public health. This center will support efforts such as “train the trainer” programs to educate veterinarians in foreign animal diseases.

**National Animal Health
Emergency Management
System**

USDA’s National Animal Health Emergency Management System incorporates a nationwide network of state and federal personnel in each state, a National Animal Health Laboratory Network, and Area Emergency Coordinators operating within the National Response Plan and the National Incident Management System. The system also includes a steering committee consisting of representatives of the animal health community and other stakeholders that provides a means of communication and coordination on issues of emergency management and response. The central principles of the National Animal Health Emergency Management System are provided in a single set of written guidelines that consolidate strategy, operations, facility management, and administrative procedures.

Comments from the U.S. Department of Agriculture

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



**United States
Department of
Agriculture**

Marketing and
Regulatory
Programs

Animal and
Plant Health
Inspection
Service

Washington, DC
20250

Mr. Robert A. Robinson, Managing Director
Natural Resources and Environment
United States Government Accountability Office
Washington, DC 20548

Dear Mr. Robinson:

The U.S. Department of Agriculture (USDA) has reviewed the Government Accountability Office's Draft Report, "Homeland Security: Much is Being Done to Protect Agriculture from a Terrorist Attack, but Important Challenges Remain" (GAO 05-214). We found that the report provided a number of insightful and appropriate recommendations. We appreciate this opportunity to comment on your findings.


Rapid Diagnostic Testing

The current process and procedures for investigating a suspected animal health event include several layers of precautionary actions. These actions are embedded in Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) policies and requirements to protect the industry and minimize losses due to international and interstate trade restrictions.

The first precaution concerns VS "front lines" defense. When a veterinary foreign animal disease diagnostician (FADD) is sent to a premises to investigate a situation, that person has authority from the State to act immediately upon his/her findings. If the FADD suspects that a foreign animal disease (FAD) is present in the livestock on the premises, a State hold order or quarantine is placed on all movement of livestock and the producer is required to provide additional information on his/her overall operation production system. These actions are necessary to prevent movement of the disease agent through movement off the premises of livestock, feed, or other materials and support immediate biosecurity and containment of the disease agent.

In addition, VS works with its Federal and State counterparts to minimize the time from when an FAD is suspected to the point of disease confirmation through laboratory testing. Within this system, the disease is immediately contained and thus, the response at the local level is progressing while the samples are in route to the laboratory for confirmatory testing. Employing methods of rapid assay detection may be useful for confirming suspicions but would be inadequate for release of hold orders or quarantines and would not affect control strategies already being employed.

The National Veterinary Services Laboratories (NVSL), which includes the Foreign Animal Disease Diagnostic Laboratory (FADDL), is officially responsible for testing and confirming foreign animal disease. Those labs have the expertise and resources



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See comment 1.

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to make informed diagnoses. Furthermore, USDA performs such confirmatory testing to eliminate the possibility of a false positive, which could have serious repercussions on producers and the economy. During a large-scale animal health event covering multiple locations across several States, VS does deploy rapid disease diagnostic tools directly to the affected site to efficiently identify infected livestock.

For example, in two recent outbreaks, exotic Newcastle disease (END) samples were rapidly tested by real time PCR in California's San Bernardino Laboratory, and avian influenza (AI) samples were tested in Harrisonburg, Virginia. APHIS relied on its network of local laboratories in these cases; because these laboratories were located closer to the outbreak, shipping samples there saved valuable diagnostic time. NVSL continued to test samples during both outbreaks, but the bulk of the rapid tests (PCR for AI and END, and Directigen^R for AI) were performed locally. Even if rapid pen-side tests were developed, validated, and used by FADDs to test for FAD suspicious animals on routine investigations (before an outbreak was confirmed), confirmatory testing would still be necessary as these tests are designed to be sensitive and not specific. This would occur for several reasons including economics, virus isolation and typing, and trade relations. USDA believes that caution should be used in spending public funds and that the particular virus and strain or type of virus must be known before expending resources. Trading partners including other States will impose restrictions on the infected areas depending on the type of virus or organism present.

The report states that "USDA developed state-of-the-art, rapid diagnostic tools to detect FMD, classical swine fever, African swine fever, Rinderpest, avian influenza, and Newcastle disease...designed to yield results in less than an hour and ...intended to be used outside of specialized laboratories at the site of an outbreak." While proof-of-concept tools have been developed, it is important to note that these tools have not been validated to the extent necessary to be used to identify and confirm an FAD. Before a definitive diagnosis is made, care must be taken to rule out diseases with similar clinical signs or those with conserved genomic or protein sequences that might result in a false-positive result. Therefore, initial diagnosis must be confirmed using well-validated test procedures and must be interpreted by trained and experienced diagnosticians, especially when there are enormous economic and trade consequences to the results.

Then, once the initial diagnosis of an infectious FAD is confirmed, there may be opportunities to use validated rapid diagnostic tools to evaluate herd health either at the facility (farm) or at a near-by laboratory. For any highly-infectious FAD, it may be unrealistic to assume that any tool would be used to determine that some animals in a herd could be diagnosed as infected and others spared if the results were negative. No tool is sensitive enough to detect all exposed animals prior to the replication of an infectious agent in an animal; therefore, in an outbreak, once the infectious agent is detected in a herd, the entire herd is known to be exposed. Continuous repeat testing of individual animals is a poor use of resources for controlling outbreaks. In addition, the report suggests that use of the rapid diagnostic tools would help identify the index case

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“definitively in less than an hour.” It is unlikely that the rapid diagnostic tools would be used to test animals with no known risk factors, no clinical signs, and no known exposure to FAD agents. Furthermore, current rapid diagnostic tools primarily utilize nucleic-acid amplification and detection methods. VS continues to explore newer technologies (such as chip technologies) that could have even greater potential for improving rapid diagnostic capabilities.

Additionally, the report’s assumption that an outbreak can be effectively countered by vaccine use is misleading. There are a limited number of diseases that can be “treated” by using vaccines during an outbreak. Vaccines may have some use in limiting disease spread when they are used in areas adjacent to the outbreak or in populations likely to become exposed or when used to decrease shedding of an agent from infected animals. But even then, most vaccines will not prevent infection (since vaccines are based on an immune response, it can take approximately 10 days for maximum efficacy) and can hinder surveillance during an outbreak. While APHIS will continue its efforts to develop the National Veterinary Stockpile (NVS), the report incorrectly implies that having a stockpile of ready-to-use vaccines translates to the quick control of any outbreak. Also, since vaccines are specific to variations of strains and have a shelf-life of approximately 18 months, it would not be cost-effective to have a continuous resupply of every possible permutation of each disease of concern. See below for more information on the Stockpile strategy.

In the case of foot-and-mouth disease (FMD), having vaccine stocks available in 24 hours is likely prudent; however, as the report also points out, the vaccine use decision tree is complex. While APHIS can explore the possibility of designing a more rapid decision making process, the report does not mention the amount of time it would take to select, deploy, equip, and direct vaccination crews to administer vaccine in a manner that would be advantageous to disease eradication. In fact, hastily applied vaccination programs could prove detrimental. For example, the “Eradication of Exotic Newcastle Disease in Southern California 1971-74” report concludes “in the massive vaccination program, it also appeared that increased activity and traffic of vaccinators among the poultry ranches contributed to the disease’s rapid spread.” An ill-conceived or mismanaged FMD vaccination program could presumably be equally damaging in that by encouraging vaccination, FMD virus could spread more easily from farm to farm. Before a full scale vaccination program could be effected, it is likely that several days or more might pass.

One area not addressed in the above section of the report is the need to develop marker vaccines. Since the ability to differentiate vaccinates from animals infected with live agents has a large impact on trade, a discussion of the value of marker vaccines to be used for at-risk animals is needed. Marker vaccines would provide the ability to differentiate vaccinated animals from infected ones. Such vaccines may be used more strategically in control and eradication efforts and to facilitate movement of animals.

See comment 2.

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See comment 2.

National Veterinary Stockpile

USDA will use the NVS to consider options to cut some of the time delay for obtaining finished final “ready-to-use” vaccine product. USDA’s goal is for the NVS to be one component of an overall response planning and recovery effort to provide the best possible protection against an attack on our agriculture and food system. This goal will be accomplished through the NVS Steering Committee which serves as the recommending body that determines what is contained in the NVS (and what constitutes sufficient amounts of which products and appropriate time for their deployment) as stipulated in the Response Planning and Recovery Section of HSPD-9: “...animal vaccine, antiviral, or therapeutic products to appropriately respond to the most damaging animal diseases affecting human health and the economy and that will be capable of deployment within 24 hours of an outbreak. The NVS will leverage where appropriate the mechanisms and infrastructure that have been developed for the management, storage, and distribution of the Strategic National Stockpile.”

The mission of the NVS Steering Committee is to ensure that decisions regarding the composition, inventory, storage, deployment, use, and staffing of the NVS are based on the most current threat assessments, the most rigorous science available, the best predictive modeling possible, and the best expert advice available.

The NVS Steering Committee is chaired by VS’ Associate Deputy Administrator for Emergency Management and Diagnostics. The Steering Committee is composed of voting members from these Departments and Agencies (USDA, Department of Homeland Security, the Environmental Protection Agency, and the Department of Health and Human Services, Centers for Disease Control). The Steering Committee also has voting representation from the U.S. Food and Drug Administration (FDA) which has jurisdiction over products which may be contained in the NVS, and from the Department of Defense (DOD), which has numerous experts on logistical issues of managing and deploying the NVS to mitigate damage from biological, chemical, nuclear, and explosive weapons.

Additional non-voting ex-officio representatives from CDC, FDA, DOD or other agencies may attend meetings of the Committee to offer information, observations, and comments. Non-voting ex-officio representatives from the Armed Forces Medical Intelligence Center, the Central Intelligence Agency, and the Federal Bureau of Investigation may be invited to provide current assessments of terrorist risks that may affect the composition of the NVS. There will also be a non-voting liaison representative from the National Institutes of Health for the Bioshield initiative and Lawrence Livermore Biodefense Knowledge Center. Membership on the Committee may be expanded, as deemed necessary for the Committee to effectively carry out its functions, by VS’ Deputy Administrator. All members of the Committee will need to maintain a security clearance at the Secret Level or greater. This Steering Committee was formed in late 2004.

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Veterinary Accreditation and FAD Training

The information in the section on veterinary training should be clarified. The document incorrectly assumes that veterinary students who do not receive a specific course on FADs receive no training on the subject at all. Moreover, the quotation from the Wenzel study is misleading. All relevant disease information is covered in the veterinary curriculum; however, this information is not presented in one FAD course. All students must take instruction in infectious diseases and in pathology (during which instruction, FADs are covered). Additionally, each year since 1990, APHIS has run the Smith-Kilborne Program on foreign animal diseases offered to one student in each U.S. veterinary school. Each participant is expected to present information from the course to his or her classmates. Furthermore, APHIS has worked to develop web- and CD-ROM-based training, and worked with veterinary schools on curriculum development.

The requirement that an accredited veterinarian is licensed ensures that personnel have received this basic training. USDA is working to update the Veterinary Accreditation system to emphasize continuing education. APHIS is developing an information system to streamline the accreditation of veterinarians, which will allow them to apply and maintain accreditation as well as receive credit for FAD and emergency response training.

In fact, USDA already has a cadre of certified private veterinary practitioners who partner with APHIS to report any suspected FAD cases to Federal officials. These surveillance efforts are further augmented by the work of 450 specially trained animal disease diagnosticians from State, Federal, and military ranks who actively search for FMD and other FADs across the country. USDA continues to train an additional 100 FADDs annually. These FADDs respond to calls from the general public, private practitioners, and animal disease diagnostics laboratories to evaluate any disease recognized as outside the norm for any reason. However, USDA realizes that additional training is needed. Specifically, APHIS is seeking to strengthen its presence in veterinary colleges to provide information on various aspects of regulatory medicine. APHIS is also working to increase the visibility of public practice careers making veterinary students and veterinarians aware of public service career potential. These efforts will increase the number of veterinarians entering public service.

National Animal Health Laboratory Network

USDA will integrate information from the laboratory networks by mid-2005 (though the laboratories themselves will not be integrated by that time). USDA leads the development of a Memorandum of Agreement (MOA) for an Integrated Consortium of Laboratory Networks (ICLN) which was drafted in late 2004. USDA, Departments of Homeland Security, State, Defense, Justice, Interior, Energy and Human Health Services, and the Environmental Protection Agency are parties to the agreement.

See comment 3.

See comment 4.

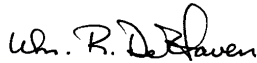
Appendix VI
Comments from the U.S. Department of
Agriculture

Mr. Robert A. Robinson
Page 6

The MOA provides a framework for the Federal government to work collaboratively to provide timely, high quality, and interpretable results for early detection and effective consequence management of acts of terrorism and other events requiring an integrated laboratory response. The ICLN will provide surge capacity capabilities for all hazard incidents that overwhelm existing laboratory systems within individual Departments.

Once again, I appreciate the opportunity to offer comments on the report. The report was informative and thorough. I hope that our observations prove helpful.

Sincerely,



W. Ron DeHaven
Administrator
Animal and Plant Health Inspection Service

The following are GAO's comments on the U.S. Department of Agriculture's letter dated February 23, 2005.

GAO Comments

1. Regarding USDA's comments about the use of rapid diagnostic tools at the site of an outbreak, our report acknowledges that USDA has already utilized these tools for the control of exotic Newcastle disease and avian influenza, but notes that USDA has only done so in a laboratory setting. The report also acknowledged USDA's concern for using this technology at the site of an outbreak. For example, we noted that rapid diagnostic tools still need to be validated for many diseases, including FMD. Furthermore, the report acknowledges USDA's concern that samples need to be sent to USDA's reference laboratories for final confirmation to determine the disease subtype, which must be known to deploy the correct type of vaccine. However, we continue to believe that use of these tools at the site of an outbreak would help reduce the impact of a terrorist attack because the tools would allow for a more rapid diagnosis so that informed control measures could be implemented as quickly as possible, and they would also permit the monitoring of nearby herds before symptoms appeared so that only infected herds would have to be killed. We understand that it would not be appropriate or cost-effective to test all animals within a herd for any highly infectious foreign animal disease because in all likelihood, if one tests positive, the other animals in that herd would already be infected. Also, as noted by state officials, the use of these tools would help prevent laboratories from becoming overwhelmed with test samples in the event of a terrorist attack involving the introduction of diseases at multiple locations.
2. Regarding USDA's comments about the use of vaccines to control an outbreak, we acknowledge that using vaccines to control an outbreak has some limitations; however, as our report states, a recent USDA test exercise of an intentional introduction of FMD in multiple locations suggests that the current "stamping out approach" would have catastrophic results. Also, in February 2005, the National Audit Office in the United Kingdom reported that based on experience from the 2001 FMD outbreak in the United Kingdom, the ability to vaccinate, in conjunction with culling, may be necessary to contain an FMD outbreak. The report further states that the government in the United Kingdom has substantially increased stocks of vaccines for FMD in order to better contain the spread of FMD should another outbreak occur. Furthermore, USDA's draft response plan for an outbreak of foot

and mouth disease or other highly contagious animal disease notes that vaccines may be used strategically to create barriers between infected zones and disease-free zones. We have added this information to the report.

Furthermore, our report does not imply that it is cost effective to maintain a supply of vaccines for every possible permutation of each disease of concern. In fact, the report clearly states that it is unlikely that vaccines will ever be developed for all strains of diseases and the report also notes that vaccines should be developed for those of primary concern to USDA. We do not state that vaccines are necessary for all foreign animal diseases. We acknowledge, however, that our report did not address the need to develop marker vaccines, and we have modified the report to reflect this need. Finally, in response to USDA's comment about simplifying the decision-making process on vaccine use, we have added language to the report to clarify USDA's position.

3. We modified our report to state that while all U.S. veterinary schools offer information about foreign animal diseases, only about 26 percent of the nation's veterinary graduates have taken a course specifically dedicated to foreign animal diseases. We also revised the report to note that, according to USDA officials, all veterinary students must take instruction in infectious diseases and pathology which, according to these officials, includes foreign animal diseases.

In addition, we modified the report to state that USDA officials believe that requiring accredited veterinarians to be licensed ensures that they receive basic training in foreign animal diseases. Furthermore, we note that there are a small number of personnel trained specifically in the diagnosis of foreign animal diseases.

Finally, we modified the report to state that USDA officials told us that new efforts are being made to strengthen APHIS' role in colleges of veterinary medicine to provide information on various aspects of regulatory medicine and that USDA intends to increase the number of veterinarians entering public service by working to increase the veterinary student awareness of potential careers in public service.

4. We modified our report to include a statement about USDA's Memorandum of Agreement.

Comments from the Department of Homeland Security

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

U.S. Department of Homeland Security
Washington, DC 20528



Homeland Security

February 14, 2005

Mr. Robert A. Robinson
Managing Director, Natural Resources and Environment
U.S. Government Accountability Office
Washington, DC 20548

Re: Draft Report GAO-05-214, Homeland Security: Much is Being Done to Protect Agriculture from Terrorist Attack, but Important Challenges Remain

Dear Mr. Robinson:

Thank you for the opportunity to review and comment on the subject draft report. We are providing general comments for your use in preparing the final report and have submitted technical comments under separate cover.

The draft report indicates that there has been a decline in agriculture inspections at ports of entry. In fiscal year 2002, there were 40.9 million agricultural inspections at ports of entry. In fiscal year 2003, as the agriculture inspection mission was transitioning to the Department of Homeland Security (DHS), 35.0 million inspections were performed. In fiscal year 2004, there were 37.5 million agricultural inspections. In June of 2003, the U.S. Department of Agriculture (USDA) transferred 1,507 agriculture inspectors to DHS; however, by October 2004, the number of inspectors had decreased to 1,452. Despite an initial drop in the volume of inspections during this year of transition, total inspections increased in 2004 even as the number of inspectors was decreasing.

There are developments currently being undertaken by DHS that will impact agriculture inspections. Among these is the development of the first agroterrorism rule set for the Automated Targeting System (ATS). This rule set will be used by agriculture specialists stationed at Advanced Targeting Units (ATU). The agriculture specialists are receiving training in ATS and risk management skills to focus on high-risk agricultural cargo. This includes the development of specific selectivity criteria for the prevention of foreign animal disease in commercial cargo.

There are also efforts underway to hire approximately 500 agriculture specialists. The combination of additional personnel with specialized knowledge in the biological sciences together with advanced targeting systems and risk management will produce a more efficient inspection process.

The draft report also references a lack of coordination of research efforts among DHS and other agencies. However, since the summer of 2003, DHS's Science and Technology

www.dhs.gov

See comment 1.

See comment 2.

See comment 2.

Directorate has worked with USDA's Agricultural Research Service (ARS) and Animal Plant Health Inspection Service (APHIS) to develop and coordinate "A Joint Strategy for Foreign Animal Disease Research and Diagnostic Programs" (including assays and diagnostics, and vaccines and therapeutics), with an initial focus on foot-and-mouth disease. A report summarizing this strategy was submitted in January 2005 in response to a request by the U.S. House of Representatives Appropriations Subcommittee for Homeland Security.

In addition, a Board of Directors has been chartered to provide an inter-agency forum for coordination of use of the Plum Island Animal Disease Center (PIADC) by representatives from DHS, USDA, and other agencies as appropriate. This will allow both DHS and USDA to efficiently utilize the unique capabilities at PIADC for the accomplishment of their respective mission directed requirements. Also, a charter is being drafted for a Joint Federal Working Group on Research and Diagnostic Development for Foreign Animal and Zoonotic Diseases that will continue the coordination of research efforts against agroterrorism. Further, the DHS National Center for Foreign Animal and Zoonotic Diseases, led by Texas A&M University, is working closely with PIADC to coordinate their respective efforts on research and development on foot and mouth disease, and is in dialogue with researchers in the other respective fields of their efforts, e.g., avian influenza, to prevent any overlap.

GAO also indicates that "...there is no overall departmental coordination of policy and budget issues concerning agricultural and food security within DHS and with other departments and agencies" (page 40). However, since HSPD-9 was issued in February 2004, there have been extensive interactions between program staff across DHS, and with other federal departments and agencies. Successful realization of the implementation of HSPD-9 now requires engaging senior policy and decision makers across DHS organizational elements, along with other federal departments and agencies, to resolve necessary policy, mission, and budget related issues.

See comment 3.

GAO states that DHS may not be providing sufficient guidance to the states on using the Homeland Security Grant Program (HSGP) to obtain federal emergency preparedness assistance to support the agriculture sector. However, it is important to note that the agricultural component was an optional part of the FY 2003 Assessment and Strategy process. As such, the Department did not give explicit guidance on how to use federal financial assistance towards agroterrorism when it may not be applicable in all cases. However, Fiscal Year 2004 and Fiscal Year 2005 program guidance clearly notes that states may expend funds towards the prevention, response and mitigation of agroterrorism incidents through the purchase of equipment, training, exercises or planning. However, any funds expended must be in accordance with the goals and objectives outlined in the State or Urban Area Homeland Security Strategy. As noted, DHS gives the states maximum flexibility to determine the needs of their state and local entities; agricultural issues may not necessarily be a concern for them. In the FY 2005 program guidance, equipment, training or exercises related to agroterrorism is only noted as an allowable item in the State Homeland Security Program (SHSP) and the Urban Areas Security Initiative (UASI). These two programs are the most broad-based and

See comment 3.

well-funded sections of the overall HSGP. The other four programs do not allow for agroterrorism because they are much more focused program areas. For example, the Metropolitan Medical Response System (MMRS) grant may only be spent for ongoing activities related to MMRS, and the Emergency Management Performance Grant (EMPG) funds are only to be used for all-hazards, emergency management costs.

Finally, with respect to the report's recommendations, the Department generally concurs with the recommendations. Various corrective actions have already taken place to implement at least two of these recommendations and they are articulated below:

Recommendation: The Secretaries of Agriculture and Homeland Security work together to identify the reasons for declining agricultural inspections and to identify potential areas for improvement.

USDA and DHS have entered into a Joint Agency Quality Assurance Plan (JAQAP) and have agreed to conduct joint quality assurance reviews of ports of entry (POE). This joint program is intended to study the performance of the agricultural mission under DHS and identify the best business practices of individual ports. If the JAQAP does a port review and finds a decline in inspections, the reasons for a port's declining inspections will be explored and actions to improve the port's performance will be recommended. This program is part of the overall agreement between the two agencies. The vision statement of the Joint Quality Assurance Plan reads as follows:

JAQAP will provide suggestions for preventing terrorists and terrorist weapons in the form of agroterrorism from entering the United States. JAQAP will assist Customs and Border Protection to safeguard agricultural and natural resources from the intentional (agroterrorism) or unintentional introductions of animal and plant pests and disease into the United States.

The joint teams' first review was in December 2004. At least four port reviews are expected to take place during the next calendar year. These cooperative efforts will identify weaknesses in the port's agricultural operations and suggest areas and ways to address those areas of concern.

The Department also plans to increase hiring of agriculture specialist and agriculture supervisors. In November 2004, DHS advertised 129 government-wide agricultural specialist positions. These positions are presently being processed. In addition, DHS approved 14 training classes for new officers which began in the summer of 2004 and will continue through January 2006. It is estimated that these training classes will result in 720 new officers. As of February, 2005, 109 new agricultural specialists have passed New Officer Training (NOT) and are working at Ports of Entry.

In addition to new officers, DHS has identified the need to replace and increase the number of agricultural supervisors. The Department began issuing vacancy announcements for new agricultural supervisors during the week of February 7, 2005.

The added supervisors will enhance the DHS agricultural inspection infrastructure as the number of specialists and their workloads increase.

The Department also plans to improve agricultural targeting to make more interceptions of pests and diseases. The assignment of Agricultural Specialists to the Advance Targeting Units (ATU) will greatly enhance the ability of DHS to more effectively target passengers and commodities at all the POEs. “Smarter” targeting will increase the number of interceptions by focusing on the people and commodities of greater risk. A number of agricultural specialists have already received the ATS targeting training necessary to be part of an ATU team.

DHS has developed and delivered ATS training aimed solely at agricultural specialists. Eighteen agricultural specialists from various seaports successfully completed the agriculture specific training on February 10, 2005. An additional class of ATS for the agricultural specialists will be held in June 2005 for seaport based specialists. It is planned to have ATS training for agricultural specialists in air cargo and land border POEs completed by the end of FY 2005.

Recommendation: The Secretaries of Agriculture and Homeland Security streamline the flow of information between USDA and DHS agricultural inspectors, and expedite the integration of the two agencies’ databases and information technology systems at the port level.

DHS is working with USDA to complete Appendix 8 of Article 8 of the Memorandum of Agreement (MOA) between USDA APHIS and DHS to enhance communication. The relevant databases maintained by USDA APHIS are now available to all DHS agricultural specialists electronically. Initially there had been problems achieving connectivity between the two agencies but to date these problems have been resolved and DHS officers now have full access to the necessary databases.

As for USDA access, after extensive negotiations with USDA APHIS, DHS is now reviewing the final version of Article 8 of the MOA. This is the crucial article that solidifies the ability of USDA to gain access to relevant databases held by DHS. As agreed to in the draft Appendix 8, USDA has already identified those positions for which they are requesting access to DHS databases. This request is currently being processed. Additionally, USDA will soon be placing two employees at the National Targeting Center (NTC) to work with the DHS targeters.

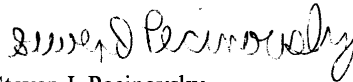
The Department is also working to improve information sharing with USDA’s Food Safety and Inspection Service (FSIS). DHS has gained access to the relevant database in FSIS. In turn, FSIS has now stationed two individuals at the NTC to assist with targeting meat and poultry commodities. DHS is continuing to work with FSIS to gain more access for FSIS personnel. In addition to these efforts, FSIS has developed, in conjunction with the NTC and the Office of Strategic Trade, rule sets for meat. The rule set is presently undergoing final adjustments and will be piloted shortly.

In conjunction with USDA, DHS is developing rule sets for agroterrorism targeting. The agencies have identified a plan of action for this targeting effort and established ownership of responsibilities for subsequent actions. USDA has agreed to form a working group to coordinate the risk assessment and rules refinement work. DHS is in the process of forming a corresponding work group.

In summary, DHS is in the process of implementing six corrective actions in response to the GAO's review addressing agroterrorism. These actions include: jointly identifying problem areas and solutions; increased hiring of personnel; improved automated targeting; and, increased information sharing between agencies. These actions are expected to be completed by January 2006.

We thank you again for the opportunity to provide comments on this draft report and look forward to working with you on future homeland security issues

Sincerely,



Steven J. Pecinovsky
Acting Director, Departmental GAO/OIG Liaison
Office of the Chief Financial Officer

The following are GAO's comments on the Department of Homeland Security's letter dated February 14, 2005.

GAO Comments

1. DHS provided minor modifications to the total number of agricultural inspectors transferred from USDA as well as the number of inspectors remaining as of October 2004. We have added a footnote to our report to address this change. DHS commented that following the transition of inspectors from USDA to DHS in mid-2003, the number of agricultural inspections increased. We agree, and our report clearly identifies this increase, but also states that between 2002 and 2004, the overall number of inspections declined.
2. At the time of our draft report, USDA noted that they were unaware of the full scope of research efforts supported by DHS, and DHS officials told us that there was no overall departmental coordination of policy and budget issues concerning agriculture security research. DHS now states that since the summer of 2003, the agency has been working with USDA's Agricultural Research Service and with the Animal and Plant Health Inspection Service to develop a joint strategy for foreign animal disease research and diagnostic programs, and that a report summarizing this strategy was submitted to the House of Representatives Appropriations Subcommittee for Homeland Security in January 2005. We have modified our report to reflect this comment. Regarding DHS's other comments about research at the Plum Island Animal Disease Center and at the National Center for Foreign Animal and Zoonotic Diseases at Texas A&M University, our report acknowledges these efforts so we made no further modifications.
3. We agree that, as DHS states, the fiscal year 2004 and 2005 grant program guidance notes that states may expend funds towards the prevention, response, and mitigation of agroterrorism incidents through the purchase of equipment, training, exercises or planning. However, as our report states, we believe that the guidance continues to provide limited emphasis on agriculture relative to other funding priorities. As a result, state governments, which have been accustomed to seek funding for traditional emergency disciplines such as law enforcement, may not be sufficiently informed about the availability of DHS grant funds to protect their agriculture industries.

Comments from the Department of Health and Human Services



DEPARTMENT OF HEALTH & HUMAN SERVICES

Office of Inspector General

Washington, D.C. 20201

FEB 17 2005

Mr. Robert A. Robinson
Managing Director, Natural Resources and Environment
U.S. Government Accountability Office
Washington, DC 20548

Dear Mr. Robinson:

Enclosed are the Department's comments on the U.S. Government Accountability Office's (GAO's) draft report entitled, "Homeland Security—Much Is Being Done to Protect Agriculture from a Terrorist Attack, but Important Challenges Remain" (GAO-05-214). The comments represent the tentative position of the Department and are subject to reevaluation when the final version of this report is received.

The Department provided several technical comments directly to your staff.

The Department appreciates the opportunity to comment on this draft report before its publication.

Sincerely,

A handwritten signature in cursive script that reads "Daniel R. Levinson".

Daniel R. Levinson
Acting Inspector General

Enclosure

The Office of Inspector General (OIG) is transmitting the Department's response to this draft report in our capacity as the Department's designated focal point and coordinator for U.S. Government Accountability Office reports. OIG has not conducted an independent assessment of these comments and therefore expresses no opinion on them.

**COMMENTS OF THE DEPARTMENT OF HEALTH AND HUMAN SERVICES
FOR THE U.S. GOVERNMENT ACCOUNTABILITY OFFICE'S (GAO'S)
DRAFT REPORT ENTITLED "HOMELAND SECURITY—MUCH IS BEING
DONE TO PROTECT AGRICULTURE FROM A TERRORIST ATTACK, BUT
IMPORTANT CHALLENGES REMAIN" (GAO-05-214)**

The Department of Health and Human Services (HHS) appreciates the opportunity to review and comment on GAO's draft report entitled "Homeland Security—Much is Being Done to Protect Agriculture from a Terrorist Attack, but Important Challenges Remain" (GAO-05-214).

Overall, HHS agrees with the recommendations in the draft report and welcomes the attention given to the implications of animal diseases.

The draft report frequently asserts that the costs and benefits of developing stockpiles of ready-to-use vaccines should be evaluated. The Centers for Disease Control and Prevention (CDC) suggests including information on the process required for U.S. Department of Agriculture licensure, such as the BL-3, B1-3 agriculture laboratory space that would be sufficient to conduct Good Laboratory Practice vaccine efficacy trials among statistically appropriate numbers of livestock-type animals. The shortage of sufficient space to conduct efficacy trials is a formidable barrier to vaccine development.

In response to GAO's recommendation that HHS and other agencies compile after-action reports and submit them to the Department of Homeland Security network under development, it should be noted that CDC has standardized after-action reporting procedures currently in place that are refined following events.

GAO Contacts and Staff Acknowledgments

GAO Contacts

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Acknowledgments

In addition to the persons named above, Josey Ballenger, Jill Ann Roth Edelson, and Steve Rossman made key contributions to this report. Other contributors included Kevin Bray, Karen Keegan, Amanda Kutz, Lynn Musser, Omari Norman, Cynthia Norris, and Claire van der Lee.

Related GAO Products

Drinking Water: Experts' Views on How Federal Funding Can Best Be Spent to Improve Security. [GAO-04-1098T](#). Washington, D.C.: September 30, 2004.

Emerging Infectious Diseases: Review of State and Federal Disease Surveillance Efforts. [GAO-04-877](#). Washington, D.C.: September 30, 2004.

Homeland Security: Observations on the National Strategies Related to Terrorism. [GAO-04-1075T](#). Washington, D.C.: September 22, 2004.

9/11 Commission Report: Reorganization, Transformation, and Information Sharing. [GAO-04-1033T](#). Washington, D.C.: August 3, 2004.

Status of Key Recommendations GAO Has Made to DHS and Its Legacy Agencies. [GAO-04-865R](#). Washington, D.C.: July 2, 2004.

Coast Guard: Key Management and Budget Challenges for Fiscal Year 2005 and Beyond. [GAO-04-636T](#). Washington, D.C.: April 7, 2004.

Homeland Security: Summary of Challenges Faced in Targeting Oceangoing Cargo Containers for Inspection. [GAO-04-557T](#). Washington, D.C.: March 31, 2004.

Homeland Security: Risk Communication Principles May Assist in Refinement of the Homeland Security Advisory System. [GAO-04-538T](#). Washington, D.C.: March 16, 2004.

Homeland Security: Preliminary Observations on Efforts to Target Security Inspections of Cargo Containers. [GAO-04-325T](#). Washington, D.C.: December 16, 2003.

Bioterrorism: A Threat to Agriculture and the Food Supply. [GAO-04-259T](#). Washington, D.C.: November 19, 2003.

Combating Bioterrorism: Actions Needed to Improve Security at Plum Island Animal Disease Center. [GAO-03-847](#). Washington, D.C.: September 19, 2003.

Food-Processing Security: Voluntary Efforts Are Under Way, but Federal Agencies Cannot Fully Assess Their Implementation. [GAO-03-342](#). Washington, D.C.: February 14, 2003.

Related GAO Products

Homeland Security: CDC's Oversight of the Select Agent Program.
[GAO-03-315R](#). Washington, D.C.: November 22, 2002.

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