United States Government Accountability Office

Report to Congressional Addressees

June 2021

COVID-19

DOD Has Focused on Strategy and Oversight to Protect Military Servicemember Health

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GAO-21-321

GAO Highlights

Highlights of GAO-21-321, a report to congressional addressees

June 2021

COVID-19

DOD Has Focused on Strategy and Oversight to Protect Military Servicemember Health

Why GAO Did This Study

The COVID-19 pandemic poses risks to the health of U.S. servicemembers. Protecting forces from COVID-19 is therefore essential to DOD's ability to defend the United States, maintain warfighting readiness, and support the whole-of-government response to the pandemic.

To help facilitate the COVID-19 pandemic response, Congress appropriated about $10.5 billion to DOD through the CARES Act. The CARES Act includes a provision for GAO to report on its ongoing monitoring and oversight related to the pandemic. GAO was also asked to examine the military health system response to COVID-19. This report examines, in regard to COVID-19, DOD's (1) strategy for protecting military servicemember health, (2) oversight of its strategy, and (3) research and development projects for vaccines, therapeutics, and testing.

GAO reviewed guidance and plans for health protection and pandemic response that comprise DOD's strategy, and evaluated alignment of the strategy with key considerations from prior GAO work on pandemic preparedness. To identify oversight efforts, GAO reviewed DOD briefings on the progress of health protection measures, and analyzed 2020 DOD data on COVID-19 cases, hospitalizations, and testing.

GAO also interviewed DOD leaders, officials from the military department medical organizations, combatant commands, and four military medical treatment facilities selected on the basis of military department and location.

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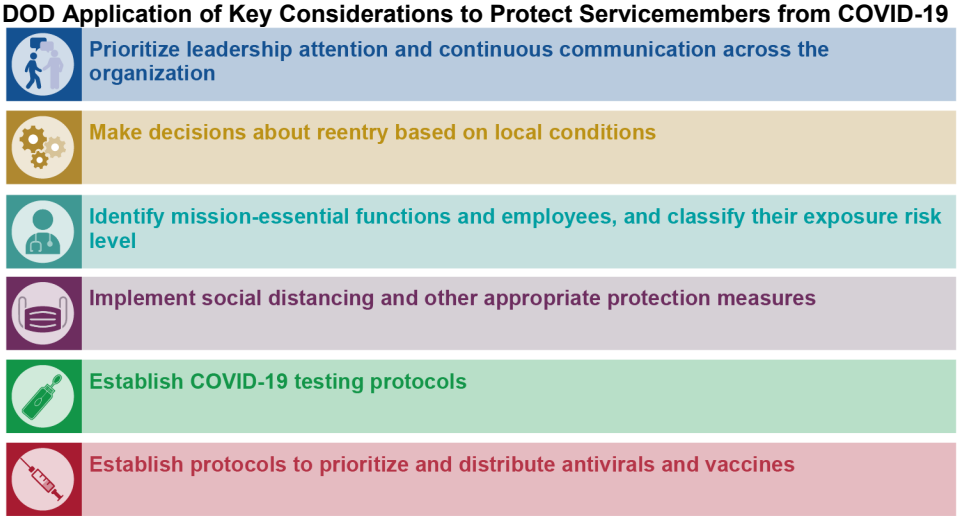
What GAO Found

Since January 2020, the Department of Defense (DOD) has developed a strategy to protect the health of military servicemembers from COVID-19, with a goal of minimizing risks while continuing operations. The strategy tailors protection measures to local conditions and risks to health and force readiness. GAO found that DOD's strategy applies several key considerations.

DOD Application of Key Considerations to Protect Servicemembers from COVID-19



Source: GAO analysis of Department of Defense (DOD) documents and interviews with DOD officials. | GAO-21-321

Text of DOD Application of Key Considerations to Protect Servicemembers from COVID-19

- Prioritize leadership attention and continuous communication across the organization
- Make decisions about reentry based on local conditions
- Identify mission-essential functions and employees, and classify their exposure risk level
- Implement social distancing and other appropriate protection measures
- Establish COVID-19 testing protocols
- Establish protocols to prioritize and distribute antivirals and vaccines

Source: GAO analysis of Department of Defense (DOD) documents and interviews with DOD officials. | GAO-21-321

DOD officials oversee the implementation of the department's COVID-19 health protection strategy for servicemembers through:

- **Sustained leadership attention**. In January 2020, the Secretary of Defense initiated COVID-19 planning and established a senior task force to oversee the response. Combatant command and installation officials continuously evaluate regional and local implementation and perform compliance checks. Notwithstanding these efforts, DOD officials stated that they expect some limited incidents of personnel not following protocols.

- **Data monitoring.** Senior leaders and local commanders assess data on cases, community spread, and testing, among other metrics, to inform strategy implementation and assess its effectiveness.

- **Lessons learned analyses.** While these analyses are ongoing as the pandemic continues, DOD has implemented mitigations to address some challenges identified, such as a new system to collect more timely and specific COVID-19 case data.

DOD has research and development projects underway to advance COVID-19 vaccines and therapeutics and improve detection methods. DOD's investments include many projects that have specific applications for servicemembers, such as pre- and postexposure prophylactic treatments to prevent the onset of the disease.

Contents

Tables

Figures

Abbreviations

ASD(HA)	Assistant Secretary of Defense for Health Affairs
CDC	Centers for Disease Control and Prevention
COVID-19	Coronavirus Disease 2019
DHA	Defense Health Agency
DOD	Department of Defense
EUA	emergency use authorization
FDA	Food and Drug Administration
JPEO CBRND	Joint Program Executive Office for Chemical, Biological, Radiological, and Nuclear Defense
MTF	medical treatment facility

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June 3, 2021

Congressional Addressees

More than a year since the World Health Organization declared it a pandemic, the Coronavirus Disease 2019 (COVID-19) continues to pose risks to the health of U.S. servicemembers and the Department of Defense's (DOD) missions. As of May 20, 2021, over 164 million confirmed COVID-19 cases, including over 3.4 million deaths globally, had been reported to the World Health Organization. By the same date, in the United States, more than 32.8 million COVID-19 cases and 584,975 deaths had been reported to the Centers for Disease Control and Prevention (CDC). Yet, the CDC estimates that the total disease burden (including unreported cases) could be at least four times higher than reported. Given that U.S. servicemembers live and work among the general population of the United States and over 160 other countries affected by COVID-19, the scope and severity of the pandemic underscore the imperative of maintaining servicemembers' health to defend the United States and preserve warfighting readiness for emergent contingencies. Moreover, servicemember health is paramount to DOD's support of civil authorities in the whole-of-government response to the COVID-19 pandemic.

DOD and its military health system have long maintained a spectrum of capabilities necessary to prevent, prepare for, and respond to infectious disease outbreaks, including those of the past 2 decades—Severe Acute Respiratory Syndrome (known as SARS), Middle East Respiratory Syndrome (known as MERS), H1N1 influenza, Ebola, and Zika virus.[1] DOD's capabilities in this area range from global health engagement activities to improve partner nations' public health capabilities and interoperability; biosurveillance assets across the world to monitor emerging infectious diseases; specialized health care personnel, including epidemiologists and public health officers; stockpiles of pandemic medical supplies and equipment; a public health emergency management response framework and pandemic plans; and a research and development infrastructure—including laboratories and

[1]Like COVID-19, Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) were respiratory illnesses caused by coronaviruses that originated in animals and spread to humans.

manufacturing facilities—to study diseases and develop medical countermeasures.[2]

Our prior work has reviewed DOD's and the federal government's pandemic preparedness. In 2006, we reported on DOD's then-evolving plans for pandemic influenza.[3] We made four recommendations to improve accountability and oversight of planning, and DOD implemented all of them. We have also reported on federal response issues related to the H1N1 pandemic—the most recent pandemic experienced by our nation prior to COVID-19—and disease outbreaks like the one caused by the Zika virus in the United States in 2016.[4] In 2011, based on our findings from the H1N1 pandemic response, we made two recommendations to help the federal government prepare for a future influenza pandemic or other public health emergencies, which the Departments of Health and Human Services and Homeland Security implemented. In 2017, we made five recommendations to improve diagnostic tests (such as those for Zika virus) and information on mosquito control. The Food and Drug Administration (FDA) and the CDC implemented four of the recommendations; as of January 2021 the FDA had not yet implemented the other. More recently, in June 2020 we testified about considerations for federal workers as they reenter workplaces during the COVID-19 pandemic, which include a range of factors to carry out their missions while protecting workforces and members of the public.[5]

To help facilitate DOD's ability to respond to the COVID-19 pandemic, in March 2020 Congress appropriated approximately $10.5 billion to the

[2]Medical countermeasures are drugs, vaccines, and devices to diagnose, treat, prevent, or mitigate potential health effects of exposure to infectious diseases and chemical, biological, radiological, and nuclear agents.

[3]GAO, *Influenza Pandemic: DOD Has Taken Important Actions to Prepare, but Accountability, Funding, and Communications Need to be Clearer and Focused Departmentwide*, GAO-06-1042 (Washington, D.C.: Sept. 21, 2006).

[4]GAO, *Influenza Pandemic: Lessons from the H1N1 Pandemic Should Be Incorporated into Future Planning*, GAO-11-632, (Washington, D.C.: June 27, 2011) and *Emerging Infectious Diseases: Actions Needed to Address the Challenges of Responding to Zika Virus Disease Outbreaks*, GAO-17-445 (Washington, D.C.: May 23, 2017).

[5]GAO, *Federal Workforce: Key Considerations for Agencies Returning Employees to Workplaces during Pandemics*, GAO-20-650T (Washington, D.C.: June 25, 2020).

department in funding through the CARES Act.[6] These supplemental appropriations included approximately $3.8 billion for the Defense Health Program to prevent, prepare for, and respond to COVID-19.[7] The Defense Health Program was also appropriated $82 million by the Families First Coronavirus Response Act for COVID-19 related health care items and services.[8]

The CARES Act includes a provision for us to report on our ongoing monitoring and oversight efforts related to the COVID-19 pandemic.[9] This report is part of our body of work in response to the CARES Act and focuses on DOD's efforts related to protecting the health of servicemembers.[10] It also responds to a request from the Armed Services Committee of the House of Representatives for us to examine the military health system response to COVID-19.[11] With regard to COVID-19, this

[6]Coronavirus Aid, Relief, and Economic Security (CARES) Act, Pub. L. No. 116-136, div. B, title III, 134 Stat. 281, 518 (2020).

[7]The Defense Health Program provides worldwide medical services to active-duty servicemembers and other eligible beneficiaries, including costs associated with the delivery of TRICARE benefits. At the end of fiscal year 2020, DOD had obligated about $1.9 billion of its Defense Health Program supplemental appropriations for COVID-19 requirements, and returned $1 billion of unobligated funds to the Under Secretary of Defense, Comptroller. In May 2020, DOD identified $252 million of the $3.8 billion Defense Health Program appropriation for transfer or reprogramming to fund other COVID-19 response efforts. We reported in September 2020 that DOD's transfers or reprogramming actions were taken because of fewer than expected requirements for costs such as hospital bed expansion at medical treatment facilities (MTFs) and expeditionary hospital packages. DOD had budgeted the remaining $3.6 billion of Defense Health Program funds from the CARES Act for costs associated with increased health care and laboratory operations, procurement of vaccines and antivirals, and procurement of medical equipment, diagnostics tests and other medical countermeasures. GAO, *COVID-19: Federal Efforts Could Be Strengthened by Timely and Concerted Actions,* GAO-20-701 (Washington, D.C.: Sept. 21, 2020).

[8]Families First Coronavirus Response Act, Pub. L. No. 116-127, title II, 134 Stat. 178, 181 (2020).

[9]Pub. L. No. 116-136, § 19010 (2020).

[10]We regularly issue government-wide reports on the federal response to COVID-19. For the latest report, see GAO, *COVID-19: Sustained Federal Action Is Crucial as Pandemic Enters Its Second Year,* GAO-21-387 (Washington, D.C.: Mar. 31, 2021). Our next government-wide report will be issued in July 2021 and will be available on GAO's website at https://www.gao.gov/coronavirus.

[11]We initiated this review in response to the Chairwoman and Ranking Member of the Subcommittee on Military Personnel, House Armed Services Committee of the 116th Congress.

report examines DOD's (1) strategy for protecting the health of military servicemembers, (2) oversight mechanisms for implementing its health protection strategy, and (3) research and development projects for vaccines, therapeutics, and testing.

For each of our objectives, our scope included DOD's actions to address COVID-19 since January 2020, focusing on active-duty servicemembers. For objectives one and two, we interviewed officials from geographic combatant commands and a nongeneralizable sample of four military medical treatment facilities (MTF) that we selected to represent each geographic region of the world in which DOD operates, and each military department.[12] From the geographic combatant commands, we obtained force health protection guidance for COVID-19 and examples of health surveillance update briefings. Our observations from these interviews and related documents provided insight into DOD's strategy for protecting military servicemembers as well as illustrative examples of how commands and selected MTFs have overseen DOD's implementation of its strategy for protecting servicemembers.

In addition, for our first objective we reviewed DOD's force health protection policies, guidance, and planning documents issued through February 2021 specific to COVID-19, and identified actions that comprise DOD's strategy to protect servicemembers.[13] We also reviewed DOD's global pandemic campaign plan and an example of a regional campaign plan from U.S. Indo-Pacific Command, which were published prior to the COVID-19 pandemic. To understand the plans' relevance to the COVID-19 health protection strategy, we identified health protection measures discussed in the plans that were similar to or different from those identified in DOD's other force health protection policies, guidance, and planning documents for COVID-19. We compared DOD's strategy with key considerations for agencies during pandemics based on our prior work to determine how the actions aligned, and whether there were

[12]The five combatant commands we interviewed included U.S. Northern Command, U.S. Southern Command, U.S. Indo-Pacific Command, U.S. Central Command, and U.S. European Command. The four MTFs we interviewed included the 60th Medical Group at David Grant Medical Center, Travis Air Force Base, California; Naval Health Clinic Corpus Christi, Naval Air Station Corpus Christi, Texas; Naval Hospital Okinawa, Camp Foster, Japan; and the Army's Landstuhl Regional Medical Center, Kaiserslautern, Germany.

[13]In addition, we reviewed COVID-19 force health protection guidance that DOD issued and made publicly available on the defense.gov website from March 1, 2021 through May 20, 2021 to determine whether key changes were made to previously issued guidance during the time that DOD was reviewing a draft of this report for comment.

deficiencies or additional steps DOD has taken beyond those key considerations.[14]

To assess consistency between DOD's guidance and that of the CDC—the lead federal agency for prevention of and control of diseases—we selected measures discussed in DOD's force health protection guidance representing the range of protection activity categories of the CDC guidance, including day-to-day protection, mitigating infections, and COVID-19 testing. We compared those selected measures with guidance from CDC's website. To further our understanding of the strategy for health protection, we interviewed DOD officials, including senior leaders, combatant command representatives, and personnel from selected MTFs.

In addition, for our second objective, we reviewed key documentation on oversight activities, including briefing documents from working groups within DOD on the progress of health protection measures, along with commanders' orders for health emergencies. We reviewed these documents to identify DOD's methods for assessing compliance and the consistency and uniformity of implementation. We also analyzed DOD data from January 2020 to December 2020 on numbers of COVID-19 tests by type, positive tests, and positivity rates among active-duty servicemembers, along with confirmed positive cases, hospitalizations, and deaths, to identify trends and compare them with statements by DOD leaders regarding their assessment of the effectiveness of health protection actions. We determined the data were sufficiently reliable for our purposes to describe trends over time and provide examples of analyses DOD leaders use to monitor efforts to protect servicemembers

[14]Specifically, federal agencies should consider doing the following: prioritize leadership attention and continuous communication across the organization; make decisions about reentry based on local conditions; identify mission-essential functions and employees, and classify their exposure risk level; implement social distancing and other appropriate protection measures for employees; establish COVID-19 testing protocols; and establish protocols to prioritize and distribute antivirals and vaccines. We refer to these as "key considerations" because they are not exhaustive. We developed them by reviewing prior work on pandemic response and planning. Namely, in June 2020, we testified on key considerations for agencies as their employees reenter workplaces during pandemics. GAO-20-650T. To ensure these key considerations were comprehensive and relevant as knowledge of the pandemic increased later in 2020, we identified leadership attention (in conjunction with communicating to employees) and testing protocols as other critical factors on the basis of our more recent reports on COVID-19. *See* GAO, *COVID-19: Critical Vaccine Distribution, Supply Chain, Program Integrity, and Other Challenges Require Focused Federal Attention*, GAO-21-265 (Washington, D.C.: Jan. 28, 2021); *COVID-19: Urgent Actions Needed to Better Ensure an Effective Federal Response*, GAO-21-191 (Washington, D.C.: Nov. 30, 2020); and GAO-20-701.

from COVID-19 by (1) reviewing the databases for errors, (2) cross-checking data with other DOD documentation and reporting, and (3) interviewing DOD officials knowledgeable about the data. Finally, we reviewed lessons learned reports and interviewed DOD officials, including personnel from selected MTFs, about oversight mechanisms they employ to assess their health protection efforts.

For our third objective, we reviewed DOD briefing documents from periodic progress updates on all COVID-19 medical countermeasures research and development projects initiated since January 2020. We also identified and reviewed documentation on individual projects from DOD's press releases, updates to ClinicalTrials.gov, and scientific journal articles. Together with interviews of DOD officials, we analyzed and described DOD's overall strategy to leverage its research and development capabilities and those of academic and industry partners. We also identified DOD-unique aspects of the various project investments, including benefits to the servicemember population that differ from the needs of the general population. We provide further details on our scope and methodology in appendix I.

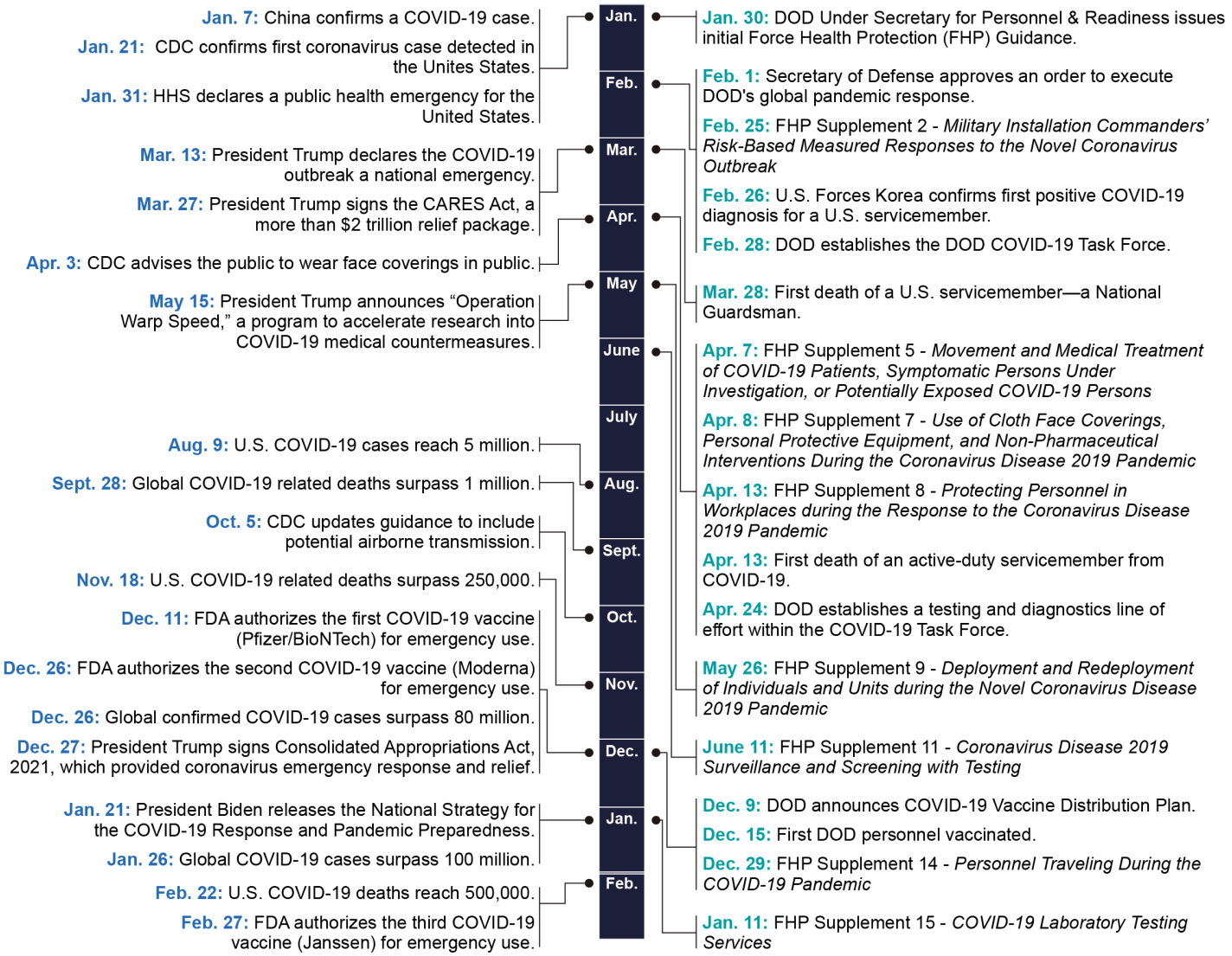
We conducted this performance audit from May 2020 to June 2021 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Timeline of COVID-19 Pandemic and DOD Milestones

The department has issued force health protection guidance and supplements since January 30, 2020 on a range of topics that include risk reduction measures, testing, treatment, and travel. Figure 1 shows these issuances, along with COVID-19 trends and U.S. federal actions, through February 2021—the first year of the pandemic.

Figure 1. Timeline of COVID-19 Pandemic and DOD Milestones, January 2020 to February 2021



Source: GAO analysis of information from Centers for Disease Control and Prevention (CDC), Department of Defense (DOD), Food and Drug Administration (FDA), Department of Health and Human Services (HHS), and the White House. | GAO-21-321

Notes: Except for FHP Supplement 11, each of the FHP supplements shown in the figure was rescinded and replaced by a later supplement. From March 2021 through May 2021, DOD issued five new FHP supplements and two revisions to existing supplements, which provided updated guidance to personnel on: laboratory testing services; deployment and redeployment procedures; use of masks, personal protective equipment, and non-pharmaceutical interventions; protecting personnel in DOD workplaces; traveling; and movement and medical treatment of COVID-19 patients.

DOD Policy and Planning for Public Health Emergencies and Force Health Protection

According to DOD Directive 6200.04, *Force Health Protection (FHP)*, it is DOD policy that commanders, supervisors, individual servicemembers, and the military health system shall promote, improve, conserve, and restore the physical and mental well-being of servicemembers across the full range of military activities and operations.[15] The Assistant Secretary of Defense for Health Affairs (ASD(HA)) is the principal advisor to the Secretary of Defense and the Under Secretary of Defense for Personnel and Readiness for all DOD health and force health protection policies, programs, and activities.[16] The ASD(HA) establishes force health protection guidelines and prioritizes distribution of vaccines and antiviral medications by the military services in consultation with the geographic combatant commands.

Force health protection is a broad endeavor that includes several components:

- casualty prevention, which is the application of prevention and protection capabilities, such as control of vaccine-preventable diseases;
- preventive medicine, including public health and epidemiology, to monitor, identify, prevent, and control communicable diseases, illnesses, and injuries;
- comprehensive health surveillance and risk management, which includes identifying populations at risk and identifying and assessing these populations' potentially hazardous exposures, monitoring and reporting disease and injury rates, and reporting health risks to higher authority while employing countermeasures; and
- biosurveillance of information related to all-hazards, threats, or disease activity affecting human, animal, or plant health.[17]

[15]Department of Defense Directive 6200.04, *Force Health Protection (FHP)* (Oct. 9, 2004).

[16]Department of Defense Directive 5136.01, *Assistant Secretary of Defense for Health Affairs (ASD(HA))* (Sept. 30, 2013) (incorporating change 1, Aug. 10, 2017).

[17]Joint Chiefs of Staff, Joint Pub. 4-02, *Joint Health Services* (Dec. 11, 2017) (incorporating change 1, Sept. 28, 2018).

Force health protection is part of DOD's all-hazards emergency management framework to prepare and respond to public health emergencies caused by a pandemic; a chemical, biological, radiological, nuclear, or high-yield explosive incident; or other hazard.[18] To advance force health protection in a public health emergency (and protect DOD facilities, property and individuals working or residing on DOD installations), DOD Instruction 6200.03, *Public Health Emergency Management (PHEM) within the DOD* establishes policy, assigns responsibilities, and provides direction across the department to ensure mission assurance and readiness.[19] Table 1 describes selected responsibilities across the department in accordance with DOD's policies for public health emergency management and force health protection.

Table 1. Selected Responsibilities According to the Department of Defense (DOD) Public Health Emergency Management and Force Health Protection Issuances

Under Secretary of Defense for Personnel and Readiness	Provides criteria, guidance, and instruction to incorporate public health emergency management requirements into appropriate DOD policy, program, and budget documents.
Assistant Secretary of Defense for Health Affairs (ASD(HA))	Under the authority, direction, and control of the Under Secretary of Defense for Personnel and Readiness, oversees the policy; program planning and execution; and allocation and use of public health, medical, and veterinary resources. Develops appropriate force health protection guidance to achieve the greatest public health benefit while minimizing disruptions to DOD missions and deployments.
Director, Defense Health Agency	Supports the Secretaries of the military departments' public health emergency management responsibilities and activities. Provides technical support to the surgeons general of the military departments, geographic combatant commanders, appropriate joint force commanders, DOD agencies, and other DOD components.
Assistant Secretary of Defense for Homeland Defense and Global Security	Coordinates with the ASD(HA) on public health emergency management policy and guidance to ensure integration and consistency with policies and programs related to homeland defense, global security, and defense support of civil authorities among others.
Chairman of the Joint Chiefs of Staff	Assesses force health protection as part of the overall planning of any force deployment decision. Periodically reassesses the force health protection posture of deployed forces. Reviews Combatant Commanders' joint plans, deployment orders, and other relevant documents for force health protection considerations.

[18]DOD considers a pandemic to be a medical event and not a chemical biological, radiological, nuclear event. Joint Chiefs of Staff, Joint Pub. 3-41, *Chemical, Biological, Radiological, and Nuclear Response* (Sept. 9, 2016).

[19]A public health emergency within DOD is the occurrence or imminent threat of an illness or health condition that poses a high probability of a significant number of deaths, serious or long-term disabilities, widespread exposure to an infectious or toxic agent, overwhelmed health care resources, or severe degradation of mission capabilities. Department of Defense Instruction 6200.03, *Public Health Emergency Management (PHEM) within the DOD* (Mar. 28, 2019).

Secretaries of the military departments	Ensure execution of public health emergency management program requirements at installations. Ensure military commanders establish, at their discretion, a health protection condition level during an emergency to communicate specific health protection measures on installations. Report metrics in accordance with ASD(HA) requirements.
Geographic combatant commanders	Ensure unity of effort in the implementation of public health emergency management at DOD installations within the combatant command's area of responsibility. Establish force health protection policies and programs for the protection of all forces assigned or attached to the command.
DOD component heads	Implement public health emergency management guidance of the ASD(HA). Ensure that the headquarters and installation identify appropriate public health and medical subject matter experts to advise on public health and medical issues.
Military commanders	Ensure an appropriate local response to public health emergencies by directing the public health emergency officer, medical treatment facility commander or director, and medical emergency manager to establish a framework of health protection measures for the installation population that are specific to the scope and severity of the current situation.

Sources: Department of Defense Directive 6200.04, *Force Health Protection (FHP)* (Oct. 9, 2004); Department of Defense Instruction 6200.03, *Public Health Emergency Management (PHEM) within the DOD* (Mar. 28, 2019). | GAO-21-321

DOD guidance states that pandemic disease outbreaks are public health emergencies of national significance, which would likely result in surge requirements that overwhelm civilian medical facilities and health care providers.[20] Accordingly, combatant commands, with support from the military services, are directed to develop and execute pandemic plans, which include force health protection measures consistent with guidance from the ASD(HA). DOD's Global Pandemic Campaign Plan, issued in 2013, provides overarching guidance to DOD and the military services on how to plan and prepare for a pandemic outbreak. U.S. Northern Command is DOD's lead combatant command for pandemic planning and synchronizing efforts across other supporting combatant commands. In this role, Northern Command is responsible for providing strategic planning guidance for DOD's efforts to prepare for and respond to pandemic diseases.

DOD's Global Pandemic Campaign Plan contains general procedures commanders should follow to protect forces, allowing for some adaptations in the context of a specific outbreak. It explains how U.S. Northern Command would respond to a pandemic by identifying capabilities—such as personal protective equipment and medical countermeasures—to prevent human-to-human transmission. The plan also includes key assumptions about how a pandemic could affect DOD's ability to provide homeland defense. According to DOD officials, the plan provides execution guidance, while policies and guidance comprise strategy for force health protection in a pandemic.

[20]DOD Instruction 6200.03.

DOD's Medical Research and Development and Health Surveillance Infrastructure

Under the authority, direction, and control of the Under Secretary of Defense for Personnel and Readiness, the ASD(HA) develops policies, procedures, and standards that govern the management of programs for medical research and development, and clinical investigations within the military health system. Specifically, the ASD(HA) oversees medical research and development, and clinical investigations funded by the Defense Health Program appropriation. Funding for DOD's COVID-19 medical research and development is overseen and prioritized by the Under Secretary of Defense for Research and Engineering, and the ASD(HA).

DOD maintains a large enterprise of organizations that sponsor and conduct medical research. The Defense Health Agency (DHA), the Joint Program Executive Office for Chemical, Biological, Radiological, and Nuclear Defense (JPEO CBRND), and the Defense Advanced Research Projects Agency sponsor projects that are executed by partners in industry and academia. Other DOD entities perform medical research in their facilities and with partners in industry and academia, including the U.S. Army Medical Research Institute of Infectious Diseases, the Walter Reed Army Institute of Research, the Naval Medical Research Center, the Air Force Research Laboratory, and the Uniformed Services University of the Health Sciences.

In addition to medical research performed in laboratory settings, DOD also manages clinical investigation programs with human volunteers to add to medical knowledge. These clinical investigation program activities are generally carried out at MTFs. They include observational studies and clinical trials to advance the understanding of diseases or conditions, including related treatment, diagnosis, and prevention. Clinical trials provide data on the safety and effectiveness of new drugs, biological products (such as vaccines), and medical devices.

DHA's Armed Forces Health Surveillance Division is DOD's central epidemiologic resource, which enables, among other things, monitoring trends over time of diseases (as well as other illnesses and injuries among servicemembers). For example, the Division's epidemiology and analysis section provides health surveillance products to DOD policymakers, commanders, health care providers, public health officers, and researchers. Furthermore, the Division's Global Emerging Infections

Surveillance program supports force health protection decision-making with a global laboratory network that analyzes and provides infectious disease surveillance information to geographic combatant commands and partner agencies.

Prior GAO Reports on COVID-19

Since June 2020, we have reported on progress of the whole-of-government efforts to mitigate the COVID-19 pandemic and protect the health of the American people, including challenges that have hampered the federal response. Our reports in this area have addressed:

- **Testing and supplies.** In June 2020, we found that the Department of Health and Human Services and other agencies faced several challenges that resulted in significant delays in testing nationwide and a dearth of quality information on testing at the federal level.[21] Specifically, agencies faced challenges developing accurate tests quickly and coordinating needed testing supplies. We found that, early in the national response, shortages of key testing supplies became problematic due to unprecedented domestic demand and overall global competition, which contributed to the delay in broad-scale testing. There were shortages in test kit supplies such as swabs and testing reagents, and in personal protective equipment needed to administer tests. Subsequently, in January 2021, we found that our concerns about shortages of these and other medical supplies have persisted.[22]
- **Data on testing, cases, and hospitalizations.** In June 2020, we first reported that the CDC reported incomplete and inconsistent data from state and jurisdictional health departments on the amount of viral testing occurring nationwide, making it more difficult to track and know the number of infections, mitigate the effect of infections, and inform decisions on reopening communities.[23] Likewise, in September 2020, we reported that some hospitalizations data from the CDC were limited to approximately 10 percent of the U.S. population.[24] CDC also

[21]GAO, *COVID-19: Opportunities to Improve Federal Response and Recovery Efforts,* GAO-20-625 (Washington, D.C.: June 25, 2020).

[22]GAO-21-265.

[23]GAO-20-625.

[24]GAO-20-701.

collects data on hospitalizations from states and jurisdictions that voluntarily report cases; however, according to CDC officials, these data were incomplete.

- **Communications.** In June 2020, we further reported that inconsistent communications have hampered the federal COVID-19 response.[25] Specifically, in March 2020 the federal government issued inconsistent guidance regarding the safety of group gatherings. The lack of clear, consistent communication from the federal government can lead to a loss of credibility with the public and other stakeholders when responding effectively to a pandemic requires the public's participation. In November 2020, we reported that frequent changes to general CDC testing guidelines were not always communicated with a scientific rationale, which risks creating confusion and eroding trust in important federal partners.[26] We recommended that the Department of Health and Human Services ensure the CDC clearly discloses the scientific rationale for any change to testing guidelines at the time the change is made. The department concurred with the recommendation. As of May 2021, the CDC had begun steps to implement it by, for example, providing links on its website to studies that explained the scientific rationale for testing guidance issued on February 16, 2021. A list of other related products is included at the end of this report.

DOD's Strategy for COVID-19 Health Protection is Risk- and Conditions-Based and Applies Key Considerations for the Reentry of Employees to the Workforce

Since January 2020, DOD has developed a strategy—outlined in force health protection guidance for COVID-19, planning documents, and orders—for protecting servicemembers from COVID-19. DOD's strategy seeks to balance the reduction of health risk with the need to continue operations. In March 2020, the Secretary of Defense described the department's three priorities as protecting troops, DOD civilians, and their families; safeguarding national security capabilities; and supporting the

[25]GAO-20-625.

[26]GAO-21-191.

whole-of-nation response.[27] According to DOD leaders, the strategy balances these three priorities by assuming that complete elimination of new infections is infeasible; rather, the goal is to conduct training and other operations to the extent possible to maintain readiness while minimizing infections. The strategy relies on coordination and collaboration between operational forces and medical personnel and is informed by scientific updates from leading federal agencies and academic institutions.

On the basis of our review of DOD policies and guidance, combatant command campaign plans for pandemic influenza, and interviews with DOD officials, we found that the strategy for COVID-19 health protection is an extension of these documents in terms of the desired end states, objectives, procedures, and responsibilities they outline. For example, the plans we reviewed describe timeframes and tasks to achieve desired end states. They identify the force health protection measures that are imperatives in all phases of a pandemic—measures that are in turn described in DOD's policies and guidance.

Further, as shown in figure 2 and described in detail below, we found that DOD's strategy has applied key considerations for the reentry of federal employees to the workplace.

[27]Secretary of Defense Memorandum, *Message to the Force – COVID-19 Response* (Mar. 27, 2020).

Figure 2. Examples of DOD Application of Key Considerations to Protect Servicemembers during the COVID-19 Pandemic

Source: GAO analysis of Department of Defense (DOD) documents and interviews with DOD officials. | GAO-21-321

Text for Figure 2. Examples of DOD Application of Key Considerations to Protect Servicemembers during the COVID-19 Pandemic

- Prioritize leadership attention and continuous communication across the organization

- The Secretary of Defense announced that the protection of workforces is DOD's top priority. DOD leaders have communicated key guidance updates throughout the pandemic, and publicly reaffirmed the commitment to health and safety as a critical imperative.

- Make decisions about reentry based on local conditions
  - Commanders have discretion to set the health protection condition level at their installation that dictates permissible activities based on local health conditions.
- Identify mission-essential functions and employees, and classify their exposure risk level
  - DOD has identified highest-priority personnel in support of essential national security functions, such as those who protect nuclear capabilities, and other critical operations like healthcare. DOD has taken steps to reduce exposure risk of medical personnel by postponing elective surgeries and encouraging telemedicine.
- Implement social distancing and other appropriate protection measures
  - DOD continuously updates health protection guidelines as new information emerges from lead federal agencies, including the Centers for Disease Control and Prevention (CDC).
- Establish COVID-19 testing protocols
  - DOD conducts diagnostic, screening, and surveillance testing in alignment with CDC guidance and Food and Drug Administration regulations. Diagnostic tests for symptomatic or exposed patients are DOD's first priority. Screening tests are conducted in a tiered priority framework based on servicemembers' missions. Surveillance tests are conducted as resources permit.
- Establish protocols to prioritize and distribute antivirals and vaccines
  - DOD recommends a limited number of supplemental therapeutics to treat COVID-19 infection in accordance with National Institutes of Health guidelines. DOD established a vaccination implementation plan and began administering vaccines in mid-December 2020 to priority groups.

Source: GAO analysis of Department of Defense (DOD) documents and interviews with DOD officials. | GAO-21-321

Note: These six considerations for protecting servicemembers are adapted from GAO, *Federal Workforce: Key Considerations for Agencies Returning Employees to Workplaces during Pandemics*, GAO-20-650T (Washington D.C.: June 25, 2020).

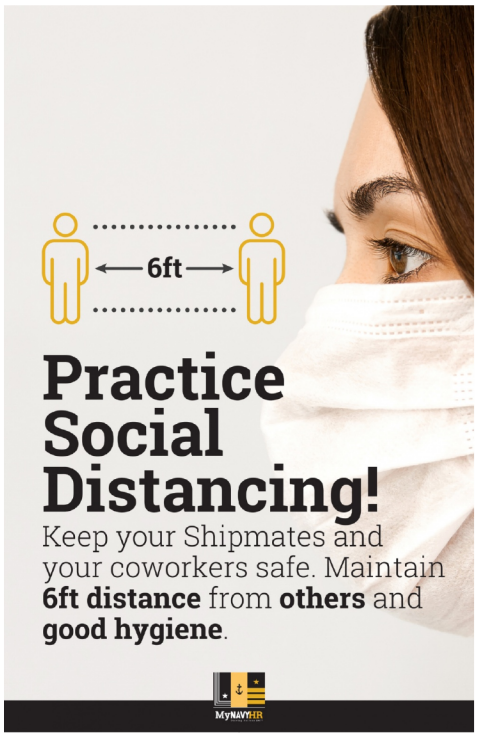
Prioritize leadership attention and continuous communication across the organization. The department issued its first force health protection guidance on January 30, 2020 and has issued another 21 supplements thereafter as of May 2021. The Secretary of Defense and other leaders have periodically issued additional memorandums outlining or reinforcing policies. For example, on November 20, 2020, the Acting Secretary of Defense reminded leaders across the department that as COVID-19 cases increase in the United States they should ensure their staff are following protection guidelines.[28]

According to a Public Affairs official in the Office of the Secretary of Defense, the department's communications approach for COVID-19 has emphasized providing clear, factual information on a routine basis, and setting guiding principles for commands and agencies to develop their local communications plans. A key element of this approach includes featuring COVID-19 guidance prominently on DOD's public website. The site is updated continuously with information for personnel and the public on DOD's COVID-19 response efforts, travel restrictions, and infection statistics. Furthermore, we found that the websites for each geographic combatant command and selected MTFs also highlight COVID-19 updates, including information about the current health protection condition level and restrictions at installations, signs and symptoms of the disease, what personnel should do if they are feeling ill, and news stories about personnel receiving vaccines.

The communications component of DOD's force health protection strategy has also included the use of posters as visual reminders to remain vigilant and follow guidance (see fig. 3).

[28]Secretary of Defense Memorandum, *Coronavirus Disease 2019 Guidelines* (Nov. 20, 2020).

Figure 3. Examples of Department of Defense Posters on COVID-19 Precautions



Sources: U.S. Marine Corps/J. Donnelly (left) and U.S. Navy/D. Bedford (right). | GAO-21-321

Officials from combatant commands and selected MTFs we interviewed described various ways that leaders have instructed personnel to follow DOD's COVID-19 risk reduction measures to reinforce the imperatives of preventing infections and preserving warfighting readiness. These measures have included town halls, public service announcements, social media posts, and online resource portals.

Make decisions about reentry based on local conditions. On May 22, 2020, the Secretary of Defense announced the end of a nearly 2.5 month-long travel restriction and its replacement with a conditions-based approach to personnel movement and travel.[29] Under the new approach, three criteria drive resumption of unrestricted travel between installations for DOD personnel: declining case trends in the local area, compliance with installation-level criteria, and senior-leader approval. On March 15,

[29]Secretary of Defense Memorandum, *Transition to Conditions-based Phased Approach to Coronavirus Disease 2019 Personnel Movement and Travel Restrictions* (May 22, 2020).

2021, the Secretary of Defense updated this conditions-based approach, which lists the following four factors that senior leaders must assess before determining that movement is permitted to or from a DOD installation, facility, or location:

- removal of local travel restrictions;
- availability of essential services (e.g., schools, childcare, and moving services);
- quality control/assurance capability for household goods packing and moving; and
- favorable health protection conditions (i.e., installations operating below health protection condition C).[30]

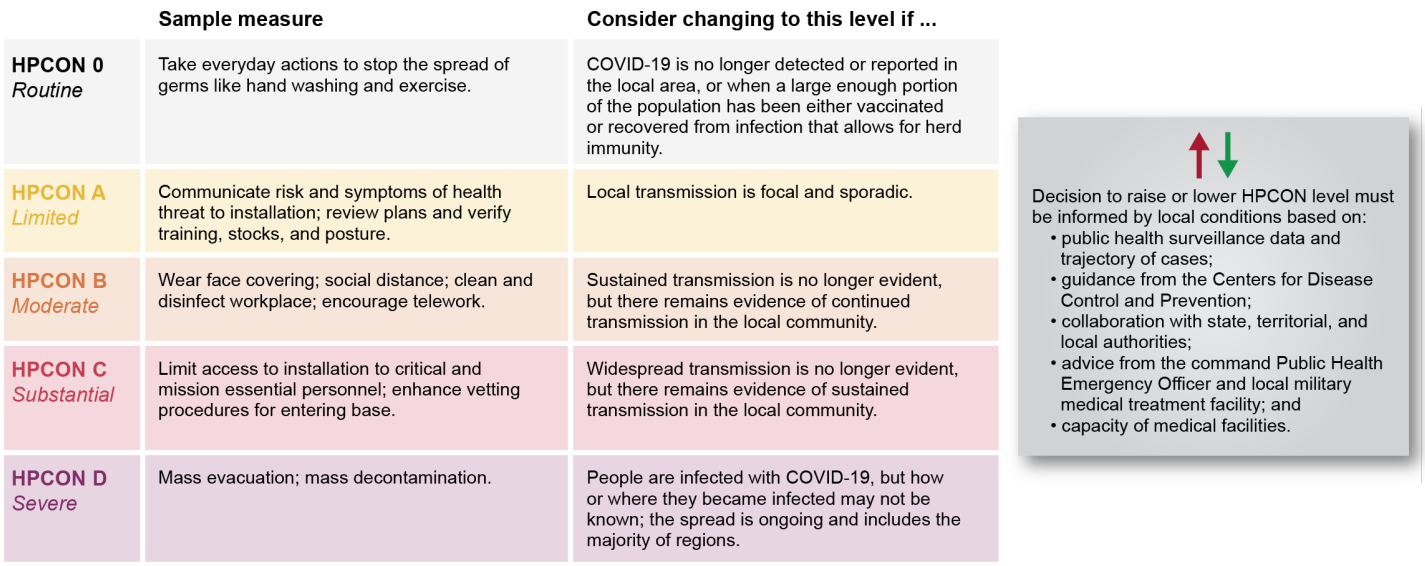
DOD allows unrestricted travel between installations when all these criteria are met, or when an approval authority grants an exemption or waiver. As of February 16, 2021, DOD permitted unrestricted travel at 102 of 231 installations worldwide, or 44 percent of all installations. This marked a change in eight installations from the prior week of February 8, 2021—from one week to the next, eight installations had travel restrictions lifted (including four installations in South Korea and four domestic installations), and none had restrictions imposed.

Installation protocols for COVID-19 leverage DOD's long-standing public health emergency management framework.[31] As outlined in the framework, each installation commander, in consultation with the installation's public health emergency officer and MTF commander or director, is responsible for setting a health protection condition with permissible and prohibited activities based on factors such as local COVID-19 transmission and the ability to meet the continued mission of that command (see fig. 4).

[30]Secretary of Defense Memorandum, *Update to Conditions-based Approach to Coronavirus Disease 2019 Personnel Movement and Travel Restrictions* (Mar. 15, 2021).

[31]DOD Instruction 6200.03.

Figure 4. Considerations for Changing Health Protection Condition (HPCON) Levels at Military Installations and Sample Protection Measures



Source: GAO analysis of Department of Defense documents. | GAO-21-321

Figure 4. Considerations for Changing Health Protection Condition (HPCON) Levels at Military Installations and Sample Protection Measures

	Sample Measure	Consider changing to this level if…
HPCon 0 Routine	Take everyday actions to stop the spread of germs like hand washing and exercise.	COVID-19 is no longer detected or reported in the local area, or when a large enough portion of the population has been either vaccinated or recovered from infection that allows for herd immunity.
HPCon A Limited	Communicate risk and symptoms of health threat to installation; review plans and verify training, stocks, and posture.	Local transmission is focal and sporadic.
HPCon B Moderate	Wear face covering; social distance; clean and disinfect workplace; encourage telework.	Sustained transmission is no longer evident, but there remains evidence of continued transmission in the local community.
HPCon C Substantial	Limit access to installation to critical and mission essential personnel; enhance vetting procedures for entering base.	Widespread transmission is no longer evident, but there remains evidence of sustained transmission in the local community.
HPCon D Severe	Mass evacuation; mass decontamination.	People are infected with COVID-19, but how or where they became infected may not be known; the spread is ongoing and includes the majority of regions.

Source: GAO analysis of Department of Defense documents. | GAO-21-321

Consistent with DOD's conditions- and risks-based strategy for COVID-19, local commanders may set health protection condition levels that are more stringent than surrounding community requirements based on mission and other risk considerations. Our review found that measures have varied based on location type. For example, at Joint Base San Antonio from March 2020 through December 2020, the commander increased the health protection condition three times and decreased it once between levels B and C. Measures that the installation commander directed included

- at level B, social distancing and temporary cancellations of religious services with large gatherings; and
- at level C, identification checks of all passengers age 17 and over at all entry control points; visitor access restrictions; telework for non-critical personnel with management approval; and cancellation of open recreation or sports activities at child care centers.

At the Pentagon, where the DOD Chief Management Officer was responsible for health protection conditions until January 1, 2021,[32] the measures have included

- at level B, random entrance screening, including temperature checks, and a goal of 20 percent or more of the workforces teleworking; and
- at level C, gatherings limited to less than 10 people and a goal of 60 percent or more workforces teleworking.

Identify mission-essential functions and employees, and classify their exposure risk level. The military health system is responsible for delivering mission-essential health care services, including services in support of COVID-19 missions. To these ends, DOD has identified mission-essential medical personnel and taken steps to reduce their exposure risk. For example, to conserve vital health care resources and protect patients, medical personnel, and the community from further exposure and transmission of COVID-19, in March 2020 the ASD(HA) directed MTFs to postpone almost all elective surgeries, invasive procedures, and dental procedures performed on beneficiaries at military

[32]On January 1, 2021, the National Defense Authorization Act for Fiscal Year 2021 abolished the position of DOD Chief Management Officer and required that the Secretary of Defense transfer each duty or responsibility of the DOD Chief Management Officer to another DOD officer or employee within 1 year. Pub. L. No. 116-283, § 901 (2021).

and dental treatment facilities.[33] Although the ASD(HA) has since permitted the resumption of elective surgeries at the discretion of MTF commanders, the military health system continues to protect the delivery of critical health care functions and personnel with measures such as prioritizing allocation of personal protective equipment to health care providers and encouraging the use of telemedicine, particularly for follow-up appointments and ongoing care of isolated patients with COVID-19.[34]

DOD has also identified personnel essential to national security functions to preserve their readiness, manage risks, and prioritize resources accordingly. For example, according to U.S. Northern Command officials, its mission-critical personnel are available on a rotating shift schedule to ensure personnel will be available even if others must quarantine. DOD has also directed the military services and combatant commands to categorize all of their forces in a tiered structure of priority to national security and exposure risk for the purposes of allocating limited testing resources to screen for COVID-19 infections. Specifically, in a May 2020 memorandum to the military departments and other components, DOD described its tiers of priority for units and personnel, as shown in table 2.[35]

Table 2. Department of Defense's Tiered Framework for Prioritizing COVID-19 Testing

Testing priority tier	Examples of personnel and units
Tier 1 - Critical national capabilities	• strategic and nuclear deterrence forces • homeland defense forces • senior Department of Defense leaders • National Mission Forces • accession sources (recruits, training)
Tier 2 - Engaged field forces	• U.S. Northern Command COVID-19 response forces • forward deployed forces in Afghanistan and Iraq • critical capabilities/assets

[33]Assistant Secretary of Defense for Health Affairs Memorandum, *Elective Surgical, Invasive, and Dental Procedures in Military Treatment Facilities* (Mar. 24, 2020).

[34]Assistant Secretary of Defense for Health Affairs Memorandum, *Resuming Elective Surgical, Invasive, and Dental Procedures in Military Medical and Dental Treatment Facilities* (May 19, 2020).

[35]Department of Defense COVID-19 Task Force Memorandum, *Testing and Reporting of DoD COVID-19 Screening, Attachment 1* (May 18, 2020).

Testing priority tier	Examples of personnel and units
Tier 3 - Forward deployed/re-deploying forces	• U.S. Indo-Pacific Command • U.S. Southern Command • U.S. European Command
Tier 4 - All other forces	n/a

n/a = not applicable

Source: Department of Defense COVID-19 Task Force Memorandum, *Testing and Reporting of DoD COVID-19 Screening, Attachment 1* (May 18, 2020). | GAO-21-321

Similarly, DOD has prioritized initial COVID-19 vaccination doses in accordance with mission-critical functions and exposure risk. Examples of personnel in the first tiers of priority for receiving the COVID-19 vaccine included medical and emergency services personnel, personnel performing activities associated with critical national capabilities, personnel preparing to deploy to locations outside the United States, and high-risk individuals. DOD's testing and vaccine plans are discussed in more detail later in this report.

Implement social distancing and other appropriate protection measures. DOD established health protection guidelines in January 2020, and since then has updated its guidelines to identify protection measures and the situations in which they should apply. We found that DOD's guidance generally aligns with CDC guidance in our review of selected areas, including use of face coverings, social distancing, and returning to work after illness. For example, the Secretary of Defense requires 6 feet of social distancing to the extent practicable, in accordance with CDC guidelines.[36] However, many training and operational settings in DOD are not conducive to social distancing. In such instances, military services have adopted alternate approaches to reduce exposure risk. For example, the Navy issued detailed guidance in April 2020 for protecting ship crews.[37] The services have taken various steps to protect new recruits in basic training, such as temporarily reducing training capacity, requiring restriction of movement periods off base prior to entry, and testing recruits for COVID-19 prior to and at the end of training.

[36]Centers for Disease Control and Prevention, *Social Distancing,* accessed February 16, 2021, https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/social-distancing.html.

[37]Navy and Marine Corps Public Health Center, *Guidance for Underway Evaluation and Management of Suspected Persons Under Investigation (PUI) for Coronavirus Disease 2019 (COVID-19)* (*updated* June 24, 2020).

From April 5, 2020 through May 2021, DOD required personnel to wear face coverings. On May 13, 2021, in keeping with updated CDC guidelines, DOD stopped requiring personnel who are fully vaccinated (i.e., at least 2 weeks beyond their final dose) to wear a mask indoors or outdoors at DOD facilities. According to department guidance, personnel who are not fully vaccinated should continue to wear masks indoors.[38] However, DOD's guidance states that commanders and supervisors should not ask about an employee's vaccination status. Other protection measures are discussed further below.

MTF and combatant command officials stated that they have adopted split shifts to reduce the density of personnel in confined workspaces, reconfigured workspaces to facilitate social distancing, and created single-direction entry and exit doors for their buildings. Officials at selected MTFs stated that they have taken additional measures to facilitate social distancing and reduce the density of staff and patients inside their buildings, such as establishing drive-through and delivery pharmacy services. Moreover, MTF officials stated they have physically separated COVID-related testing and care of COVID-19 patients from other parts of their facility.

On the basis of combatant command and military department guidance and interviews with DOD officials, we also found that DOD has encouraged maximizing telework to the extent practicable to facilitate social distancing and reduce exposure risk.[39] According to DOD officials, they do not maintain department-wide data on the number of servicemembers who are teleworking at a given time. DOD officials told us that individual offices and commands are responsible for monitoring telework among servicemembers, and some do so as part of their personnel accountability mechanisms to determine whether absence from

[38]Deputy Secretary of Defense Memorandum, *Updated Mask Guidelines for Vaccinated Persons* (May 13, 2021).

[39]Civilian DOD employees, who often work alongside servicemembers, are encouraged to telework. DOD guidance issued in March 2020 and extended in November 2020 provided that DOD components may allow civilian employees to telework during an emergency with a child or other persons requiring care or supervision present at home. Office of the Under Secretary of Defense for Personnel and Readiness Memorandum, *Civilian Personnel Guidance for DOD Components in Responding to Coronavirus Disease 2019* (Mar. 8, 2020); Under Secretary of Defense for Personnel and Readiness Memorandum, *Extension of Maximum Telework Flexibilities* (Nov. 20, 2020). During the fourth quarter of fiscal year 2020, according to data provided by DOD civilian personnel policy officials, about half of DOD's approximately 786,000 civilian employees had teleworked to some extent. We also have an ongoing review of the use of telework across federal agencies during the COVID-19 pandemic, including DOD. We expect to report on this later in 2021.

the workplace is due to telework, illness, or time off. Given DOD's mission and diversity of occupations, telework may be infeasible for the substantial number of military personnel who do not work in an office setting. In such instances, DOD and the military services have mandated other risk reduction practices, including those previously discussed. Examples of these and DOD's other day-to-day protection measures and mitigation steps after infection are outlined below in table 3.

Table 3. Examples of the Department of Defense's (DOD) Key Protection Measures and Mitigation Steps After COVID-19 Infection

Protection measures	Mitigation steps after infection

• social distancing when practicable
• telework when feasible
• face coverings
• hand hygiene and workspace disinfection procedures for high-touch areas
• restriction of movement, including travel and social activities
• sick individuals directed not to come to work
• limited building entry points with one-way directional signs, screening, and temperature checks
• accountability procedures to document and monitor employee health conditions and work absences
• divided shifts to reduce the density of workers in a space
	• isolation and testing
	• quarantine of close contacts
	• contact tracing
	• sanitation and disinfection of work spaces
	• return to work when criteria to end isolation is met
	  • at least 10 days since symptoms first appeared, and
	  • at least 24 hours with no fever without fever-reducing medication, and
	  • other symptoms of COVID-19 are improving

Source: GAO analysis of DOD guidance. | GAO-21-321

A Navy Approach to Prevent and Mitigate COVID-19 Outbreaks on Ships: The COVID-19 Free "Bubble"

The Navy has experienced high-profile COVID-19 outbreaks on ships, such as the USS *Theodore Roosevelt* in March 2020. To address the unique challenges of protecting sailors in close quarters, since April 2020 the Navy has issued detailed, platform-specific guidance to commanders and ship medical departments with procedures to prevent infections and mitigate outbreaks. Key to its approach for ships is ensuring a COVID-free crew before departure within a "bubble." To accomplish this before a long period at sea (e.g., deployment), all crew members undergo a 14-day restriction of movement, or isolation, before embarking the ship, or a 14- to 21-day restriction of movement on the ship with medical screening and temperature checks before embarkation.

During the first 30 days, commanders consider closing areas such as gyms where close contact is inevitable. Personnel transit the ship up and forward on the starboard side and down and aft on the port side. Face coverings must be worn at all times.

If COVID-19 appears on the ship, commanders are to take every reasonable action to trace and contain its spread, and "aggressively fix small problems before they become big problems" by taking steps, including predesignating berthing areas for isolation sick wards and having a standing close contact list for all personnel.

Source: GAO analysis of Navy guidance (text); U.S. Navy/PO3 E. Schaudt (photo). | GAO-21-321

A key aspect of DOD's strategy to reduce COVID-19 exposure risk is referred to as "restriction of movement." Where reasonably necessary for a valid military purpose, such as mitigating the impacts of COVID-19, commanders may lawfully issue orders restricting the movement of servicemembers under their authority (to include military personnel who may or may not yet have been exposed to COVID-19).[40] Until April 2021, DOD guidance during the COVID-19 pandemic generally required servicemembers to restrict movement to their home for 14 days prior to or after traveling, limit close contact with others, and self-monitor for COVID-19 symptoms.[41] Updated guidance that DOD issued on April 12, 2021 permits reduced movement restriction periods, such as 10 days or 7 days, depending on circumstances such as travel destination (e.g., within or outside the United States) and whether the traveler has been fully

[40]Department of the Navy, Criminal Law Division, *Code 20 Sidebar – COVID-19 Pandemic Restriction of Movement Orders (ROM) & Their Enforceability* (March 2020).

[41]Under Secretary of Defense for Personnel and Readiness Memorandum, *Force Health Protection Guidance (Supplement 9) - Department of Defense Guidance for Deployment and Redeployment of Individuals and Units during the Novel Coronavirus Disease 2019 Pandemic* (May 26, 2020); Under Secretary of Defense for Personnel and Readiness Memorandum, *Force Health Protection Guidance (Supplement 14) – Guidance for Personnel Traveling During the Coronavirus Disease 2019 Pandemic* (Dec. 29, 2020).

vaccinated or recovered from a laboratory-confirmed diagnosis of COVID-19 infection.[42]

Command-level restriction of movement protocols are sometimes more restrictive than DOD guidance or host nation requirements. For example, according to U.S. European Command officials, even though Germany waives its quarantine requirement for military travel, the commander requires that servicemembers quarantine for 14 days upon arrival in Germany in an abundance of caution. Naval Hospital Okinawa officials told us that they require incoming personnel from outside the island to conduct a 14-day restriction of movement upon arrival even if they had completed a 14-day restriction of movement immediately before traveling to Okinawa. This protocol, according to MTF officials, reduces the risk of infections from personnel traveling through high-risk locations (i.e., those with a high incidence of COVID-19) and provides assurance to the Okinawan Prefectural Government.

Host nation requirements can also be more restrictive about entry requirements than DOD generally requires with its restriction of movement procedures. For example, according to U.S. Indo-Pacific Command officials, the Republic of Palau agreed to let U.S. Marine Forces Pacific enter for training exercises if they followed strict procedures—specifically, all servicemembers were tested, sent out to sea for 21 days, tested again, quarantined for 14 more days, and then tested again before gaining entry.

Establish COVID-19 testing protocols. Detection of COVID-19 through testing is a key element of DOD's force health protection strategy. Yet, senior DOD officials explained to us that testing is but one component of a broader strategy in which the prevention and risk mitigation measures discussed previously are paramount. This is because a negative test can only be interpreted as a failure to detect the virus at a single point in time.

[42]Under Secretary of Defense for Personnel and Readiness Memorandum, *Force Health Protection Guidance (Supplement 20) – Department of Defense Guidance for Personnel Traveling During the Coronavirus Disease 2019 Pandemic* (Apr. 12, 2021). In addition, in May 2021, DOD updated guidance for personnel deploying or redeploying to permit certain limited exemptions to restriction of movement periods, or reduced periods of restriction of movement. Under Secretary of Defense for Personnel and Readiness Memorandum, *Force Health Protection Guidance (Supplement 16) Revision 1 – Department of Defense Guidance for Deployment and Redeployment of Individuals and Units During the Coronavirus Disease 2019 Pandemic* (May 4, 2021).

That is, a negative test could be accurate or false and does not predict future infection.

DOD is using three types of COVID-19 tests—diagnostic, screening, and surveillance—to separate infected individuals from healthy populations, determine the disease incidence, and break the chain of transmission. Separately, certain DOD laboratories are also performing serology tests to identify the number of servicemembers with COVID-19 antibodies, and sequencing tests—a specific type of surveillance test—to identify variations of the virus circulating among servicemembers.

DOD's diagnostic, screening, and surveillance testing protocols generally align with CDC guidance. For example, DOD requires that confirmation of a COVID-19 diagnosis should be performed with a molecular test.[43] We also found that DOD's testing strategy is consistent with FDA guidance for diagnostic and screening testing.[44] For example, DOD's force health protection guidance directs DOD components to use FDA-certified laboratories and COVID-19 tests with an emergency use authorization (EUA) from the FDA.

DOD prioritizes diagnostic testing for all individuals with COVID-19 symptoms or exposure, consistent with CDC guidance. Doing so allows health care providers to document a COVID-19 infection in servicemembers' medical records and continue or begin isolation and other mitigation steps.

Further, the nature of SARS-CoV-2 in terms of its transmission rate among asymptomatic individuals prompted DOD to include screening and surveillance testing as part of its strategy, according to DOD officials.[45] As a result, the department has executed testing on a scale never needed nor envisioned for a disease prior to COVID-19. However, persistent global supply shortages have led DOD to adopt a resource-informed testing approach. In accordance with the tiered framework described

[43]Molecular tests are typically performed in a laboratory to detect the virus's genetic material. Polymerase-chain reaction technology is an example of a molecular test. The CDC defines a confirmed case as meeting confirmatory laboratory evidence for COVID-19 (i.e., a positive molecular test).

[44]FDA, *COVID-19 Test Uses: FAQs on Testing for SARS-CoV-2* (Feb. 18, 2021).

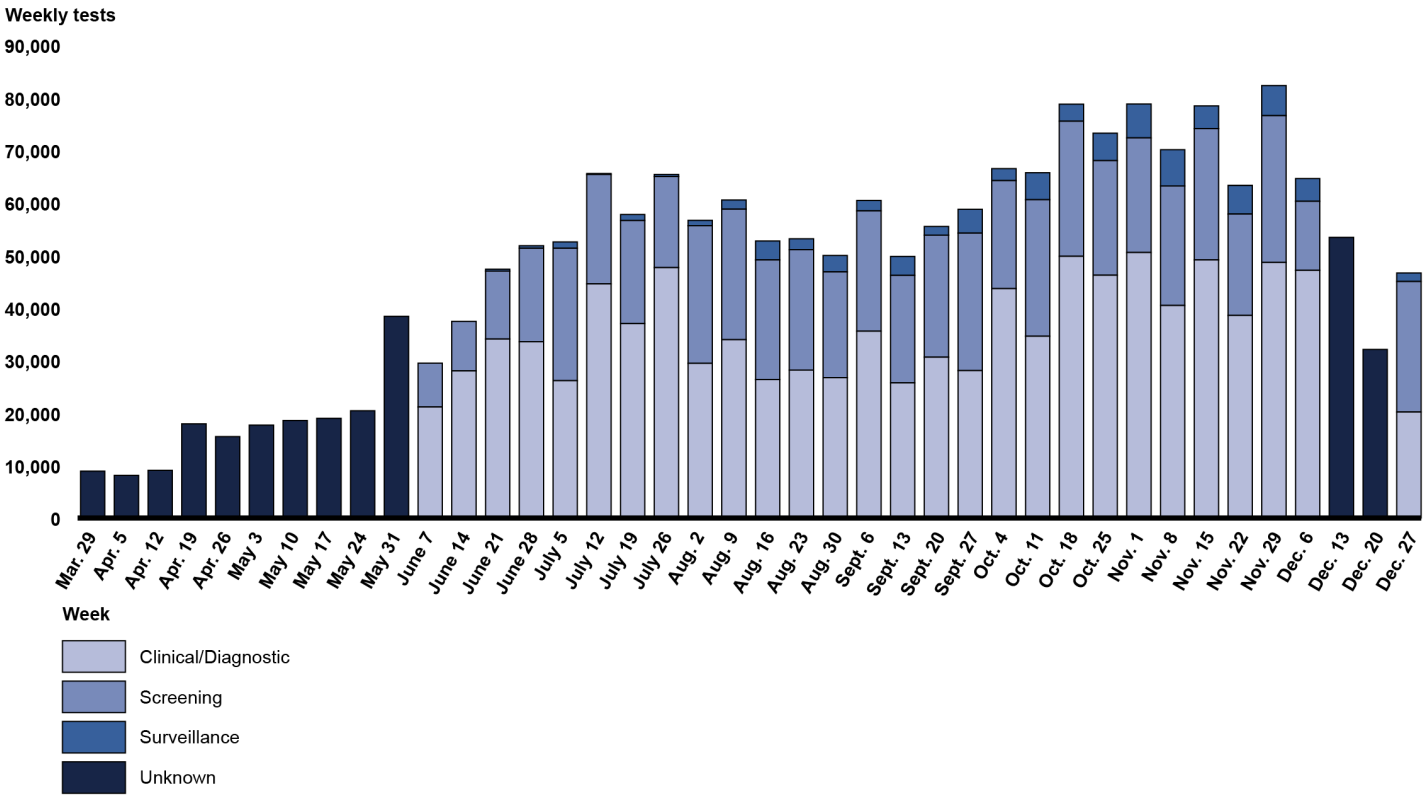
[45]Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the virus that causes the disease COVID-19.

previously in table 2, screening tests are performed for certain servicemembers before deployment or training, in order of priority. Randomized surveillance tests are last in order of priority, as the availability of testing resources allow.[46]

Figure 5 shows that DOD has generally increased its overall weekly tests from about 10,000 during the last week of March 2020, to 65,000 tests per week by the last week of July 2020. After decreasing numbers of tests through the end of August 2020, DOD generally increased its overall weekly tests again from about 50,000 in late September, to about 80,000 during the last week of November 2020. Where data on test type were available, clinical/diagnostic tests made up the largest shares of the tests, followed by screening tests. Surveillance tests made up the smallest shares of the tests.

[46]Under Secretary of Defense for Personnel and Readiness Memorandum, *Force Health Protection Guidance (Supplement 11)- Department of Defense Guidance for Coronavirus Disease 2019 Surveillance and Screening with Testing* (June 11, 2020).

Figure 5. Department of Defense Weekly COVID-19 Tests in 2020, by Type, for Active-Duty Servicemembers



Source: GAO review of data from the Department of Defense's COVID-19 Task Force. | GAO-21-321

Data table for Figure 5. Department of Defense Weekly COVID-19 Tests in 2020, by Type, for Active-Duty Servicemembers

	Clinical/Diagnostic	Screening	Surveillance	Unknown
Mar. 29	NA	NA	NA	8921
Apr. 5	NA	NA	NA	8098
Apr. 12	NA	NA	NA	9051
Apr. 19	NA	NA	NA	17917
Apr. 26	NA	NA	NA	15472
May 3	NA	NA	NA	17683
May 10	NA	NA	NA	18526
May 17	NA	NA	NA	18949
May 24	NA	NA	NA	20399
May 31	NA	NA	NA	38362
June 7	21106	8344	NA	NA
June 14	27988	9425	NA	NA

	Clinical/Diagnostic	Screening	Surveillance	Unknown
June 21	34046	12924	368	NA
June 28	33537	17780	477	NA
July 5	26128	25204	1191	NA
July 12	44557	20815	177	NA
July 19	37001	19620	1136	NA
July 26	47629	17352	375	NA
Aug. 2	29441	26175	1025	NA
Aug. 9	33932	24830	1737	NA
Aug. 16	26351	22763	3600	NA
Aug. 23	28137	22935	2054	NA
Aug. 30	26691	20128	3119	NA
Sept. 6	35562	22889	1952	NA
Sept. 13	25715	20463	3598	NA
Sept. 20	30589	23235	1636	NA
Sept. 27	28060	26144	4546	NA
Oct. 4	43635	20561	2273	NA
Oct. 11	34588	25973	5144	NA
Oct. 18	49795	25709	3232	NA
Oct. 25	46206	21796	5229	NA
Nov. 1	50511	21824	6446	NA
Nov. 8	40430	22751	6893	NA
Nov. 15	49100	25005	4304	NA
Nov. 22	38561	19263	5459	NA
Nov. 29	48613	27946	5724	NA
Dec. 6	47138	13134	4303	NA
Dec. 13	NA	NA	NA	53408
Dec. 20	NA	NA	NA	32058
Dec. 27	20151	24841	1620	NA

Notes: Data in the figure represent the total number of tests conducted in a given week, including those for servicemembers who were tested more than once. Thus, the total numbers of servicemembers tested each week are generally lower than the numbers in this figure. The data include members of the active components of the military services, and Reserve and National Guard members serving on active duty at the time of the test. Clinical/diagnostic tests are clinically indicated for patient care; screening tests are performed prior to group movements or engagement in activities; and surveillance tests are performed to identify incidence of COVID-19 in a specified population or geographic location. All tests prior to standardized reporting are labeled “Unknown.” According to a DOD COVID-19 Task Force official, the Task Force did not report data on test by type for those conducted over the winter holidays the weeks of December 13 and December 20, 2020. Lower testing numbers in December may be due to fewer individuals seeking testing during the holidays.

According to DOD officials, tests for servicemembers in tiers 1 and 2 have comprised the majority of screening tests each week because limitations in supplies have constrained available tests for tiers 3 and 4. The officials attributed this to a lack of predictability in the monthly supply chain, persistently high global demand, and market competition. We have previously reported on similar challenges with COVID-19 testing as part of the whole-of-government response. In September 2020, we found that the FDA and the Federal Emergency Management Agency identified shortages, and officials from seven of eight states we interviewed in July and August 2020 identified previous or ongoing shortages of testing supplies—challenges that we found to be attributed to a supply chain with limited domestic production and high global demand.[47]

DOD officials stated that, even if resources were unconstrained, testing every servicemember every week would not be helpful or feasible for improving outcomes. Notwithstanding persistent challenges, officials stated that they are exploring ways to increase weekly screening tests for servicemembers in tiers 3 and 4, and surveillance tests. Yet, a precise number of ideal weekly tests is difficult to determine due to tradeoffs between the speed, accuracy, and cost of tests by type, as well as lack of consensus in the scientific community about the best testing protocol. Similarly, in January 2021 we found that the Department of Health and Human Services—a lead federal agency for the COVID-19 response—has not issued a comprehensive and publicly available national testing strategy.[48] We recommended that the department develop and publish a strategy, which we believe could be done efficiently and flexibly. As of March 2021 it had not yet done so.

To increase weekly testing across its approximately 2.1 million active-duty and reserve forces, DOD has taken two key actions. First, DOD expanded and diversified its testing capabilities. Due to supply constraints associated with COVID-19 tests, the department added new testing technologies to its toolkit. As a result, DOD testing platforms now include laboratory-based molecular tests, point-of-care molecular tests, point-of-care antigen tests, as well as contracts with commercial laboratories. Second, DOD increased testing capacity by expanding the number of laboratories. In July 2020, DOD had 125 department laboratories certified for COVID-19 testing around the globe with the capacity to conduct over 200,000 tests per week. By November 2020, the number of operational

[47]GAO-20-701.

[48]GAO-21-265.

DOD laboratories had increased to 158 with the overall capacity to conduct nearly 300,000 tests per week. As a result, the median time between tests (specimen collection) and delivery of results for DOD in-house laboratory tests has been less than 24 hours since late August 2020.

Establish protocols to prioritize and distribute antivirals and vaccines. DOD recommends a limited number of supplemental therapeutics to treat COVID-19 infection in accordance with National Institutes of Health guidelines, including remdesivir for hospitalized patients with severe disease and dexamethasone for patients who require supplemental oxygen.[49] DOD is currently researching additional therapeutics including monoclonal antibodies, polyclonal antibodies, plasma-related products, antivirals, and other small molecules. We discuss DOD's research and development programs later in this report.

DOD developed an implementation plan to provide COVID-19 vaccines to eligible personnel, including servicemembers and their dependents, DOD civilian employees, military retirees, and DOD contractor personnel. Due to initial limited supply, the vaccine implementation plan established a prioritization scheme mirroring CDC guidance that focuses first on personnel providing direct medical care, critical and essential support personnel, deploying forces, and those at highest risk for developing severe illness from COVID-19.[50]

According to DOD officials, the COVID-19 vaccine implementation plan is based on the department's influenza vaccine plan. However, officials noted that this vaccination project is unprecedented in recent history and involves several unique logistical challenges. For example, unlike influenza vaccines, the first two COVID-19 vaccines that the FDA authorized for emergency use (manufactured by Pfizer-BioNTech and Moderna) require two doses per person and a temperature-controlled supply chain. In addition, there are typically one or two influenza vaccines that DOD distributes in a given year; whereas five or more COVID-19 vaccines could be authorized or approved by the FDA for use in the same year (including the two vaccines authorized for emergency use in

[49]Remdesivir is an antiviral medication approved October 22, 2020 by the FDA for treatment of certain COVID-19 patients requiring hospitalization. Dexamethasone is a steroid with anti-inflammatory effects.

[50]We discuss DOD's vaccine plan, including its prioritization scheme, in more detail in GAO-21-387. Our next government-wide report on the federal response to COVID-19 will be issued in July 2021 and will include information about DOD's vaccination efforts.

December 2020, and a third vaccine, manufactured by Johnson & Johnson, authorized for emergency use in February 2021). Despite these complexities, DOD officials stated that they believe the experience and knowledge gained from annual influenza vaccine distribution will help the department distribute the COVID-19 vaccines.

DOD initially made COVID-19 vaccination voluntary due to federal law that says a vaccine released under an EUA cannot be made mandatory.[51] However, the President has authority to waive this provision and require members of the armed forces to take a vaccine released under an EUA in the interests of national security.[52] According to DOD officials, DOD will revisit its decision to make vaccination voluntary if the FDA gives a vaccine full approval.

DOD began limited distribution of the Pfizer-BioNTech vaccine to the first of 16 locations on December 11, 2020 to gather lessons learned, make adjustments, and improve its process for subsequent distribution. According to DHA officials involved in overseeing the vaccine plan implementation, factors affecting the rate of vaccine administration have varied over time and by location. For example, the holidays in late December 2020 through mid-January 2021 and winter weather slowed vaccination efforts at U.S. sites. Officials stated that differences in the populations served by vaccination site (e.g., reserve or active component) has been another factor.

[51]21 U.S.C. § 360bbb-3(e)(1)(A)(ii)(III).

[52]10 U.S.C. § 1107a(a).

DOD Oversight Mechanisms for COVID-19 Health Protection Measures Include Leadership Attention, Data Tracking, and Lessons Learned Analyses

Senior Leaders and Local Commanders Oversee COVID-19 Protection Measures and Adapt to Changing Conditions

Consistent with the Secretary of Defense's pronouncement in early 2020 that DOD's top priority is protecting its workforces from COVID-19, we found that senior leaders and task-organized forums across the department at various levels continuously oversee and monitor implementation of force health protection measures. On the basis of our interviews with DOD officials, we also found that DOD's oversight priority for COVID-19 reflects officials' concerns about the potential for servicemembers to become complacent or fatigued with COVID-19 and restrictive protocols. Officials told us they are concerned that complacency could contribute to outbreaks, which can jeopardize readiness and relationships with host and partner nations. DOD officials have acknowledged that mistakes occurred early in the pandemic when less was known about asymptomatic transmission. Officials also stated that mistakes may invariably continue given the consequences of even one person's noncompliance—an assumption that underscores the imperative of effective oversight.

Key tenets of the department's oversight structure include 1) sustained leadership attention, including enterprise-level policy-making and monitoring, and 2) a concept called "mission command," which, applied to COVID-19, allows local commanders to adapt force health protection guidance to their mission and local conditions as needed and ensure compliance.

Sustained leadership attention. The Secretary and Deputy Secretary of Defense oversee COVID-19 response efforts in consultation with other senior leaders, such as the Chairman of the Joint Chiefs of Staff and the Under Secretary of Defense for Personnel and Readiness. According to DOD officials, the Secretary convened the first meeting on COVID-19 in early January 2020 to discuss the developing emergency and prepare initial guidance. In February, the Secretary established a COVID-19 Task

Force, with the Deputy Secretary of Defense and the Vice Chairman of the Joint Chiefs of Staff serving as co-chairs, according to Task Force members. The Task Force has facilitated enterprise-level oversight across all lines of effort, ranging from force health protection to DOD support to other federal agencies and U.S. states, territories, and commonwealths (known as defense support of civil authorities). After a new Secretary of Defense was sworn in on January 22, 2021, one of the first items on his agenda was to chair a meeting of the COVID-19 Task Force.

According to DOD officials, the Secretary and other leaders have continuously leveraged medical expertise from subject matter experts, such as the ASD(HA) and the Joint Staff Surgeon. For example, according to the Joint Staff Surgeon, he briefs the Secretary and the Chairman of the Joint Chiefs of Staff on COVID-19 updates at least weekly. The Joint Staff Surgeon stated that he also convenes a COVID-19 medical synchronization meeting up to 3 days per week—a forum that brings together medical experts from across DOD, including representatives from the Office of the ASD(HA), combatant commands' surgeons, the military departments, the DHA, the Defense Logistics Agency, the DOD COVID-19 Task Force, and DOD's CDC liaison. The group discusses the disease trajectory, scientific updates, changes to health protection guidance, and implementation challenges.

To inform their ongoing guidance development and assess the COVID-19 response, DOD leaders and medical experts monitor scientific updates and force health metrics. This information ranges from U.S. and global health data and the numbers, locations of COVID-positive cases among servicemembers and their severity, and numbers and types of tests conducted, to the numbers of available MTF hospital beds and staff and inventories of personal protective equipment and medical supplies. According to senior DOD leaders, they use this information to evaluate their strategy, the implementation of force health protection measures, and any effects on force readiness. By doing so, leaders can adjust implementation measures. For example, following outbreaks on underway ships, the Navy issued detailed risk-reduction procedures to fleet commanders in April 2020, as discussed previously in this report.

In addition, through a COVID-19 Testing Task Force that reports to the DOD COVID-19 Task Force, senior leaders oversee and standardize the implementation of DOD's COVID-19 tiered testing strategy and intervene when needed. Military department and combatant command officials alike stated that department-wide oversight from the Testing Task Force has

been helpful to mitigate challenges within DOD's control—such as redistributing supplies in accordance with demand—and external challenges, such as supply chain constraints faced more broadly throughout the United States and across the world.

DOD officials also stated that enterprise-level monitoring has helped conserve and prioritize DOD's force health protection capabilities as the department contributes to the whole-of-government response to COVID-19. For example, DHA officials stated that the Secretary of Defense approved the release of materials from the DOD stockpile to the federal government for the public health response, having been assured from DOD's data and monitoring that sufficient supplies remained available for MTFs.[53]

Mission command and authorities of local commanders. According to an April 2020 Secretary of Defense memorandum, COVID-19 impacts are different in the many places the department operates and leaders at all echelons must be proactive in protecting local servicemembers, civilians, and families.[54] Commanders should also exercise mission command by making rapid decisions to upgrade health protection conditions; take measures suited to the needs of their organizations, informed by their assessments and reflective of conditions in the surrounding communities and direction from the CDC; and coordinate between installation commanders within local commuting areas. DOD Instruction 6200.03 directs commanders to make decisions to change health protection conditions in consultation with experts, including the installation public health emergency officer and local MTF commander. Consistent with the Secretary's memorandum and DOD Instruction 6200.03, on the basis of our interviews we found that COVID-19 force health protection is a high oversight priority among combatant commands and selected MTFs, which make decisions based on conditions in their respective regions.

According to officials from geographic combatant commands, their command headquarters have each established a task-organized COVID-19 forum, including medical staff and other directorates, to centralize all COVID-19 information. These forums meet at least weekly to discuss

[53]In June 2020, we reported that, according to the Federal Emergency Management Agency, DOD had distributed almost 14 million N95 respirator masks from its inventory to cities, states, and the Department of Veterans Affairs. GAO-20-625.

[54]Secretary of Defense Memorandum, *Guidance for Commanders on the Implementation of the Risk-Based Responses to the COVID-19 Pandemic* (Apr. 1, 2020).

policy updates and data on testing and COVID-19 cases. In addition, combatant command staff explained that they work to educate their component commanders and other subordinate command leaders on how to implement specific force health protection measures in the context of operations, especially social distancing and restriction of movement.

Likewise, MTF officials identified examples of collaboration between their installation leadership, MTF leaders, public health emergency officers, commanders of tenant commands, and other stakeholders. Together, these personnel monitor and oversee their local response and continuously reevaluate the health protection condition for the installation. For example, public health emergency officers we interviewed at selected MTFs stated that they perform compliance checks across their installation and recommend improvements. Through contact tracing, officials stated that they can typically identify the sources of transmission and whether an outbreak or disease cluster resulted from a violation, such as attending a party. Military personnel who violate commanders' health emergency and protection orders may be punished under Article 92 of the Uniformed Code of Military Justice.[55]

Combatant command and MTF officials alike acknowledged to us that, as the pandemic endures, they confront challenges sustaining COVID-19 vigilance among personnel. However, they stated that they consistently reinforce the criticality of protective measures for health and readiness. According to combatant command and MTF officials, military culture has been both a help and a hindrance in this regard. For example, conforming with leadership direction and peers is a normative military behavior that aids compliance with COVID-19 protection measures, according to officials. However, other cultural norms are disadvantages in the pandemic environment, including reticence about illness and reluctance to stay home from work out of concern for the impact on others. Combatant command and MTF officials explained that they leverage oversight, messaging, peer pressure, and enforcement to reverse this norm.

DOD Uses Case and Testing Data to Monitor the Effectiveness of Protection Efforts

According to senior DOD leaders, the readiness of servicemembers for overseas deployments is the ultimate indicator of the department's

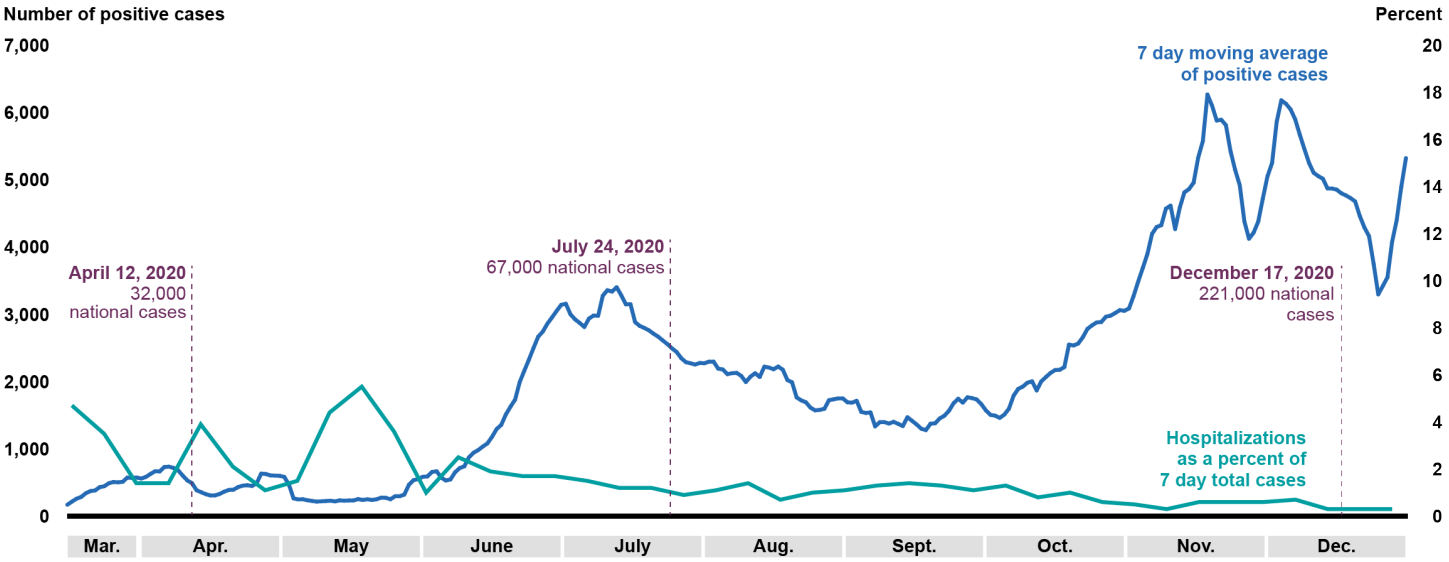
[55]10 U.S.C. § 892.

effectiveness in implementing its force health protection strategy. Yet, given DOD's goals of protecting workforces and minimizing the spread and severity of the pandemic, senior leaders also monitor their strategy's effectiveness by evaluating data on COVID-19 cases and testing.

DOD organizations at many levels gather and report health surveillance data on servicemembers and provide updates daily or multiple times per week to commanders and senior DOD leaders to monitor the degree of transmission in the military population. Examples of key data points include daily and weekly changes in COVID-positive case counts among servicemembers as a whole and by locations, hospitalizations, and the rate of positive COVID-19 tests relative to the total number of COVID-19 tests conducted.

From January 1, 2020 through December 31, 2020, there were over 93,000 reported cases of COVID-19 among active-duty servicemembers (about 7 percent of the total 1.3 million active component servicemembers) and over 800 were hospitalized during this time. Overall, our analysis found that the peaks in cases among servicemembers were within a couple of weeks of the peaks identified in cases among the overall U.S. population from March through December 2020. Specifically, as shown in figure 6, DOD's COVID-19 cases peaked and declined prior to peaks in the U.S. population that occurred in April, July, and December 2020. Of note, DOD tracks COVID-19 cases based on specimen collection dates, while national data are based on dates laboratory-confirmed and probable cases are reported to the CDC. For DOD laboratories, the median time between specimen collection and laboratory confirmation has been less than 24 hours since late August 2020 but may be up to 2 weeks. Figure 6 also shows that hospitalizations have comprised a small portion of confirmed servicemember cases of COVID-19 over time, having not exceeded 3 percent since June 2020.

Figure 6. COVID-19 Cases and Hospitalization Rates among Active-Duty Servicemembers, March 2020 through December 2020



Source: GAO analysis of Department of Defense data. | GAO-21-321

Data table for Figure 6. COVID-19 Cases and Hospitalization Rates among Active-Duty Servicemembers, March 2020 through December 2020

Date	7 day moving average of positive cases	Hospitalizations as a percent of 7 day total cases
4-Jan-20	0.285714286	NA
5-Jan-20	0.285714286	NA
6-Jan-20	0.285714286	NA
7-Jan-20	0.285714286	NA
8-Jan-20	0.285714286	NA
9-Jan-20	0.285714286	NA
10-Jan-20	0.285714286	NA
11-Jan-20	NA	NA
12-Jan-20	NA	NA
13-Jan-20	NA	NA
14-Jan-20	NA	NA
15-Jan-20	NA	NA
16-Jan-20	NA	NA
17-Jan-20	NA	NA
18-Jan-20	NA	NA
19-Jan-20	NA	NA

Date	7 day moving average of positive cases	Hospitalizations as a percent of 7 day total cases
20-Jan-20	NA	NA
21-Jan-20	NA	NA
22-Jan-20	NA	NA
23-Jan-20	NA	NA
24-Jan-20	NA	NA
25-Jan-20	NA	NA
26-Jan-20	NA	NA
27-Jan-20	NA	NA
28-Jan-20	NA	NA
29-Jan-20	NA	NA
30-Jan-20	NA	NA
31-Jan-20	NA	NA
1-Feb-20	NA	NA
2-Feb-20	NA	NA
3-Feb-20	NA	0
4-Feb-20	NA	0
5-Feb-20	NA	0
6-Feb-20	NA	0
7-Feb-20	NA	0
8-Feb-20	NA	0
9-Feb-20	NA	0
10-Feb-20	0.142857143	0
11-Feb-20	0.142857143	0
12-Feb-20	0.142857143	0
13-Feb-20	0.142857143	0
14-Feb-20	0.285714286	0
15-Feb-20	0.285714286	0
16-Feb-20	0.285714286	0
17-Feb-20	0.285714286	0
18-Feb-20	0.285714286	0
19-Feb-20	0.285714286	0
20-Feb-20	0.285714286	0
21-Feb-20	0.142857143	0
22-Feb-20	0.142857143	0
23-Feb-20	0.285714286	0
24-Feb-20	0.142857143	0

Date	7 day moving average of positive cases	Hospitalizations as a percent of 7 day total cases
25-Feb-20	0.142857143	0
26-Feb-20	0.285714286	0
27-Feb-20	0.428571429	0
28-Feb-20	0.428571429	0
29-Feb-20	0.571428571	0
1-Mar-20	0.857142857	0
2-Mar-20	1	0.142857143
3-Mar-20	1.285714286	0.142857143
4-Mar-20	1.428571429	0.142857143
5-Mar-20	1.714285714	0.142857143
6-Mar-20	2.285714286	0.142857143
7-Mar-20	3.142857143	0.142857143
8-Mar-20	2.857142857	0.142857143
9-Mar-20	5	0.285714286
10-Mar-20	5.714285714	0.285714286
11-Mar-20	7.285714286	0.285714286
12-Mar-20	9.285714286	0.285714286
13-Mar-20	11.42857143	0.285714286
14-Mar-20	13.14285714	0.285714286
15-Mar-20	17.57142857	0.285714286
16-Mar-20	23.57142857	1.428571429
17-Mar-20	30.28571429	1.428571429
18-Mar-20	36.42857143	1.428571429
19-Mar-20	40	1.428571429
20-Mar-20	47.71428571	1.428571429
21-Mar-20	52.28571429	1.428571429
22-Mar-20	53.71428571	1.428571429
23-Mar-20	60.85714286	1.857142857
24-Mar-20	62.85714286	1.857142857
25-Mar-20	69.28571429	1.857142857
26-Mar-20	71.42857143	1.857142857
27-Mar-20	70.85714286	1.857142857
28-Mar-20	71.71428571	1.857142857
29-Mar-20	80.71428571	1.857142857
30-Mar-20	80.28571429	1.571428571
31-Mar-20	81.14285714	1.571428571

Date	7 day moving average of positive cases	Hospitalizations as a percent of 7 day total cases
1-Apr-20	79	1.571428571
2-Apr-20	83	1.571428571
3-Apr-20	89.28571429	1.571428571
4-Apr-20	95.42857143	1.571428571
5-Apr-20	95	1.571428571
6-Apr-20	104.2857143	1.428571429
7-Apr-20	105.1428571	1.428571429
8-Apr-20	102.2857143	1.428571429
9-Apr-20	97.28571429	1.428571429
10-Apr-20	86	1.428571429
11-Apr-20	75.71428571	1.428571429
12-Apr-20	70	1.428571429
13-Apr-20	54.85714286	1.571428571
14-Apr-20	50.71428571	1.571428571
15-Apr-20	46.71428571	1.571428571
16-Apr-20	44	1.571428571
17-Apr-20	44.14285714	1.571428571
18-Apr-20	47.28571429	1.571428571
19-Apr-20	52.14285714	1.571428571
20-Apr-20	55.71428571	1.714285714
21-Apr-20	56.28571429	1.714285714
22-Apr-20	61.85714286	1.714285714
23-Apr-20	64.85714286	1.714285714
24-Apr-20	65.71428571	1.714285714
25-Apr-20	64	1.714285714
26-Apr-20	69.42857143	1.714285714
27-Apr-20	90.14285714	1.285714286
28-Apr-20	89.14285714	1.285714286
29-Apr-20	86.14285714	1.285714286
30-Apr-20	85.57142857	1.285714286
1-May-20	85.14285714	1.285714286
2-May-20	83	1.285714286
3-May-20	66.71428571	1.285714286
4-May-20	37.28571429	0.428571429
5-May-20	35.14285714	0.428571429
6-May-20	35.42857143	0.428571429

Date	7 day moving average of positive cases	Hospitalizations as a percent of 7 day total cases
7-May-20	33.42857143	0.428571429
8-May-20	31.85714286	0.428571429
9-May-20	30.42857143	0.428571429
10-May-20	31	0.428571429
11-May-20	31.57142857	1
12-May-20	32.28571429	1
13-May-20	31	1
14-May-20	33.14285714	1
15-May-20	32.42857143	1
16-May-20	32.85714286	1
17-May-20	33	1
18-May-20	36.14285714	2
19-May-20	34.14285714	2
20-May-20	35.57142857	2
21-May-20	34.14285714	2
22-May-20	35.71428571	2
23-May-20	39.28571429	2
24-May-20	38.71428571	2
25-May-20	35.71428571	1.571428571
26-May-20	42	1.571428571
27-May-20	42	1.571428571
28-May-20	45.28571429	1.571428571
29-May-20	66.14285714	1.571428571
30-May-20	75.85714286	1.571428571
31-May-20	78.28571429	1.571428571
1-Jun-20	83	0.857142857
2-Jun-20	84	0.857142857
3-Jun-20	93.42857143	0.857142857
4-Jun-20	95.28571429	0.857142857
5-Jun-20	81.71428571	0.857142857
6-Jun-20	75.57142857	0.857142857
7-Jun-20	77.85714286	0.857142857
8-Jun-20	93.28571429	1.571428571
9-Jun-20	102.1428571	1.571428571
10-Jun-20	105.7142857	1.571428571
11-Jun-20	125.1428571	1.571428571

Date	7 day moving average of positive cases	Hospitalizations as a percent of 7 day total cases
12-Jun-20	134.8571429	1.571428571
13-Jun-20	140.4285714	1.571428571
14-Jun-20	148	1.571428571
15-Jun-20	154.4285714	2.714285714
16-Jun-20	168.1428571	2.714285714
17-Jun-20	184.7142857	2.714285714
18-Jun-20	193.2857143	2.714285714
19-Jun-20	215.1428571	2.714285714
20-Jun-20	231.4285714	2.714285714
21-Jun-20	246.1428571	2.714285714
22-Jun-20	283.1428571	4.285714286
23-Jun-20	307.7142857	4.285714286
24-Jun-20	331.1428571	4.285714286
25-Jun-20	355.7142857	4.285714286
26-Jun-20	379.4285714	4.285714286
27-Jun-20	390.4285714	4.285714286
28-Jun-20	407.4285714	4.285714286
29-Jun-20	420.7142857	4
30-Jun-20	434.5714286	4
1-Jul-20	447.4285714	4
2-Jul-20	449.4285714	4
3-Jul-20	427.1428571	4
4-Jul-20	416.2857143	4
5-Jul-20	408.8571429	4
6-Jul-20	400.2857143	5.857142857
7-Jul-20	418	5.857142857
8-Jul-20	424.4285714	5.857142857
9-Jul-20	424	5.857142857
10-Jul-20	466.8571429	5.857142857
11-Jul-20	478.7142857	5.857142857
12-Jul-20	475.5714286	5.857142857
13-Jul-20	484.4285714	6.857142857
14-Jul-20	467	6.857142857
15-Jul-20	448.1428571	6.857142857
16-Jul-20	448.5714286	6.857142857
17-Jul-20	410.2857143	6.857142857

Date	7 day moving average of positive cases	Hospitalizations as a percent of 7 day total cases
18-Jul-20	402.1428571	6.857142857
19-Jul-20	397.8571429	6.857142857
20-Jul-20	393.2857143	5.142857143
21-Jul-20	386.5714286	5.142857143
22-Jul-20	380.1428571	5.142857143
23-Jul-20	372.2857143	5.142857143
24-Jul-20	364.2857143	5.142857143
25-Jul-20	355.1428571	5.142857143
26-Jul-20	347.5714286	5.142857143
27-Jul-20	334.5714286	4.571428571
28-Jul-20	326.4285714	4.571428571
29-Jul-20	324.2857143	4.571428571
30-Jul-20	321.5714286	4.571428571
31-Jul-20	325	4.571428571
1-Aug-20	324.4285714	4.571428571
2-Aug-20	327.5714286	4.571428571
3-Aug-20	327.4285714	3.285714286
4-Aug-20	312.1428571	3.285714286
5-Aug-20	310.4285714	3.285714286
6-Aug-20	300.4285714	3.285714286
7-Aug-20	302.7142857	3.285714286
8-Aug-20	303.4285714	3.285714286
9-Aug-20	297.1428571	3.285714286
10-Aug-20	284.1428571	3.571428571
11-Aug-20	295.8571429	3.571428571
12-Aug-20	303.4285714	3.571428571
13-Aug-20	295.5714286	3.571428571
14-Aug-20	317.7142857	3.571428571
15-Aug-20	316	3.571428571
16-Aug-20	312.4285714	3.571428571
17-Aug-20	318.1428571	3
18-Aug-20	311.2857143	3
19-Aug-20	289.1428571	3
20-Aug-20	284.1428571	3
21-Aug-20	251.2857143	3
22-Aug-20	244.8571429	3

Date	7 day moving average of positive cases	Hospitalizations as a percent of 7 day total cases
23-Aug-20	240.7142857	3
24-Aug-20	227.7142857	2
25-Aug-20	222	2
26-Aug-20	222.5714286	2
27-Aug-20	224.4285714	2
28-Aug-20	242.2857143	2
29-Aug-20	244.2857143	2
30-Aug-20	246.4285714	2
31-Aug-20	248.4285714	2.857142857
1-Sep-20	240.4285714	2.857142857
2-Sep-20	239.8571429	2.857142857
3-Sep-20	244.4285714	2.857142857
4-Sep-20	221.2857143	2.857142857
5-Sep-20	218.8571429	2.857142857
6-Sep-20	220	2.857142857
7-Sep-20	190.2857143	3.428571429
8-Sep-20	198.8571429	3.428571429
9-Sep-20	198.8571429	3.428571429
10-Sep-20	195.8571429	3.428571429
11-Sep-20	199.2857143	3.428571429
12-Sep-20	194.8571429	3.428571429
13-Sep-20	190.1428571	3.428571429
14-Sep-20	208.7142857	2.142857143
15-Sep-20	201.1428571	2.142857143
16-Sep-20	193.7142857	2.142857143
17-Sep-20	184.7142857	2.142857143
18-Sep-20	182.1428571	2.142857143
19-Sep-20	196.2857143	2.142857143
20-Sep-20	197.4285714	2.142857143
21-Sep-20	207.8571429	2.428571429
22-Sep-20	213.2857143	2.428571429
23-Sep-20	224	2.428571429
24-Sep-20	240	2.428571429
25-Sep-20	249.4285714	2.428571429
26-Sep-20	240.8571429	2.428571429
27-Sep-20	251.8571429	2.428571429

Date	7 day moving average of positive cases	Hospitalizations as a percent of 7 day total cases
28-Sep-20	250	3.428571429
29-Sep-20	247.7142857	3.428571429
30-Sep-20	237.5714286	3.428571429
1-Oct-20	224	3.428571429
2-Oct-20	214.8571429	3.428571429
3-Oct-20	213	3.428571429
4-Oct-20	208.4285714	3.428571429
5-Oct-20	215.5714286	3.142857143
6-Oct-20	228.4285714	3.142857143
7-Oct-20	255.2857143	3.142857143
8-Oct-20	269.2857143	3.142857143
9-Oct-20	273.8571429	3.142857143
10-Oct-20	282.2857143	3.142857143
11-Oct-20	285.4285714	3.142857143
12-Oct-20	265.7142857	2.142857143
13-Oct-20	283.8571429	2.142857143
14-Oct-20	292.8571429	2.142857143
15-Oct-20	301.5714286	2.142857143
16-Oct-20	307.7142857	2.142857143
17-Oct-20	308	2.142857143
18-Oct-20	313.5714286	2.142857143
19-Oct-20	361.2857143	3
20-Oct-20	359.2857143	3
21-Oct-20	364	3
22-Oct-20	378	3
23-Oct-20	395	3
24-Oct-20	402.4285714	3
25-Oct-20	408.4285714	3
26-Oct-20	409.2857143	1.571428571
27-Oct-20	420.5714286	1.571428571
28-Oct-20	422.7142857	1.571428571
29-Oct-20	428	1.571428571
30-Oct-20	434.2857143	1.571428571
31-Oct-20	433.1428571	1.571428571
2-Nov-20	NA	3.285714286
9-Nov-20	NA	2.428571429

Notes: The data show the number of confirmed and probable COVID-19 cases per day based on the lab collection dates and the weekly percentage of new hospitalizations of the number of cases. National case lines represent the highest 7-day moving average of cases in the United States between April to June, July to September, and October to December, based on the date the case was reported to the Centers for Disease Control and Prevention (CDC) as a confirmed or probable case, as of data available from the CDC Data Tracker on January 26, 2021.

According to DOD officials, the number of servicemembers infected with SARS-CoV-2 and those hospitalized at any one time have remained manageable and small in scale relative to their initial projections of the virus' spread and to infection and hospitalization rates in surrounding civilian communities. DOD officials stated that they believe that rates of infection and low mortality among servicemembers demonstrate the effectiveness of the department's force health protection strategy.

We found that these results could also be attributed, in part, to favorable characteristics in servicemember demographics. For example, servicemembers are generally younger than the general population of the United States. Table 4 shows that only 1 percent of DOD servicemembers are 55 years of age or older, compared to 17 percent of the U.S. population in that demographic.

Table 4. Characteristics of the U.S. and DOD Servicemember Populations Aged 17 to 62

Characteristic	U.S. population (percentage)	DOD servicemembers (percentage)
Age (years) 17-24	17	35
Age (years) 25-34	23	38
Age (years) 35-44	21	20
Age (years) 45-54	20	6
Age (years) 55-62	17	1
Sex Male	50	81
Sex Female	50	19

Source: GAO analysis of U.S. Census Bureau, Centers for Disease Control and Prevention, National Center for Health Statistics, and Department of Defense (DOD) data. | GAO-21-321

Notes: U.S. population data is from the Vintage 2019 Bridged-race Postcensal Population Estimates. DOD servicemember data include the total DOD force (active component, reserve, and National Guard) in October 2020. Percentages may not sum to 100 percent because of rounding.

Further, servicemembers generally have fewer preexisting conditions and better access to healthcare overall than the U.S. general population. These factors could contribute to lower mortality and fewer severe cases of COVID-19 among servicemembers. For example, our analysis found that the number of predicted COVID-19 deaths through December 31, 2020, based on U.S. COVID-19 provisional death rates and the size and composition (location, sex, and age) of DOD servicemembers, was more

than 175—a number that was significantly higher than the 15 actual COVID-19 deaths among the servicemember population in 2020.[56] The Navy, in particular, has also observed that demographic characteristics are associated with COVID-19 cases being mild or asymptomatic. For example, based on their investigation of a March 2020 outbreak of COVID-19 aboard the USS *Theodore Roosevelt*, the Navy and the CDC reported that the outbreak was characterized by widespread transmission with relatively mild symptoms and asymptomatic infection among a sample of mostly young, healthy adults.[57] Navy guidance states that roughly 35 percent of infected sailors within the Navy population exhibit few to no symptoms.[58]

To better understand the effectiveness of its strategy, DOD also monitors weekly data on total COVID-19 tests, numbers of cases among servicemembers, percentage of confirmed or probable cases among servicemembers tested, and tests by type. Based on our analysis of DOD COVID-19 testing and case data, the weekly rate of confirmed or probable COVID-19 cases among active-duty servicemembers tested remained below 7 percent from March to November 2020, but increased from November through December to about 10 percent (see fig. 7).[59]

[56]We calculated the number of expected deaths in the servicemember population using provisional COVID-19 death counts from the National Center for Health Statistics and the indirect standardization method, which accounted for differences in the state, sex, and age distributions of the U.S. and servicemember populations. Our analysis did not account for other factors related to the COVID-19 death rate, such as access to health care or comorbid conditions. Provisional death may not be complete due to reporting delays, especially for the most recent weeks.

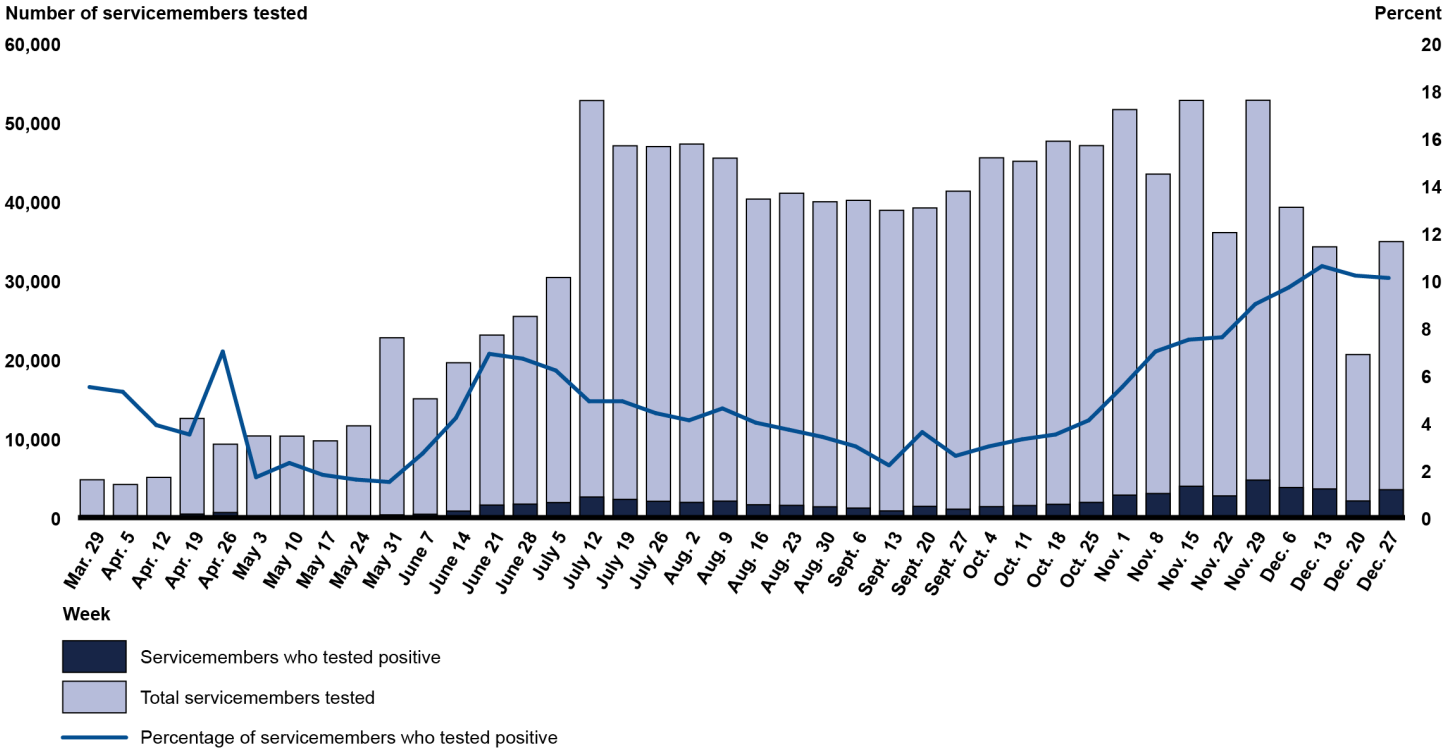
[57]Payne DC, Smith-Jeffcoat SE, Nowak G, et al., "SARS-CoV-2 Infections and Serologic Responses from a Sample of U.S. Navy Service Members — USS Theodore Roosevelt," April 2020. *MMWR Morb Mortal Wkly Rep* 2020;69:714–721. In this investigation, the Navy and the CDC studied a convenience sample of 382 young adult servicemembers aboard the USS *Theodore Roosevelt*. In a later study of the outbreak, the Navy found that out of 1,271 *Roosevelt* crew members with laboratory-confirmed infections, 55 percent experienced symptoms (i.e., 45 percent remained asymptomatic). Of 1,331 with confirmed or suspected COVID-19, 23 were hospitalized, four received intensive care, and one died. Kasper, M, Ph.D., Geibe, J., M.D., et al., "An Outbreak of Covid-19 on an Aircraft Carrier," Dec. 17, 2020. *N Engl J Med* 2020; 383:2417-2426.

[58]NAVADMIN 298/20, *U.S. Navy COVID-19 Standardized Operational Guidance Version 3.1* (Nov. 4, 2020).

[59]The World Health Organization advises governments that before reopening, rates of positivity in testing (i.e., out of all tests conducted, how many came back positive for COVID-19) should remain at 5 percent or lower for at least 14 days. Testing rates help gauge the spread of COVID-19 and show whether enough testing is occurring.

Higher positivity rates in December may be attributed, in part, to fewer asymptomatic individuals seeking testing during the holidays.

Figure 7. Percentage of Confirmed or Probable COVID-19 Cases among Active-Duty Servicemembers Tested, Weeks of March 29, 2020 through December 27, 2020



Source: GAO review of data from the Department of Defense's COVID-19 Task Force. | GAO-21-321

Data table for Figure 7. Percentage of Confirmed or Probable COVID-19 Cases among Active-Duty Servicemembers Tested, Weeks of March 29, 2020 through December 27, 2020

	Total servicemembers tested	Servicemembers who tested positive	Percentage of servicemembers who tested positive
Mar. 29	4774	261	5.5
Apr. 5	4188	223	5.3
Apr. 12	5069	200	3.9
Apr. 19	12532	436	3.5
Apr. 26	9284	647	7
May 3	10325	171	1.7
May 10	10304	240	2.3
May 17	9705	170	1.8

	Total servicemembers tested	Servicemembers who tested positive	Percentage of servicemembers who tested positive
May 24	11591	184	1.6
May 31	22733	348	1.5
June 7	15027	412	2.7
June 14	19572	817	4.2
June 21	23082	1583	6.9
June 28	25447	1699	6.7
July 5	30367	1890	6.2
July 12	52746	2591	4.9
July 19	47027	2305	4.9
July 26	46926	2052	4.4
Aug. 2	47239	1921	4.1
Aug. 9	45463	2076	4.6
Aug. 16	40270	1609	4
Aug. 23	41020	1529	3.7
Aug. 30	39931	1350	3.4
Sept. 6	40120	1194	3
Sept. 13	38854	837	2.2
Sept. 20	39150	1419	3.6
Sept. 27	41276	1059	2.6
Oct. 4	45499	1382	3
Oct. 11	45065	1509	3.3
Oct. 18	47600	1676	3.5
Oct. 25	47040	1926	4.1
Nov. 1	51602	2837	5.5
Nov. 8	43444	3047	7
Nov. 15	52753	3963	7.5
Nov. 22	36029	2737	7.6
Nov. 29	52772	4733	9
Dec. 6	39235	3807	9.7
Dec. 13	34233	3621	10.6
Dec. 20	20627	2094	10.2
Dec. 27	34897	3522	10.1

Notes: Data in the figure represent the number of unique individuals who were tested. Some servicemembers were tested more than once. Thus, the total numbers of tests conducted each week are generally higher than the numbers in this figure. The data include members of the active components of the military services, and Reserve and National Guard members serving on active duty at the time of the test. The tests performed included diagnostic, screening, and surveillance tests.

DOD's COVID-19 Task Force, DHA, combatant commands, and installation commanders and their emergency working groups also collect and review more specific data points on a daily and weekly basis to identify local trends and ascertain the causes of outbreaks or clusters of positive COVID-19 cases. For example, at the installation level, selected MTF and command officials we interviewed stated that they work continuously to maintain data on probable and confirmed COVID-19 cases and identify, through contact tracing, the methods of transmission so they can stop an outbreak or disease cluster from growing and apprise commanders of patterns to enable corrective actions.

DOD Is Analyzing Lessons Learned from Its COVID-19 Response to Identify Best Practices and Corrective Actions for Challenges

Another oversight mechanism that we identified in our review is DOD's evaluation of lessons learned from the COVID-19 response, which include lessons germane to force health protection among others, such as force readiness. Lessons learned collection and reporting was an early leadership-driven focus within DOD in its pandemic response. In April 2020, the Secretary instructed combatant commanders to exchange best practices and unanticipated challenges in organizing the Joint Force to execute the departments' three priority missions (the first of which is protection of military and civilian personnel and their families). The Secretary directed U.S. Northern Command to consolidate and share these lessons.[60] In May 2020, the Deputy Secretary of Defense announced a department-wide lessons learned line of effort.[61] The same month, the DHA Director announced the start of after-action planning across the military health system in preparation for the next major public health emergency.[62]

Some of DOD's earliest lessons learned efforts were initiated earlier than DOD leaders directed. In March 2020, for example, U.S. Forces Korea disseminated across DOD its recommendations and principles learned

[60]Secretary of Defense Memorandum, *Guidance for Commanders on the Implementation of the Risk-Based Responses to the COVID-19 Pandemic* (Apr. 1, 2020).

[61]Deputy Secretary of Defense Memorandum, *DOD Coronavirus 2019 Task Force – Lessons Learned* (May 29, 2020).

[62]Defense Health Agency Memorandum, *Defense Health Agency, Coronavirus 2019 After Action Event Planning* (May 22, 2020).

from the command's early experience near the epicenter of the COVID-19 outbreak. Among other things, the command's principles emphasized an "all-hands" approach to early and frequent prevention and mitigation measures, and treating the response like a combat operation.

The military departments' medical organizations have also been collecting lessons learned. In March 2020, for example, the Navy launched a lessons learned initiative of its fleet-wide response to COVID-19 shortly after the first cases were identified aboard the USS *Theodore Roosevelt*. The assessment was designed to address future pandemic influenza and infectious disease events by identifying gaps and capability improvements, and informing new investments for future budgets. Some of the recommendations identified in a July 2020 briefing of the study's results related to force health protection, such as improving unit capacity, knowledge, and expertise in health protection, and improving science-based testing and guidance on restriction of movement.[63] Separately, in learning from its experience with the COVID-19 outbreak aboard the USS *Theodore Roosevelt*, the Navy identified and implemented best practices for the short-term by issuing guidance to the fleet in April 2020.[64] Later in August 2020, the Navy's Bureau of Medicine and Surgery concluded its own review of the COVID-19 response aboard the *Roosevelt*, determining that the April 2020 guidance, as updated in June 2020, appropriately reinforced best practices.

According to DOD officials, a key lesson learned from early in the pandemic was the need for timely and specific data on COVID-19 cases among not only servicemembers, but civilian and contractor personnel. These personnel often serve in mission-essential or key enabling occupations across many functions of the department and typically serve alongside servicemembers. Such data requirements exceeded the capabilities of the department's health information databases because many civilian and contractor personnel receive their health care outside the military health system. In addition, DOD's health databases provide medically-validated data, but do not consistently provide certain timely and specific data, such as locations of infections, that would enable commanders and leaders to understand the scope and nature of

[63]U.S. Fleet Forces Command, *Coronavirus 2019 Pandemic Lessons Learned Collection and Assessment* (July 22, 2020).

[64]Navy and Marine Corps Public Health Center, *Guidance for Underway Evaluation and Management of Suspected Persons under Investigation (PUI) for Coronavirus Disease 2019 (COVID-19)* (*updated* June 24, 2020).

outbreaks in real time. On the basis of our interviews with DOD officials, we found that the department quickly developed mitigation strategies to provide location data and other details to senior leaders until a permanent solution is established for the long-term.

As of January 2021, according to DOD officials, organizations across the department were continuing to gather and document lessons and best practices for improving the continuing response to the COVID-19 pandemic and future pandemic preparation. For example, senior DOD officials told us that U.S. Northern Command is rewriting its 2013 Global Campaign Plan—a portion of which includes execution guidance for force health protection to prepare for a pandemic. A key assumption from the most recent plan that COVID-19 experiences invalidated, according to DOD leaders, is that particular regions could rely upon support from unaffected areas. The revised plan, according to senior leaders, will consolidate lessons learned during the COVID-19 pandemic, including recent DOD guidance on force health protection.

Given the ongoing nature of DOD's wide-ranging lessons learned efforts for COVID-19 with respect to force health protection, it remains to be seen to what extent these lessons and any corrective actions identified from them will be fully institutionalized and shared within and across the department to relevant stakeholders.

DOD's COVID-19 Research and Development Efforts Aim to Advance Prevention and Treatment Methods and Improve Detection among Servicemember Populations

Since January 2020, when COVID-19 cases were increasing in Asia among the general population, DOD has leveraged its research and development infrastructure and investments in preexisting infectious disease research to advance medical countermeasures that prevent, treat, and detect COVID-19. DOD's experiences with SARS-CoV-1 in 2003 and Middle East Respiratory Syndrome (MERS) in 2014 facilitated rapid progress with COVID-19 research. More broadly, according to DOD officials, scientists and program managers have drawn upon decades of experience in research, development, and acquisition for infectious diseases and biological defense to conduct studies and acquisition efforts

across the continuum of medical countermeasures capabilities required to combat COVID-19.

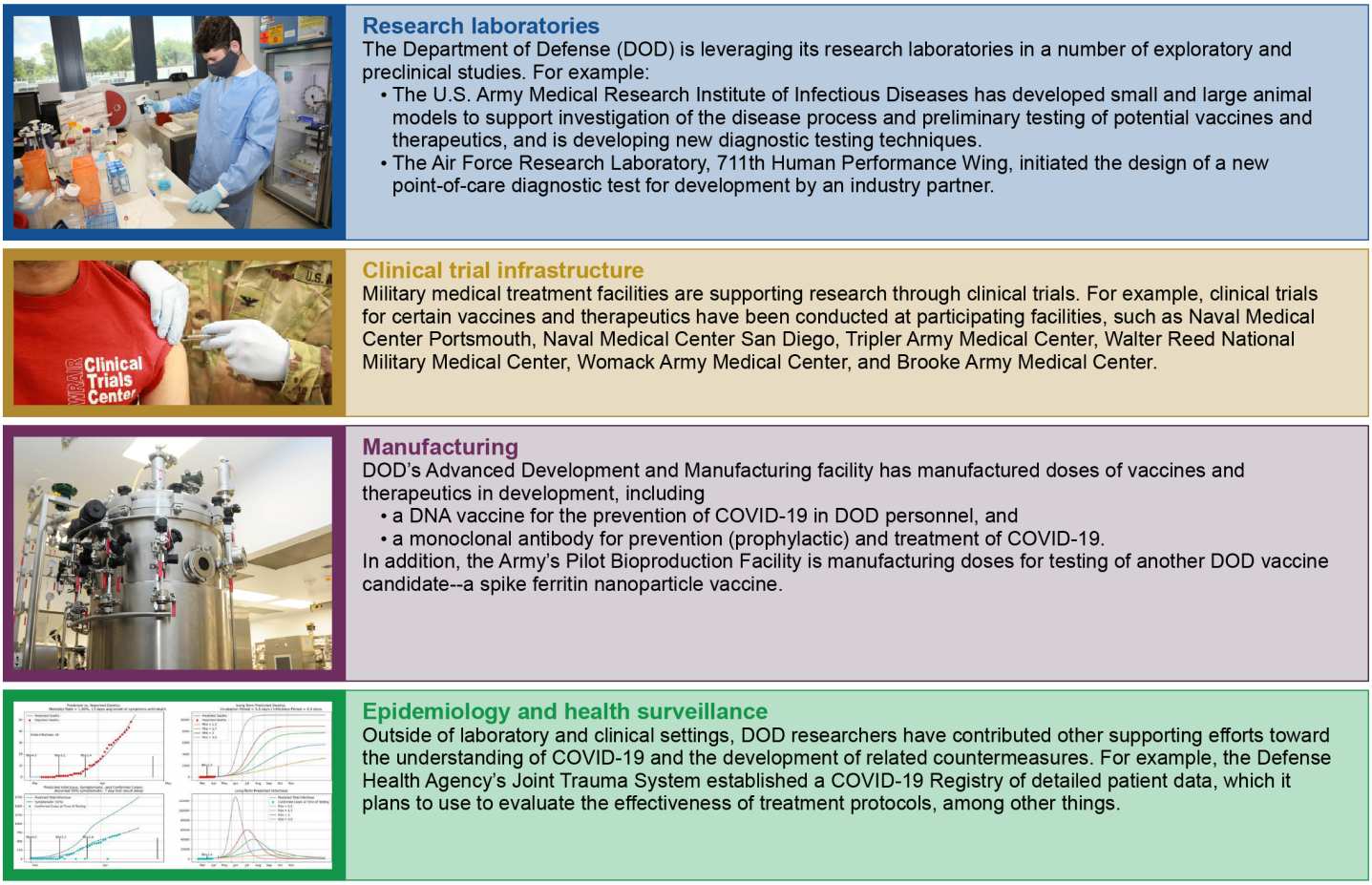
According to DOD officials responsible for shaping the COVID-19 medical countermeasures strategy, they agreed in January 2020 to adopt a three-pronged approach to protect and treat servicemembers by pursing new vaccines, therapeutics, and diagnostic methods. In February 2020, to help expedite early expansion of research and development efforts, DOD received a sample of SARS-CoV-2 and used it to prepare a "master stock" for testing countermeasures.

Another early step in DOD's strategy for developing COVID-19 countermeasures, according to DOD officials, was to ensure the department's investments would be complementary to government-wide efforts by coordinating with agencies within the Department of Health and Human Services that were beginning their own research and development.[65] During 2020, DOD's portfolio of projects grew to expand knowledge about SARS-CoV-2 and COVID-19, and to diversify the number and types of countermeasures projects, including the science and technologies behind them. DOD leaders explained that this scope and diversity of efforts is necessary because there are no guarantees of success and the risks are high.

DOD's research and development activities for COVID-19 countermeasures have involved research laboratories (DOD's and those of academic and commercial research partners), its clinical trial network, manufacturing facilities, and epidemiology and health surveillance entities (see fig. 8).

[65]Separately from the projects focused on servicemembers and discussed in the scope of this report, DOD has also partnered with the Department of Health and Human Services since June 2020 through Operation Warp Speed to accelerate the development, manufacturing, and distribution of COVID-19 vaccines and therapeutics. For more information on Operation Warp Speed, see GAO, *Operation Warp Speed: Accelerated COVID-19 Vaccine Development Status and Efforts to Address Manufacturing Challenges*, GAO-21-319 (Washington, D.C.: Feb. 11, 2021); *COVID-19*: *Federal Efforts Accelerate Vaccine and Therapeutic Development, but More Transparency Needed on Emergency Use Authorizations*, GAO-21-207 (Washington, D.C.: Nov. 17, 2020); and GAO-21-191.

Figure 8: Examples of Department of Defense Medical Research and Development Capabilities for COVID-19 Countermeasures



Sources: GAO analysis of DOD documents and interviews with DOD officials; U.S. Army/M. Walters, U.S. Army, and U.S. Air Force (photos, top to bottom). | GAO-21-321

Text of Figure 8: Examples of Department of Defense Medical Research and Development Capabilities for COVID-19 Countermeasures

Research laboratories

- The Department of Defense (DOD) is leveraging its research laboratories in a number of exploratory and preclinical studies. For example:
  - The U.S. Army Medical Research Institute of Infectious Diseases has developed small and large animal models to support investigation of the disease process and preliminary testing of

potential vaccines and therapeutics, and is developing new diagnostic testing techniques.

- The Air Force Research Laboratory, 711th Human Performance Wing, initiated the design of a new point-of-care diagnostic test for development by an industry partner.

Clinical trial infrastructure

- Military medical treatment facilities are supporting research through clinical trials. For example, clinical trials for certain vaccines and therapeutics have been conducted at participating facilities, such as Naval Medical Center Portsmouth, Naval Medical Center San Diego, Tripler Army Medical Center, Walter Reed National Military Medical Center, Womack Army Medical Center, and Brooke Army Medical Center.

Manufacturing

- DOD's Advanced Development and Manufacturing facility has manufactured doses of vaccines and therapeutics in development, including
  - a DNA vaccine for the prevention of COVID-19 in DOD personnel, and
  - a monoclonal antibody for prevention (prophylactic) and treatment of COVID-19.
- In addition, the Army's Pilot Bioproduction Facility is manufacturing doses for testing of another DOD vaccine candidate--a spike ferritin nanoparticle vaccine.

Epidemiology and health surveillance

- Outside of laboratory and clinical settings, DOD researchers have contributed other supporting efforts toward the understanding of COVID-19 and the development of related countermeasures. For example, the Defense Health Agency's Joint Trauma System established a COVID-19 Registry of detailed patient data, which it plans to use to evaluate the effectiveness of treatment protocols, among other things.

Sources: GAO analysis of DOD documents and interviews with DOD officials; U.S. Army/M. Walters, U.S. Army, and U.S. Air Force (photos, top to bottom). | GAO-21-321

As of March 2021, DOD's portfolio of countermeasures included dozens of projects in varying stages of maturity. Many organizations within DOD's research and development enterprise have led or collaborated on projects involving partners from industry and academia. Examples of ongoing efforts related to vaccines, therapeutics, diagnostic testing, and complementary research studies are described in detail below.

Vaccines. According to DOD briefings on the progress of research and development, DOD's vaccine investments seek a longer-term solution to the COVID-19 pandemic with diverse efforts to ensure effectiveness. To that end, each of DOD's four vaccine projects (ongoing as of March 2021) applies a different platform or technology.[66] The vaccines also offer certain unique and specific applications for the servicemember population, including storage in deployed environments and application for future coronaviruses. Two of these projects, sponsored by the Naval Medical Research Center, were in preclinical development and testing as of March 2021. DOD officials told us that one of the two Navy projects—a phage-display vaccine—offers the advantages of rapid formulation, reformulation, manufacturing at scale, and easy storage. The other Navy project—a psoralen-inactivated vaccine—leverages a simple and flexible method that does not require extensive knowledge of a virus or bacterium (unlike the knowledge of coronaviruses that has facilitated other COVID-19 vaccines), has potential application for future infectious diseases that have not been studied, and may produce longer-lasting immunity than other vaccine types, according to DOD officials.

DOD's other two vaccine projects for COVID-19 are more mature than the Navy projects.

- *DNA vaccine.* The JPEO CBRND is working with partners—Ology Bioservices and Inovio Pharmaceuticals—to develop a DNA vaccine that provides logistical advantages to DOD. The vaccine candidate in development would be stable at room temperature for more than a year and stable at 37 degrees Celsius for more than a month, according to a news release from Inovio.[67] Moreover, the vaccine has a projected 5-year shelf life at normal refrigeration temperature and

[66]DOD has contributed funding to a fifth vaccine candidate as part of Operation Warp Speed, manufactured by Novavax.

[67]In contrast, the Operation Warp Speed vaccine candidates have shipping and storage temperature requirements ranging from negative 80 degrees Celsius to 8 degrees Celsius.

does not need to be frozen during transport or storage. DOD's Advanced Development and Manufacturing facility began producing the vaccine in early 2020. This manufacturing capability provides priority access for DOD's emergency requirements, allowing rapid production to meet a surge in vaccine demand. Phase 1 clinical trials, which began in April 2020, found the vaccine to be safe, tolerable, and 100 percent immunogenic in all 38 trial participants.[68] Combined Phase 2 and 3 clinical trials began in November 2020 and are expected to conclude in September 2022. The Walter Reed Army Institute of Research is one of 16 trial locations for the vaccine. The other 15 sites are civilian facilities in the United States.

- *Spike ferritin (protein) nanoparticle vaccine.* The Walter Reed Army Institute of Research has led the development of a unique vaccine candidate that leverages an existing nanoparticle platform it tested prior to the emergence of SARS-CoV-2. An advantage of this vaccine is its potential application as a universal vaccine for future coronaviruses. This vaccine uses nanoparticles of an iron-containing protein called ferritin. Researchers attach a certain type of spike protein to a polymerized version of ferritin. The spike protein is what SARS-CoV-2 uses to enter human cells. The Army began manufacturing vaccine doses for testing at the Walter Reed Army Institute of Research Pilot Bioproduction Facility. Researchers conducted preclinical development and testing for most of 2020 in coordination with the U.S. Army Medical Research Institute of Infectious Diseases using its small- and large-scale animal models. The Walter Reed Army Institute of Research chose the vaccine as the most promising prototype among more than 2 dozen others it began developing in January 2020. As of March 2021, the Army had not announced a start date for a Phase 1 clinical trial, but had identified industry partners for development through Phase 2 trials.

In addition to sponsoring and leading development of the aforementioned vaccines, DOD has used its clinical trial infrastructure to test vaccines in development by other federal agencies or nonfederal entities. For example, DOD announced in September 2020 that it would support Phase 3 clinical trials at five of its MTFs for the AstraZeneca vaccine for COVID-19, which is sponsored by the Department of Health and Human Services under Operation Warp Speed. In November 2020, DOD began enrolling health care providers as study participants at two MTFs and the

[68]P. Tebas et al., "Safety and immunogenicity of INO-4800 DNA vaccine against SARS-CoV-2: A preliminary report of an open-label, Phase 1 clinical trial," *EClinicalMedicine* (2020), https://doi.org/10.1016/j.eclinm.2020.100689.

Uniformed Services University of the Health Sciences in support of a Phase 3 clinical trial of a COVID-19 vaccine study sponsored by the Henry M. Jackson Foundation for the Advancement of Military Medicine.[69]

[69]The study, titled “Novel Use of an Existing Vaccine (BCG) Alliance: The NUEVA Trial,” will evaluate the efficacy of the BCG LIVE strain of the BCG vaccine by Merck (indicated for tuberculosis) in reducing the incidence of infection of SARS-CoV2 and severity of COVID-19 disease. This study focuses on health care workers, 18-64 years of age, who are likely to care for patients with COVID-19 illness, and are eligible for care in DOD facilities.

DOD's Role in Remdesivir COVID-19 Treatment Evolution

Gilead Sciences, Inc., began researching remdesivir in 2009 for use against hepatitis C and respiratory syncytial virus. DOD began investigating remdesivir during the early stages of research and development when antiviral profiling suggested its potential as a broad-spectrum antiviral against emerging viruses, such as Ebola and Marburg. Prior to the FDA's authorization of remdesivir for emergency use to treat severe COVID-19 infection, DOD fielded remdesivir as an investigational product used to treat COVID-19 in military personnel, prior to FDA approval, and leveraged existing industry relationships to accelerate efforts to repurpose remdesivir as a COVID-19 treatment.

Source: GAO analysis of Department of Defense (DOD) and FDA information (text); Tobias Arhelger/stock.adobe.com (photo). | GAO-21-321

Timeline of Remdesivir Approval for COVID-19

May 1, 2020	Food and Drug Administration (FDA) issued an emergency use authorization (EUA) for severe COVID-19 infection.
August 28, 2020	FDA expanded EUA, allowing treatment for all hospitalized patients regardless of severity.
October 22, 2020	FDA approved remdesivir for the treatment of COVID-19 patients requiring hospitalization and weighing at least 40 kilograms, and revised the EUA to authorize treatment for children.

Therapeutics. According to DOD's spend plan for its research and development investments, therapeutic treatment solutions were a critical part of the near-term response to COVID-19 in the absence of a vaccine to prevent illness.[70] However, DOD officials stated that treatments will continue to be essential countermeasures even after vaccines are available.

One component of DOD's research and development efforts in therapeutics for COVID-19 has included screening, evaluation, and clinical trials of new and existing drugs that could be repurposed to treat COVID-19, including antiviral and other small molecule drugs. According to DOD officials, novel drug development efforts, in concert with repurposing of therapeutics to combat COVID-19, enables a multi-layered defense approach for effective medical countermeasures development and delivery. To that end, for example, the Defense Advanced Research Projects Agency has programs in place to facilitate drug discovery through known and unknown molecules that may address emerging threats, including COVID-19. One such program funds the development of new approaches using artificial intelligence techniques to accelerate the discovery of drugs to combat SARS-CoV-2, including synergistic combination therapies and those that inhibit the virus.[71]

The U.S. Army Medical Research Institute of Infectious Diseases has used a system to screen thousands of chemical compounds at a time for potential therapeutic use—the same system that identified the antiviral drug remdesivir as a potential therapeutic for Ebola virus. In March 2020, the U.S. Army Medical Materiel Development Activity announced a partnership with Gilead Sciences to obtain remdesivir and initiate an expanded access study for investigational use of the drug to treat eligible patients in MTFs. DOD joined a Phase 3 clinical trial for remdesivir use in adults hospitalized with COVID-19, sponsored by the National Institute of Allergy and Infectious Diseases, with five participating MTFs. Preliminary results in April 2020 led to the FDA issuing the first EUA for

[70]Under Secretary of Defense, Comptroller, *Department of Defense Spend Plan For Funding Received in the Coronavirus Aid, Relief, and Economic Security "CARES" Act (P.L. 116-136)* (May 29, 2020).

[71]A combination of drugs is synergistic when the combined effect is larger than the additive effect of each individual drug.

remdesivir.[72] These MTFs and others have participated in subsequent Phase 3 trials evaluating remdesivir paired with other drugs.[73]

In addition to remdesivir, DOD has funded ongoing studies of at least eight other drugs (including antiviral drugs and others) to investigate their efficacy for COVID-19. These studies include a mixture of new drugs, and ones evaluated or FDA-approved for other indications.

DOD also studies therapeutic applications for drugs, including antibody treatments, that are distinct from the needs of the general population—namely, the use of therapeutic agents for pre- and postexposure prophylaxis to prevent disease onset. For example, according to DHA officials, if a sailor becomes ill with COVID-19 on a ship or submarine, treating other sailors prophylactically can help limit the spread of the disease. In general, prophylaxes are a DOD-specific priority for medical countermeasures because of their significance for protecting servicemembers from infectious diseases and chemical, biological, radiological, and nuclear threats. Antibody treatments are useful for their prophylactic applications. Accordingly, antibody research and related products comprise a large share of DOD's therapeutics development portfolio for COVID-19.

As of March 2021, DOD had at least 11 antibody-related therapeutic projects underway for applications to COVID-19, including monoclonal antibodies, as well as plasma and polyclonal antibodies. DOD's investments in such projects include studying and manufacturing initial antibody doses, and studying plasma-related products. For example:

- *Gene-encoded monoclonal antibodies.* As one of several DOD projects focused on monoclonal antibodies as a COVID-19 treatment, JPEO CBRND and the Defense Advanced Research Projects Agency are leading a study of gene-encoded monoclonal antibodies. According to DOD officials, this project uses the technology for its DNA vaccine (as previously discussed) to generate prophylaxis and treatments that trigger the human body to produce life-saving

[72]Enrollment for the study, entitled Adaptive COVID-19 Treatment Trial, began on February 21, 2020. The study concluded on May 21, 2020. J.H. Beigel et al., "Remdesivir for the Treatment of Covid-19—Final Report," *The New England Journal of Medicine* 383, No. 19 (October 2020): 1813-26, https://doi.org/10.1056/NEJMoa2007764.

[73]These studies include Adaptive COVID-19 Treatment Trial 2, Adaptive COVID-19 Treatment Trial 3, and Adaptive COVID-19 Treatment Trial 4. All three studies are sponsored by the National Institute of Allergy and Infectious Diseases.

antibodies against SARS-CoV-2. By doing so, DOD officials state that they can avoid otherwise time-consuming and expensive manufacturing processes involved in producing other antibody treatments..

- *Plasma products.* One of DOD's studies of plasma-related products for therapeutic application in COVID-19 evaluates the efficacy of convalescent plasma (i.e., plasma removed from the blood of a person who has recovered from the disease and transfused into a patient with the same disease). The JPEO CBRND executed an agreement with Johns Hopkins University in July 2020 to conduct two nationwide clinical trials that will help researchers determine whether convalescent blood plasma therapy can effectively treat people in early stages of COVID-19 illness by reducing symptoms or preventing infection altogether. Prior to this study, in May 2020 the U.S. Army Medical Materiel Development Activity received FDA authorization to implement an expanded access protocol for COVID-19 convalescent plasma, and within a month began providing the investigational treatment to for use at approved MTFs across the military health system, and operational units such as aircraft carriers.

Diagnostics. According to DOD officials, testing will continue to be critical for protecting servicemembers from COVID-19 even after vaccines and therapeutics are developed because of DOD's global operating posture, including countries where COVID-19 may persist as a public health threat. DOD investments seek speed, capacity, and portability for COVID-19 testing in support of operational readiness. The diagnostic testing-based projects underway as of March 2021 include a mixture of molecular, antigen, and serology tests.[74]

Molecular tests comprised DOD's earliest investments in diagnostic testing capabilities. According to DOD officials, existing relationships with industry partners expedited EUAs in March 2020 from the FDA for DOD's initial diagnostic testing capabilities—the BioFire COVID-19 Test and Cepheid's Xpert Xpress SARS-CoV-2. DOD officials stated that they quickly delivered hundreds of these platforms and over 300,000 tests across DOD. DOD continued to acquire additional molecular-based testing instruments and kits as they received EUAs during 2020. More recent investments in diagnostic testing have included portable and rapid point-of-care tests, both molecular and antigen-based. DOD is also

[74]Molecular diagnostic viral tests detect the presence of genetic material from SARS-CoV-2, the virus that causes COVID-19. Antigen viral tests detect the presence of a protein that is present in SARS-CoV and SARS-CoV-2. Serology tests detect antibodies produced in the blood of patients who have had a previous COVID-19 infection.

evaluating its testing technologies in use to inform its overall testing plan, such as pooled testing techniques to conserve limited testing resources.

In addition, DOD's research and development efforts to advance testing capabilities include expanding its range of antibody testing. According to DOD briefings on the status of the COVID-19 medical countermeasures portfolio, evaluating the development of antibodies and their role in protection is critical to inform what antibody tests mean, and how, when, and where to use them, such as determining return to duty status for servicemembers who have had COVID-19. DOD has transferred a CDC serology test to Navy, Air Force, and Army laboratories to expand capabilities. The department is also monitoring the FDA's issuance of EUAs for new serology tests.

Complementary research studies. According to DOD officials, studies to expand knowledge of COVID-19 began in January 2020 when, for example, they decided to repurpose an ongoing influenza study by the Uniformed Services University of the Health Sciences to understand the natural history, immune response, and biomarkers of COVID-19.[75] DOD had numerous other research studies ongoing in 2020 aimed at 1) improving knowledge about SARS-CoV-2 and COVID-19 in servicemember populations (e.g., transmission, incidence, disease course, and immunological response); 2) evaluating and informing the use of testing technologies; and 3) developing "adjunctive" technologies (such as predictive modeling for emergency triage of patients with acute respiratory symptoms related to COVID-19—a project led by the Air Force) and wearable sensors, such as those for disease detection.

In the summer of 2020, the DHA developed a COVID-19 registry—a collection of data on all COVID-19 positive and suspected symptomatic cases evaluated by a medical provider within the military health system. The registry was designed to track the epidemiology of the disease and help the military health system improve clinical performance and patient outcomes. Moreover, the registry is intended to facilitate evaluation of the safety and effectiveness of COVID-19 treatments and support DOD and civilian research and medical teams who seek insights to future advancements in vaccines and therapeutics.

[75]The study, entitled "Epidemiology, Immunology, and Clinical Characteristics of Emerging Infectious Diseases with Pandemic Potential," is a multi-year, observational study of active-duty servicemembers and others eligible to receive care in the military health system. As of March 2021, the study was still enrolling participants.

Agency Comments

We provided a draft of this product to DOD for review and comment. DOD concurred without comment on the draft report and provided technical comments, which we incorporated as appropriate.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Defense, the Under Secretary of Defense for Policy, the Acting Assistant Secretary of Defense for Health Affairs, the Director of the Defense Health Agency, the Secretary of the Army, and the Acting Secretaries of the Navy and the Air Force. In addition, the report is available at no charge on the GAO website at http://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-3604 or farrellb@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix II.

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Director, Defense Capabilities and Management

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Appendix I: Objectives, Scope, and Methodology

With regard to COVID-19, this report examines the Department of Defense's (DOD) (1) strategy for protecting the health of military servicemembers, (2) oversight mechanisms for implementing its health protection strategy, and (3) research and development projects for vaccines, therapeutics, and testing.

For each of our objectives, our scope included DOD's actions to address the Coronavirus Disease 2019 (COVID-19) pandemic since January 2020. For objectives one and two, we interviewed a nongeneralizable sample of five combatant commands and four military medical treatment facilities (MTF) to represent each geographic region of the world in which DOD operates, each military department, different populations served, and both hospitals and clinics.[1] From the combatant commands, we obtained their force health protection guidance for COVID-19 and examples of health surveillance update briefings. Our observations from these interviews and related documents provided illustrative examples of how commands and MTFs have implemented and overseen DOD's strategy for protecting servicemembers. However, determining the degree to which DOD's strategy has been consistently implemented over time and universally implemented across the entire active-duty population was outside the scope of our review.

For objective one, to identify elements of DOD's strategy we reviewed its force health protection policies and the COVID-19 specific guidance and planning documents issued through February 2021. We also reviewed COVID-19 force health protection guidance that DOD issued and made publicly available on the defense.gov website from March through May 20, 2021 to determine whether key changes were made to previously issued guidance during the time that DOD was reviewing a draft of this report for comments. In addition, we reviewed DOD's global pandemic campaign plan and an example of a regional campaign plan from U.S.

[1]The five combatant commands included U.S. Northern Command, U.S. Southern Command, U.S. Indo-Pacific Command, U.S. Central Command, and U.S. European Command. The four MTFs we interviewed included the 60th Medical Group at David Grant Medical Center, Travis Air Force Base, California; Naval Health Clinic Corpus Christi, Naval Air Station Corpus Christi, Texas; Naval Hospital Okinawa, Camp Foster, Japan; Landstuhl Regional Medical Center, Kaiserslautern, Germany.

Indo-Pacific Command—both published prior to the COVID-19 pandemic—to understand their relevance to the COVID-19 health protection strategy by identifying measures that were similar to or different from those taken in accordance with DOD's other force health protection policies, guidance, and planning documents for COVID-19.

We compared DOD's strategy with our prior work on key considerations for agencies returning to the workplace during pandemics to determine how the actions aligned and whether there were deficiencies or additional steps DOD has taken beyond those key considerations.[2] Specifically, federal agencies should consider doing the following: prioritize leadership attention and continuous communication across the organization; make decisions about reentry based on local conditions; identify mission-essential functions and employees, and classify their exposure risk level; implement social distancing and other appropriate protection measures for employees; establish COVID-19 testing protocols; and establish protocols to prioritize and distribute antivirals and vaccines. We refer to these as "key considerations" because they are not an exhaustive list of steps that federal agencies must take to ensure effective planning. We developed them by reviewing prior work on pandemic response and planning. All but two of the key considerations (prioritizing leadership attention and establishing COVID-19 testing protocols) are based on our June 2020 testimony on key considerations for agencies as their employees reenter workplaces during pandemics.[3] We testified that these considerations were drawn from surveys on influenza pandemic preparedness that we conducted in 2012 and 2009 with the 24 agencies covered by the Chief Financial Officers Act of 1990. To ensure these key considerations were comprehensive and relevant as knowledge of the COVID-19 pandemic increased later in 2020, we also reviewed our more recent reports on COVID-19.[4] On the basis of those reports, we identified leadership attention (in conjunction with communicating to employees) and testing protocols as other critical factors for protecting employees.

[2]GAO, *Federal Workforce: Key Considerations for Agencies Returning Employees to Workplaces during Pandemics*, GAO-20-650T (Washington, D.C.: Jun. 25, 2020).

[3]GAO-20-650T.

[4]*See* GAO, *COVID-19: Critical Vaccine Distribution, Supply Chain, Program Integrity, and Other Challenges Require Focused Federal Attention*, GAO-21-265 (Washington, D.C.: Jan. 28, 2021); *COVID-19: Urgent Actions Needed to Better Ensure an Effective Federal Response*, GAO-21-191 (Washington, D.C.: Nov. 30, 2020); and *COVID-19: Federal Efforts Could Be Strengthened by Timely and Concerted Actions,* GAO-20-701 (Washington, D.C.: Sept. 21, 2020).

To assess consistency between DOD's guidance and that of the Centers for Disease Control and Prevention (CDC), we selected for comparison purposes a range of COVID-19 protection measures discussed in DOD's force health protection guidance. Specifically, to cover a range of topical areas, we selected nine measures that we categorized as day-to-day protections, six that we categorized as infection mitigation measures (listed in table 3 of the report), and measures that were aligned with DOD's three types of testing protocols (i.e., clinical diagnostic, screening, and surveillance). We compared these selected measures from DOD guidance with guidance from the CDC website to identify consistency or any differences.

To further our understanding of the strategy for health protection, we interviewed DOD officials, including senior leaders and representatives from the military department medical organizations, combatant command representatives, and personnel from selected MTFs. We identified common steps taken and challenges to protecting servicemembers from COVID-19 that officials noted in interviews, along with mitigation steps that the officials had taken.

For objective two, we reviewed key documentation on oversight activities, including briefing documents from working groups within DOD on the progress of health protection measures, along with commanders' orders for health emergencies. We reviewed these documents to identify DOD's methods for assessing compliance and the consistency and uniformity of implementation. We also analyzed DOD data from January 1 through December 31, 2020 on confirmed positive cases, hospitalizations, and deaths of servicemembers to identify trends, and compared our findings with statements by DOD leaders regarding their assessment of the effectiveness of health protection actions. We calculated a 7-day rolling average of positive cases among active-duty servicemembers (including activated reservists and National Guard), calculated as the sum of cases from the current day plus the 6 preceding days, divided by seven. We compared trends in the number of cases among the DOD population with those of the overall US population by identifying the dates of the peaks in COVID-19 cases nationally in each 3-month period: April-June, July-September, and October-December 2020. We calculated the percent hospitalized per week by dividing the total hospitalizations for the week by the weekly sum of the 7-day rolling average of cases among active-duty servicemembers.

To compare COVID-19-related deaths in the military versus U.S. populations, we used an indirect standardization method because of the

small number of deaths in the military population. We calculated the number of expected deaths in the servicemember population using provisional COVID-19 death counts from the National Center for Health Statistics and U.S. population estimates from the National Center for Health Statistics, and the U.S. Census Bureau, which accounted for differences in the state, sex, and age distributions of the U.S. and servicemember populations. Our analysis did not account for other factors related to the COVID-19 death rate, such as access to health care or comorbid conditions. Provisional death may not be complete due to reporting delays, especially for the most recent weeks. The U.S. population estimates were from the Vintage 2019 Bridged-race Postcensal Population Estimates. DOD servicemember data includes the total DOD force (active component, reserve, and National Guard) in October 2020.

We also analyzed DOD data from 2020 on number of tests by type, positive tests, and positivity rate among active-duty servicemembers to describe DOD's testing strategy and identify trends. We determined the data were sufficiently reliable for our purposes to describe trends over time and provide examples of analyses DOD leaders use to monitor efforts to protect servicemembers from COVID-19 by (1) reviewing the databases for errors, (2) cross-checking data with other DOD documentation and reporting, and (3) interviewing DOD officials and contractors knowledgeable about the data.

Finally, we reviewed lessons learned reports and interviewed DOD officials, including personnel from selected MTFs, about oversight mechanisms they employ to assess their health protection efforts.

For objective three, we reviewed DOD briefing documents from periodic progress updates on all COVID-19 medical countermeasures research and development projects initiated since January 2020. We also identified and reviewed public press releases on individual projects, updates to ClinicalTrials.gov, and scientific journal articles. Together with interviews of DOD officials, we analyzed and described DOD's overall strategy for leveraging its research and development capabilities along with those of academic and industry partners. We also identified DOD-unique aspects of the various project investments, including benefits to the servicemember population that differ from the needs of the general population.

We conducted this performance audit from May 2020 to June 2021 in accordance with generally accepted government auditing standards.

Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: GAO Contact and Staff Acknowledgments

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Staff Acknowledgments

In addition to the contact named above, Lori Atkinson (Assistant Director), Melissa Blanco (Analyst in Charge), Mariel Alper, Alexandra Gonzalez, Kaitlyn (Kaitie) Hunter, Amie Lesser, Patricia Powell, William Tedrick, Sirin Yaemsiri, and Lillian M. Yob made key contributions to this report.

Related GAO Products

COVID-19: Federal Action to Improve the Public Health Response and Combat Fraud Is Crucial as the Pandemic Enters Its Second Year. GAO-21-387. Washington, D.C.: March 31, 2021.

Operation Warp Speed: Accelerated COVID-19 Vaccine Development Status and Efforts to Address Manufacturing Challenges. GAO-21-319. Washington, D.C.: February 11, 2021.

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