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INSPECTOR GENERAL

U.S. Department of Defense

APRIL 01, 2022



Audit of Medical Conditions of Residents in Privatized Military Housing

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Results in Brief

Audit of Medical Conditions of Residents in Privatized Military Housing

April 01, 2022

Objective

The objective of this audit was to determine the percentage of privatized military housing (PMH) units that the DoD OIG considered unsafe, unhealthy, or both. We also attempted to determine the association of exposure to certain unsafe or unhealthy conditions in these privatized units and the rate of occurrence of associated medical conditions. Finally, we assessed the DoD's efforts to track relationships between exposures and adverse health impacts.

Background

Section 748 of the "William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021" requires the DoD OIG to:

- determine the percentage of units of privatized military housing the DoD OIG considered unsafe or unhealthy, and visit at least one military installation from each of the Military Services to verify that the units are unsafe or unhealthy;
- study the exposure to and effects of exposure to unsafe or unhealthy housing units; and
- determine the association between adverse exposures and the occurrence of a medical condition in eligible individuals residing in unsafe or unhealthy housing units and provide quantifiable data on the associations to the extent permitted by available scientific data.

Background (cont'd)

As of April 30, 2021, there were 211,826 PMH units. Private partner companies are required to maintain and repair PMH units in accordance with military, federal, state, and local standards as required by ground lease and other business agreements with the Services.

The enterprise Military Housing (eMH) system is the DoD enterprise information technology system used for the management and oversight of DoD housing. The DoD established the eMH system as the authoritative data source for housing assets on April 16, 2014, to improve the breadth, timeliness, and accuracy of housing data needed to make sound housing program and investment decisions.

Finding

We could not inspect all PMH units to fully determine what percentage of DoD's 211,826 housing units were unsafe or unhealthy based on the hazards listed in the law. However, after site visits to five military installations and a review of work orders we determined the following:

- 28,759 housing units had open work orders as of June 30, 2021. We conducted a statistical sample and projected that 58 housing units had a condition that was unsafe or unhealthy.
- The remaining 183,067 housing units did not have any open work orders as of June 30, 2021, and therefore did not have any unsafe or unhealthy conditions reported by the private partner companies or the housing residents.

Additionally, we determined exposures to the hazards listed in section 748 that may be present in housing units do have the potential to cause adverse health effects, including asthma, cancer, and developmental delays, according to Federal Agency sources.



Results in Brief

Audit of Medical Conditions of Residents in Privatized Military Housing

Finding (cont'd)

The DoD lacked sufficient information to determine the association of adverse housing exposures to the occurrence of a medical event across the Military Services. This occurred because:

- the Army and Air Force had not fully populated the eMH system with housing or resident data to enable the association of housing hazards to resident medical events; and
- the eMH system did not have a process established to track, identify, and measure housing hazards.

However, it was possible to use DoD data to connect housing conditions and the occurrence of medical events on a limited basis. We conducted a study at one location that included 5,291 current and former occupants and identified three cases where a housing condition caused a medical event.

Because DoD officials did not have readily available access to sufficient information to connect health and safety incidents to PMH, they were unable to effectively monitor and ensure the health and safety of its Service Members and their families.

Recommendations

We recommend that the Deputy Assistant Secretary of Defense for Housing:

- Direct the Army and Air Force to fully populate their entire inventory of PMH units in the eMH system by a mandatory deadline.

- Track the implementation of the environmental health and safety module and necessary updates to the eMH system to ensure completion in February 2022 as planned.
- Require the Army and Air Force to upload current and prior resident information associated with each PMH unit once the inventory is complete.

Management Comments and Our Response

The Deputy Assistant Secretary of Defense for Housing agreed with one recommendation and partially agreed with two recommendations. Specifically the Deputy Assistant Secretary agreed to direct the Army and Air Force to fully populate housing inventory in the eMH system. In addition, although the Deputy Assistant Secretary partially agreed with the recommendations to track the implementation of the environmental health and safety module in eMH system, and to require the Army and Air Force upload current and prior resident information associated with each PMH unit; we considered the comments fully responsive to the intent of the recommendations and fully addressed.

Therefore, we consider all recommendations resolved but open. We will close the recommendations once we verify that the information provided and actions taken by management fully addressed the recommendations.

Please see the Recommendations Table on the next page for the status of recommendations.

Recommendations Table

Management	Recommendations Unresolved	Recommendations Resolved	Recommendations Closed
Deputy Assistant Secretary of Defense for Housing		1.a, 1.b, 1.c	

Please provide Management Comments by May 01, 2022.

Note: The following categories are used to describe agency management’s comments to individual recommendations.

- **Unresolved** – Management has not agreed to implement the recommendation or has not proposed actions that will address the recommendation.
- **Resolved** – Management agreed to implement the recommendation or has proposed actions that will address the underlying finding that generated the recommendation.
- **Closed** – OIG verified that the agreed upon corrective actions were implemented.





**INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
4800 MARK CENTER DRIVE
ALEXANDRIA, VIRGINIA 22350-1500**

April 01, 2022

MEMORANDUM FOR ASSISTANT SECRETARY OF DEFENSE (SUSTAINMENT)
ASSISTANT SECRETARY OF DEFENSE (HEALTH AFFAIRS)

SUBJECT: Audit of Medical Conditions of Residents in Privatized Military Housing
(Report No. DODIG-2022-078)

This final report provides the results of the DoD Office of Inspector General's audit. We previously provided copies of the draft report and requested written comments on the recommendations. We considered management's comments on the draft report when preparing the final report. These comments are included in the report.

Comments from the Deputy Assistant Secretary of Defense for Housing addressed all recommendations presented in the report; therefore, we consider these recommendations resolved and open. As described in the Recommendations, Management Comments, and Our Response section of this report, we will close the recommendations when you provide us documentation showing that all agreed-upon actions to implement the recommendations are completed. Please provide us your response within 90 days concerning specific actions in process or completed on the recommendations. Send your response to either (b) (6) @dodig.mil if unclassified or (b) (6) @dodig.smil.mil if classified SECRET.

If you have any questions or would like to meet to discuss the audit, please contact me at (b) (6).

Timothy M. Wimette
Deputy Assistant Inspector General for Audit
Acquisition, Contracting, and Sustainment

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Acronyms and Abbreviations

Introduction

Objective

The objective of this audit was to determine the percentage of privatized military housing (PMH) units that the DoD OIG considered unsafe, unhealthy, or both. We also attempted to determine the association of exposure to certain unsafe or unhealthy conditions in PMH units and the rate of occurrence of associated medical conditions. Finally, we also assessed the DoD's efforts to track relationships between exposures and adverse health impacts. See Appendix A for scope, methodology, and prior audit coverage.

Background

Military Housing Privatization Initiative

In 1996, Congress authorized the Secretary of Defense to allow public-private ventures for military housing in a program called the Military Housing Privatization Initiative (MHPI).¹ Congress created the MHPI program to address two significant problems concerning housing for Military Service members and their families. The first problem was the poor condition of DoD-owned housing, where more than 50 percent of the existing housing units were in need of renovation or replacement due to insufficient maintenance or modernization. The second problem was the shortage of affordable, quality private sector housing. According to the Office of the Assistant Secretary of Defense for Sustainment, the initiative provided a solution to address the shortage of quality housing and resulted in the construction of more housing built to market standards for less money than using the military construction process.

PMH is owned and managed through a partnership between a Military Service and a private company. PMH is provided through DoD working together with the private sector to own, construct, manage, and maintain privatized housing together. As of April 30, 2021, there were 211,826 PMH units. In the United States, the DoD has privatized about 99 percent of the military housing.

As of April 30, 2021, 14 private partners owned and operated 81 privatized military family housing projects.

- 34 for the Army
- 32 for the Air Force and the Space Force
- 15 for the Navy and the Marine Corps

¹ Public Law 104-106 "National Defense Authorization Act for Fiscal Year 1996," TITLE XXVIII – General Provisions, Subtitle A - Military Housing Privatization Initiative, February 10, 1996.

Audit Requirement

This audit was required by Public Law 116-283, “William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021,” January 1, 2021. Specifically, section 748, “Audit of Medical Conditions of Residents in Privatized Military Housing” states:

(a) Audit. Not later than 90 days after the date of the enactment of this Act, the Inspector General of the Department of Defense shall commence the conduct of an audit of:

(1) the medical conditions of eligible individuals and the association between adverse exposures of such individuals in unsafe or unhealthy housing units and the health of such individuals

(b) Content of Audit. In conducting the audit under subsection (a), the Inspector General shall:

(1) determine the percentage of units of privatized military housing that are considered by the Inspector General to be unsafe or unhealthy housing units and visit at least one military installation of the Department of Defense from each of the Army, Navy, Air Force, and Marine Corps to verify that such units are unsafe or unhealthy housing units;

(2) study the adverse exposures of eligible individuals that relate to residing in an unsafe or unhealthy housing unit and the effect of such exposures on the health of such individuals;²

(3) determine, to the extent permitted by available scientific data, the association between such adverse exposures and the occurrence of a medical condition in eligible individuals residing in unsafe or unhealthy housing units and provide quantifiable data on such association

DoD Responsibilities for Military Housing

Within the Office of the Secretary of Defense, several offices are responsible for privatized housing.

- The Assistant Secretary of Defense for Sustainment/DoD Chief Housing Officer oversees all aspects of DoD privatized housing including the creation and standardization of policies and processes regarding housing units and coordination with the Military Departments.

² PL 116-283, §748, specified exposures as: 1. physiological hazards, including dampness and mold growth, lead-based paint, asbestos and manmade fibers, radiation, biocides, carbon monoxide, and volatile organic compounds; 2. psychological hazards, including ease of access by unlawful intruders and lighting issues; and 3. infection hazards, safety hazards, or other similar hazards as determined by the Inspector General.

- The Deputy Assistant Secretary of Defense for Housing (DASD-H) provides executive leadership for the Assistant Secretary of Defense for Sustainment on all matters pertaining to DoD housing, including the development and execution of policies, guidance, and procedures to support readiness and protect the quality of life for military personnel and their families by ensuring their access to safe, high-quality, affordable housing, delivered through cost-effective military construction, Government-leasing, and privatization.
- The Office of the Under Secretary of Defense for Personnel and Readiness:
 - provides policy, guidance, and general procedures relating to housing relocation assistance; and
 - monitors the morale and welfare aspects of the housing programs.
- The Office of the Assistant Secretary of Defense for Energy, Installations, and Environment:
 - provides DoD housing guidance and general procedures for community housing, housing-related relocation and referral services, Government-controlled housing, and housing privatization; and
 - communicates and coordinates with the Military Departments through regular meetings to discuss housing policies, annual budgets, and global housing issues.

Each Military Department is required to provide policies and procedures related to military housing for privatized housing.

- The Assistant Secretary of the Army for Installations and Environment provides overall policy and program direction for Army housing programs; and manages privatized housing programs.
- The Secretary of the Navy delegated the authority to execute the housing privatization program to the Assistant Secretary of the Navy (Energy, Installations, and Environment). Assistant Secretary of the Navy (Energy, Installations, and Environment) further delegated authority to the Commander, Naval Facilities Command.
- The Chief of Naval Operations designated the Commander, Navy Installations Command as the Navy housing program manager that provides management, control, and performance oversight of Navy housing programs.
- The Assistant Secretary of the Air Force for Installations provides policy, strategic direction, priorities, guidance, and oversight of the management and execution of Air Force housing programs for members.

The Enterprise Military Housing System

The enterprise Military Housing (eMH) system is the DoD enterprise information technology system for the operations and inventory management of DoD housing. The then-Under Secretary of Defense for Acquisition, Technology, and Logistics established the eMH system as the authoritative data source for housing assets on April 16, 2014. According to the establishment memorandum, “Establishing the eMH system as the Department’s common process to manage unaccompanied and family housing will significantly improve the breadth, timeliness, and accuracy of housing data needed to make sound housing program and investment decisions.” The memorandum also required Defense Components to ensure that they work with the Department of the Navy to migrate to the eMH system no later than September 30, 2015.

The eMH system is a web-enabled application with associated data structures and data exchange formats. The principal objective of the eMH system is to support efficient military housing program management by:

- automating and standardizing business processes;
- identifying and managing standard databases and data elements; and
- supporting requirements for user registration, enterprise architecture, and information assurance assessments.

The Defense Health Agency and the Defense Medical Surveillance System

The Office of the Assistant Secretary of Defense for Health Affairs is the principal staff element for all DoD health and force health protection policies, programs, and activities. The Defense Health Agency (DHA), a major element of the Office of the Assistant Secretary of Defense for Health Affairs, supports the delivery of integrated, affordable, and high-quality health services to Military Health System beneficiaries and is working toward driving greater integration of clinical and business processes across the system. The Defense Medical Surveillance System provides a relational database that documents military and medical experiences of Service members throughout their careers and is a central repository of medical surveillance data for the U.S. Armed Forces.

Review of Internal Controls

DoD Instruction 5010.40 requires DoD organizations to implement a comprehensive system of internal controls that provides reasonable assurance that programs are operating as intended and to evaluate the effectiveness of the controls.³

We identified internal control weaknesses with DoD's ability to identify the number of housing units and maintain housing resident information that would allow for tracking health conditions.

We will provide a copy of the final report to the senior official responsible for internal controls in the Office of the Under Secretary of Defense for Personnel and Readiness and Office of the Assistant Secretary of Defense for Sustainment.

³ DoD Instruction 5010.40, "Managers' Internal Control Program Procedures," May 30, 2013, (Incorporating Change 1, June 30, 2020).

Finding

The DoD Lacked Housing Information to Associate Exposures With Resident Medical Information

We could not inspect all PMH units to fully determine what percentage of DoD's 211,826 housing units were unsafe or unhealthy based on the hazards listed in the law. However, after site visits to five military installations and a review of work orders we determined the following:

- 28,759 housing units had open work orders as of June 30, 2021. We conducted a statistical sample and projected that 58 housing units had a condition that was unsafe or unhealthy.
- The remaining 183,067 housing units did not have any open work orders as of June 30, 2021, and therefore did not have any unsafe or unhealthy conditions reported by the private partner companies or the housing residents.

Exposures to the hazards listed in section 748 of the FY 2021 NDAA, that may be present in housing units do have the potential to cause adverse health effects, including asthma, cancer, and developmental delays, according to Federal Agency sources.

The DoD lacked sufficient information to determine the association of adverse housing exposures to the occurrence of a medical event across the Military Services. This occurred because:

- the Army and Air Force had not fully populated the eMH system with housing or resident data to enable the association of housing hazards to resident medical events; and
- the eMH system did not have a process established to track, identify, and measure housing hazards.

However, it was possible to use DoD data to connect housing conditions and the occurrence of medical events on a limited basis. We conducted a study at one location that included 5,291 current and former occupants and identified three cases where a housing condition caused a medical event.

Because DoD officials did not have readily available access to sufficient information to connect health and safety incidents to PMH, they were unable to effectively monitor and ensure the health and safety of its Service Members and their families.

Housing Units Were Generally Safe and Healthy

We found that nearly all PMH units that had open work orders as of June 30, 2021, did not have any reported unsafe or unhealthy conditions. To determine the percentage of PMH that we considered unsafe or unhealthy, we first had to determine the total inventory of PMH in the DoD. Then we identified conditions that may lead to unsafe or unhealthy housing units. We also visited at least one military installation from the Army, Navy, Air Force, and Marine Corps to verify the condition of PMH.

Inventory of PMH Units

We determined the total housing universe for PMH was 211,826 units as of April 30, 2021. This inventory includes family housing (203,463 units) and unaccompanied housing (8,363 units). The MHPI consists of family housing, unaccompanied housing, and Army hotels. We focused only on family and unaccompanied housing because the law required us to identify potential hazards and conditions for those residing in privatized housing.

We reviewed multiple sources to establish the complete housing universe. Specifically, we evaluated the PMH housing universe estimates from the DASD-H and housing information from the Military Departments and MHPI partners. Based on our review and information gathered from various sources, we determined the most accurate and complete housing inventory record was those provided by the MHPI partners because other sources of housing inventory information were either an approximation or incomplete. The breakout of family and unaccompanied housing as reported by the 14 partners is detailed in Tables 1 and 2.

Table 1. MHPI Family Housing Units reported by Partners

Partner/Joint Venture Name	Army	Air Force	Navy/Marine Corps	Total
Balfour Beatty Communities	18,286	14,934	8,711	41,931
Boyer Hill	0	1,092	0	1,092
Burlington Capital	0	1,954	0	1,954
Clark Realty Capital	11,383	1,685	0	13,068
Corvias Military Living	20,458	4,039	0	24,497
Hunt Companies	1,859	17,879	12,791	32,529
Hunt/Lincoln	0	0	11,554	11,554
Hunt/Miller Valentine	0	1,536	0	1,536
JL Properties	0	3,262	0	3,262
Landmark	0	0	262	262

Table 1. MHPI Family Housing Units reported by Partners (cont'd)

Partner/Joint Venture Name	Army	Air Force	Navy/Marine Corps	Total
Lendlease	25,996	6,255	7,899	40,150
Lincoln Military Housing	6,084	0	6,377	12,461
Lincoln/Clark LLC	0	0	13,055	13,055
Michael Military Housing	2,965	0	0	2,965
Patrician Management	0	0	935	935
United Communities	0	2,212	0	2,212
Total	87,031	54,848	61,584	203,463

Source: Partners, Housing Units as of April 30, 2021.

Table 2. MHPI Unaccompanied Housing Units reported by Partners

Partner	Army	Air Force	Navy/ Marine Corps	Total
Balfour Beatty Communities	370	0	0	370
Clark Realty Capital	200	0	2,398	2,598
Corvias Military Living	1,521	0	0	1,521
Hunt Companies	0	0	3,682	3,682
Lendlease	192	0	0	192
Total	2,283	0	6,080	8,363

Source: Partners, Housing Units as of April 30, 2021.

Identify PMH Units That Were Unsafe or Unhealthy

We concluded, based on our statistical sample of open work orders, that 28,701 of the 28,759 housing units were safe and healthy on June 30, 2021. See Appendix C for a Statistical Sample summary. We were not able to visit each of the 81 housing locations and inspect each of the 211,826 units. As a result, we conducted a statistical sample of housing units that had at least one open work order at some point on June 30, 2021, to determine the percentage of PMH units that had a condition that could potentially be unsafe or unhealthy.

On June 30, 2021, 183,067 of the 211,826 (or 86.4 percent) of the housing units did not have open work orders and therefore did not have any reported unsafe or unhealthy conditions. We concluded this based upon the lack of work orders for these units. Private partner companies are required to maintain and repair PMH units in accordance with military, federal, state, and local standards as required by ground lease and other business agreements with the Services. Each PMH

resident is required to report any problems in their homes by creating work orders. Specifically, the “MHPI Military Member Tenant Lease Agreement” states that each tenant is responsible for:

7.C.(8) Promptly reporting to Owner any defective, broken, damaged, or malfunctioning building systems, fixtures, appliances, smoke and carbon monoxide detectors, or other parts of the Premises, common areas or related facilities. (9) Promptly submitting to Owner any maintenance and repair request through the work order submission process described in this Lease and promptly signing off on work orders when work is completed.

On June 30, 2021, there were 28,759 housing units that had 49,334 work orders open at some point during the day. We randomly sampled 500 housing units, with 875 work orders. We reviewed each of those work orders for any indication of potentially hazardous conditions in the housing unit. For each work order that indicated a potentially hazardous condition, we held meetings with the partner company and obtained the specific details and documentation to determine whether the condition made the house unsafe or unhealthy as of June 30, 2021. We found that 1 of the 500 randomly sampled homes had a reoccurring mold issue, and therefore determined the home had a condition that was unsafe and unhealthy. When projected over the population of homes with work orders, that resulted in a finding of 58 homes with an unsafe or unhealthy condition. See Appendix C for the statistical sample summary.

Site Visits

Section 748, “Audit of Medical Conditions of Residents in Privatized Military Housing,” of the FY 2021 NDAA required us to visit at least one military installation from each of the Military Services to verify that such housing units are unsafe or unhealthy. We conducted site visits from July to September 2021 to PMH locations for each of the Military Services. Specifically, we visited the following sites.

- Fort Belvoir, Virginia
- Eglin Air Force Base, Florida
- Naval Air Station Pensacola, Florida
- Naval Air Station Whiting Field, Florida
- Marine Corps Base Quantico, Virginia

At each site, we interviewed the private partner company personnel and reviewed documentation to understand how they identified and resolved unsafe or unhealthy housing conditions. Specifically, we reviewed the following processes:

- Housing Inspections – Private partner companies stated that they complete move-in and move-out inspections as well as periodic inspections to assess housing conditions and identify potentially hazardous conditions. Partner companies stated that vendors and inspectors complete a Between Occupancy Maintenance checklist prior to occupancy. We found the checklist to be thorough because it included inspection requirements for the following areas.⁴
 - Living Areas, including inspections of windows, flooring, and doors
 - Bathrooms, including sinks, drains, tubs, showers, and toilets
 - Kitchens, including appliances, countertops, and sinks
 - Electrical, Life and Safety, including breaker panel, lights, fixtures, fans, outlets, ground fault circuit interrupters, smoke and carbon monoxide detectors
 - Mechanical, including water heaters, air conditioning, furnace, duct work, dryer vents, gas connections, and fire extinguishers
 - Exterior, including lights, doors, roofs, fences, walkways, decks, landscaping, and storage rooms
- Work Orders – Private partner companies use work orders to identify, track, and address all necessary housing repairs, including potentially unsafe and unhealthy housing conditions. Partners require residents to report all maintenance issues. Partners assign work orders to one of three categories – emergency, urgent, or routine. Partners require residents to call in all emergency work orders, and emergency calls are answered 24 hours per day. PMH representatives create work orders and contact maintenance personnel to ensure emergencies are addressed in a timely manner.
- Unexpected Displacements – Emergency or unexpected displacements occur when potentially hazardous conditions are identified and residents are moved to temporary housing. Private partner companies maintain hospitality-housing units or pay for other temporary housing when necessary.

We also interviewed DoD military housing personnel to ensure they provided adequate oversight and advocated for residents to ensure potentially hazardous conditions were addressed. We found that Military housing office personnel performed the following functions:

⁴ Items listed are highlights and not all-inclusive. The inspection checklist contains more details.

- Inspected housing units prior to occupancy to ensure that no potentially hazardous conditions were present at move-in. Military housing personnel stated that they complete an inspection checklist prior to occupancy. The checklist includes inspection requirements for the following areas.⁵
 - General Safety, including lead based paint; radon; mold/moisture control; pest management; asbestos; water; heating, ventilation, and air conditioning; and fire sprinklers.
 - Inspection criteria for both the exterior and the interior. Exterior inspection components include doors, windows, landscaping, foundations, decks, driveways, hose bibs, and electrical outlets. Interior inspections include detailed components for the kitchen, living rooms, bathrooms, bedrooms, and utility rooms. The list identifies necessary follow-up actions and overall unit inspection results. Units either pass, pass with non-health and safety condition, or fail.
- Reviewed life, health, and safety related work orders and performed necessary follow up.
- Monitored emergency or unexpected displacements.
- Used the eMH system to track and record housing unit details. However, Army and Air Force housing office personnel could not fully use eMH because they had not fully populated all housing units in the eMH system.

We toured communities with private partners and military housing officials at each of the five sites we physically visited and conducted walk-throughs of 15 vacant housing units. These units included:

- one newly constructed home;
- six residential units that were recently vacated but not yet cleaned;
- four units that were cleaned, inspected, and ready for new occupants; and
- four hospitality units that are used to house displaced residents if needed.

Partner maintenance personnel address hazardous conditions as they are reported. It would have been inappropriate for the audit team to request that a housing partner not correct a health or safety concern until we were able to visit and view the condition. Therefore, we were not able to physically visit any unsafe or unhealthy housing units. We did not identify any unsafe or unhealthy conditions in housing units ready for occupancy at the locations we visited.

⁵ Items listed are highlights and not all-inclusive. The inspection checklist contains more details.

Adverse Conditions and Effects

We reviewed multiple sources, coordinated with medical and environmental personnel, and found that the hazards listed in section 748 of the FY 2021 NDAA do have the potential to lead to associated medical conditions. The NDAA requires us to determine possible effects experienced by Military personnel and other eligible residents residing in PMH due to such exposures.

The FY 2021 NDAA defines the term “unsafe or unhealthy housing unit” as a unit of PMH in which at least one of the following hazards is present at levels exceeding national standards or guidelines:

- physiological hazards, including dampness and mold growth, lead-based paint, asbestos and manmade fibers, radiation, biocides, carbon monoxide, and volatile organic compounds;
- psychological hazards, including ease of access by unlawful intruders and lighting issues; or
- poor ventilation, safety hazards, or other similar hazards as determined by the Inspector General.⁶

We compiled and studied information from the DoD, the Centers for Disease Control (CDC), the Department of Housing and Urban Development (HUD), the Consumer Product Safety Commission (CPSC), and the Environmental Protection Agency (EPA) to determine the effects of the hazards specifically identified in the FY 2021 NDAA. The following summarizes potentially hazardous conditions and provides possible effects of residing in housing with those conditions.

Mold

Molds are living organisms that grow in damp places and mold spores are tiny particles that float through the air, according to the HUD. Exposure to damp and moldy environments may cause a variety of health effects, or none at all. Some people are sensitive to molds and, for these people, exposure to molds can lead to symptoms such as stuffy nose, wheezing, and red or itchy eyes or skin. Some people, such as those with allergies to molds or with asthma, may have more intense reactions, including fever and shortness of breath. The CDC does not recommend testing housing for mold and there are no established standards. While physicians can do testing for possible allergies to mold, no clinically proven tests can pinpoint when or where a particular mold exposure took place.

⁶ We did not identify national standards for psychological hazards, including ease of access by unlawful intruders and lighting issues.

Lead

Lead is a toxic metal found in many U.S. homes built before 1978 due to its prior use in paints. Lead is detectable in an estimated 40 percent of U.S. homes. Exposure is generally from lead dust from deteriorating paint and contaminated soil that is tracked into the house. Lead may cause a range of health problems, especially in young children. When lead is absorbed into the body, it can cause damage to the brain and other vital organs, like the kidneys, nerves, and blood. Lead may also cause behavioral problems, learning disabilities, seizures and, in extreme cases, death. Some symptoms of lead poisoning may include headaches, stomachaches, nausea, tiredness, and irritability; however, children who are lead-poisoned may show no symptoms.

Carbon Monoxide

Carbon monoxide is a poisonous gas that cannot be seen, smelled, or tasted and can be fatal at high levels. The symptoms and signs of carbon monoxide poisoning are most commonly headache, dizziness, weakness, nausea, vomiting, chest pain, and altered mental status.

Asbestos

Asbestos is a mineral with strong fibers used until the U.S. began banning asbestos in the 1970s. The EPA only recommends testing suspect materials if they are damaged (fraying, crumbling) or if one is planning a renovation that would disturb the suspect material. Asbestos is safe if it is not disturbed or does not become airborne. Individuals who breathe asbestos fibers may develop asbestos-related diseases, including asbestosis, pleural disease, lung cancer, and mesothelioma. Some of these diseases can be serious or fatal. Most people do not show any signs or symptoms of asbestos-related disease for 10 to 20 years or more after exposure, according to the CDC.

Radon

Radon is a radioactive gas. According to the EPA, radon is the leading cause of lung cancer among non-smokers and the second leading cause of lung cancer overall, responsible for approximately 21,000 deaths per year. Radioactive particles from radon gas can be trapped in lungs and those radioactive particles increase the risk of lung cancer, but it may take years before health problems appear.

Fire Safety

The CPSC data states that every year in the U.S., about 3,000 people lose their lives in residential fires. The CPSC stated that properly installed and maintained smoke detectors are considered to be one of the best and least expensive means of providing an early warning of a fire. The CPSC recommends installing smoke alarms on every level of the home, outside sleeping areas, and inside bedrooms.

Electrical Safety

Improperly installed or maintained electrical components can put residents at an increased risk of injury or death from electrical shock or fire. Electrical hazards can result from broken, frayed, or non-insulated wiring. Other possibly hazardous electrical examples include improper wiring or connections, wiring near standing water, or overloaded circuits.

Window Fall Safety

According to CPSC data, falls from windows result in an average of about eight deaths yearly for children five years or younger, while an estimated 3,300 children ages five and younger are treated each year in U.S. hospital emergency departments. On average, about 34 percent of these children required hospitalization after falling from a window.

The DoD Lacked Information to Associate Exposures With Resident Medical Information

We were not able to conduct a DoD-wide analysis of health events connected to PMH housing conditions using scientific data.⁷ This occurred because the Army and Air Force had not fully populated the eMH system with housing or resident data to enable the association of specific housing hazards to resident medical issues, despite a DoD memorandum issued in 2014 and a DoD OIG recommendation in 2019.⁸

To address the audit objective, we coordinated with DoD housing and medical officials to conduct analysis at one location that connected a few medical events to adverse housing exposures in PMH units at that location.

⁷ Scientific data includes medical diagnosis codes, medical encounter data, and medical records.

⁸ In DoD OIG Report No. DoDIG-2019-056, we recommended the Office of the Assistant Secretary of Defense for Sustainment coordinate with the enterprise Military Housing Program Management Office to ensure the development and implementation of detailed procedures for Military Department personnel to input privatized housing records into the enterprise Military Housing system, which would allow all Military Departments to comply with the "Enterprise Military Housing Information Management System" memorandum, dated April 16, 2014.

However, until the DoD adequately collects and stores housing inventory, resident information, and housing condition records, DoD officials will not be able to connect medical events, on a DoD-wide basis, that occurred because of unsafe or unhealthy conditions in privatized military housing. We detailed the information needed for a DoD-wide analysis of the association between medical events and housing conditions in the sections below.

Housing Inventory

Navy and Marine Corps housing officials have fully populated their inventory of PMH units in the eMH. However, neither the Army nor the Air Force had fully populated their inventory of PMH units in the eMH despite the requirement in the Under Secretary of Defense for Acquisition, Technology, and Logistics Memorandum “Enterprise Military Housing Information System,” dated April 16, 2014. As of June 2, 2021, the majority of the Army and Air Force PMH units were not populated in the eMH. Specifically, according to an eMH program official, the eMH inventory showed the following.

- 36,517 of 89,314 (41 percent) Army PMH units were reported in the eMH. According to an Army Housing Division official, the Army’s tentative goal was to have all inventory into the eMH by the 2nd quarter of FY 2022.
- 13,916 of 54,848 (25 percent) Air Force PMH units were in the eMH. An Air Force housing official stated that the projected completion date for inventory entry into the eMH was December 2022.

The eMH program manager stated that the Army and Air Force had not populated their inventory, at least in part, because “there was no established timeline as the effort requires significant labor to create real property records for tens of thousands of privatized inventory.”

However, based on the information provided by the eMH program manager, the Army and Air Force made progress populating the eMH housing inventory during the audit. As of October 27, 2021, the Army increased its inventory population in the eMH from 41 percent to 68 percent, as shown in Table 3. The Air Force increased its inventory population in the eMH from 25 percent to 59 percent, as shown in Table 3.

Table 3. Progress Populating Privatized Military Housing Inventory in the eMH

Military Service	Housing Units	Date	Housing Units in the eMH	Percent in the eMH
Army	89,314	June 2, 2021	36,517	40.89%
		October 27, 2021	61,393	68.74%
Air Force	54,848	June 2, 2021	13,916	25.37%
		October 27, 2021	32,215	58.74%

Source: MHPI Partner Companies, Housing Units as of April 30, 2021, and Housing Units from the eMH program official.

As a result of the PMH units not being populated into the eMH on a timely basis, the DoD did not have oversight of the housing inventory or the ability to maintain information related to the units.

Therefore, we recommend the DASD-H direct the Army and Air Force to fully populate their entire inventory of PMH units in the eMH by a mandatory deadline.

Housing Condition Information

The eMH system did not have a process established to track, identify, and measure the housing hazards. However, according to an eMH program official, the DoD had an ongoing effort to develop an environmental health and safety module in the eMH to track health and safety hazards in PMH. An eMH program official stated that the environmental health and safety module was updated and now provides a risk rating from housing inspections, which were based on statutes, regulations, codes, national standards, and Service-specific policies. Having this additional information on housing conditions could help DoD personnel associate housing conditions to medical events.

The eMH program official added that another update, scheduled for February 2022, would include search and reporting capabilities, as well as refinement of risk rating logic, and lab data for asbestos, lead paint, and radon assessments. Finally, the eMH program official stated that the environmental health and safety module would eventually be able to provide visibility of data trends and dashboards for the risk ratings at the enterprise, region, and installation levels.

As a result, until the module is operational DoD officials, will not have readily-available access to the housing records that could help associate medical events to PMH conditions.

Therefore, we recommend that the DASD-H track the implementation of the environmental health and safety module and necessary updates to the eMH to ensure completion in February 2022 as planned.

Resident Information

Although the Navy and Marine Corps populated the eMH with 10 years of resident information, Army and Air Force housing officials had not yet populated current residents in the eMH and did not have a plan to populate past residents. Army and Air Force housing officials can only populate resident data once the housing unit inventory is populated. Resident information is necessary to connect health events to potentially hazardous conditions in PMH units.

Until the Army and Air Force complete their population of housing inventory in the eMH, the DoD cannot upload resident information associated with each housing unit in the eMH, and therefore will be unable to use the eMH to support detailed analysis of health and safety conditions in PMH.

Therefore, we recommend that the DASD-H require the Army and Air Force to upload current and prior resident information associated with each PMH unit once the inventory is complete.

Association of Medical Events to Unsafe or Unhealthy Housing

Based on the lack of housing inventory, past resident information, and housing condition information in the eMH we were unable to complete a DoD-wide analysis of health events connected to unsafe or unhealthy housing conditions. However, we did conduct a review that included 5,291 individuals that resided at a Navy location because it had sufficient historical housing inventory and resident information.

DHA officials provided all available medical data for individuals that resided at the location, which included medical events that occurred before or after the individuals lived in PMH. To obtain the medical data, the DHA officials used medical codes associated with hazards listed in section 748 of the FY 2021 NDAA (see Appendix B). According to DHA officials, they used the available medical codes to identify that 21 individuals had 31 medical events that were potentially related to exposure to carbon monoxide, mold, or radon, as shown in Table 4.

Table 4. DHA Analysis of Medical Events Using Medical Codes

Medical Condition	Potential Exposure	Medical Events ¹	Individuals
Carbon Monoxide Poisoning	Carbon Monoxide	11	10
Asthma	Mold	7	3
Allergic Fungal Rhinosinusitis ²	Mold	6	5
Lung Cancer	Radon	7	3
Total		31	21

Source: Defense Health Agency – Defense Medical Surveillance System.

- 1 Medical events include a count of each calendar day the individual was seen for either inpatient or outpatient care.
- 2 According to Cedar Sinai Medical Center, allergic fungal sinusitis (AFS) is a common type of fungal infection in the sinuses. The infecting fungi are found in the environment and cause an allergic reaction, which results in thick fungal debris, sticky mucus, and blockage of the infected sinus.

Out of the 21 individuals with 31 medical events potentially related to the exposures to mold, radon, and carbon monoxide, we found that 12 individuals did not have any indication of medical events during their time living in PMH, but 9 individuals had medical events while they lived in a PMH unit.

- 4 individuals were treated in the purchased care system (medical care provided by civilian providers) and the DoD did not have access to those detailed medical records without prior approval and consent from the individual patient.
- 5 individuals had medical events where medical records were available in the direct care system.
 - 2 of the individuals' medical records did not include any indication of an exposure from a housing unit.
 - 3 of the individuals' medical records confirmed that their medical events were associated with the housing conditions.

The three individuals were a part of an event on March 9, 2014, where an individual called 911 and the fire department found elevated carbon monoxide levels in the housing unit and an adjoining unit. The adult whose carbon monoxide detector alerted him to the danger and two minors in an adjoining unit were transported, treated, and recovered from the carbon monoxide exposure. According to the eMH system housing condition records, maintenance personnel found that a water heater vent cap was damaged. The maintenance personnel secured the vent caps to prevent the vent openings from being blocked again and the fire department cleared the units for occupancy.

If the records were available for the remaining medical events, determining an association may be difficult. An exposure to radon may take years to develop into a medical condition and although mold has the potential to cause health problems, the CDC does not recommend testing a residence for mold. In addition, while physicians can test for allergies to mold, there are no tests that can pinpoint where the exposure took place. A DHA official noted a concern with the data provided by DHA in Table 4 and stated:

Concern that readers may interpret that the DoD knows the quantity of data points which may allow determination of association and or causation between exposure and a medical condition. This may allow individuals to assume that given more information that a direct association or causation determination may be reachable for all of the listed hazards and medical conditions, when in reality such determinations are very complex and may not be possible in some circumstances.

Summary

It was possible to associate medical events with a potential exposure to an unsafe or unhealthy condition in a housing unit using DoD medical data, in coordination with housing and resident information. However, the DoD lacked sufficient information to determine the association of adverse housing exposures with the occurrence of a medical event across the Military Services at the time of the audit.

Until DoD officials ensure resident information and housing records are available in the eMH system, a DoD-wide analysis of the association between medical events caused by an exposure to an unsafe or unhealthy condition in PMH housing will not be possible.

In addition, because DoD officials did not populate the eMH with sufficient information to complete a DoD-wide study, they were unable to effectively monitor and ensure the health and safety of Service members and their families. The lack of complete and accurate information in the eMH system hindered the DoD's ability to make important real-time decisions to enhance Service member and family safety and to make sound housing program and investment decisions.

Recommendations, Management Comments, and Our Response

Recommendation 1

We recommend that the Deputy Assistant Secretary of Defense for Housing:

- a. Direct the Army and Air Force to fully populate their entire inventory of privatized military housing units in the enterprise Military Housing system by a mandatory deadline.**

Deputy Assistant Secretary of Defense for Housing Comments

The Deputy Assistant Secretary of Defense for Housing agreed with the recommendation, stating she will direct the Army and Air Force to include all privatized military housing units on their installations in the eMH system by a mandatory deadline of September 30, 2022. The Deputy Assistant Secretary also stated that both the Army and Air Force are actively working to populate privatized housing information in the eMH system. Specifically, the Deputy Assistant Secretary stated that the Army has uploaded nearly 94 percent and the Air Force has uploaded 82 percent of the privatized housing information.

Our Response

Comments from the Deputy Assistant Secretary of Defense for Housing addressed all specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we verify that the Army and Air Force have fully populated the entire inventory of privatized military housing units on their installations in the eMH system.

- b. Track the implementation of the environmental health and safety module and necessary updates to the enterprise Military Housing system to ensure completion in February 2022 as planned.**

Deputy Assistant Secretary of Defense for Housing Comments

The Deputy Assistant Secretary of Defense for Housing partially agreed with the recommendation, stating that she agrees the Department should track the implementation of the environmental health and safety module in the eMH system. However, the Deputy Assistant Secretary stated that the Department did not agree to ensure completion by February 2022 as previously estimated by the eMH program manager, because the module is not scheduled for release until April 2022. Finally, the Deputy Assistant Secretary stated the Department expects the environmental health and safety module and associated necessary updates to the eMH system to be final by the end of FY 2023.

Our Response

Comments from the Deputy Assistant Secretary of Defense for Housing addressed all specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we verify that the environmental health and safety module and necessary updates to the eMH system are fully implemented.

- c. **Require the Army and Air Force to upload current and prior resident information associated with each privatized military housing unit once the inventory is complete.**

Deputy Assistant Secretary of Defense for Housing Comments

The Deputy Assistant Secretary of Defense for Housing partially agreed with the recommendation, stating that the Department agreed that once the Army and Air Force have fully populated their respective privatized housing inventories in the eMH system, they each should be required to upload available data they have, or can reasonably obtain, regarding current and prior residents of privatized housing on their installations into the eMH system. However, the Deputy Assistant Secretary also stated that this could only be accomplished to the extent that such personally identifiable information data handling and storage fully complies with DoD policies and associated requirements and to the extent that the historic data is available or obtainable.

Our Response

Comments from the Deputy Assistant Secretary of Defense for Housing addressed all specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we verify that the Army and Air Force populated the eMH system with the available and obtainable information for current and prior residents.

Appendix A

Scope and Methodology

We conducted this performance audit from April 2021 through April 2022 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.

We reviewed housing documents, met with advocacy networks, health authorities within the DoD, the Office of the Secretary of Defense level personnel, housing office personnel, eMH program managers, partner companies, operating companies, conducted extensive data analysis, visited housing locations for each branch of the Military, and worked with Military housing offices. We reviewed all available sources for information on housing conditions that may result in an unsafe, unhealthy, or both, housing environment. These sources included the DoD and private partner reporting, maintenance records, health records, investigations, DoD OIG hotline cases, testimony before Congress, news reports, and reports from and discussions with advocacy organizations.

We have included a detailed methodology related to the individual objectives within the FY 2021 NDAA:

Objective 1. Determine the percentage of units of privatized military housing that are considered by the Inspector General to be unsafe or unhealthy housing units and visit at least one military installation of the Department of Defense from each of the Army, Navy, Air Force, and Marine Corps to verify that such units are unsafe or unhealthy housing units;

We used multiple online resources and coordinated with the DASD-H, Military Department Housing officials, the privatized housing partner companies, many operational level installations, and environmental personnel to determine the percentage of units of privatized military housing that were unsafe or unhealthy. Specifically, we reviewed information from the multiple sources that follow to identify the number of houses and we used partner company work order data to conduct a statistical sample of the conditions in the housing units with open work orders.

- Military Department FY 2021 Budget Estimates," Military Housing Privatisation Initiative (MHPI), FH-6 Exhibit"
- Deputy Assistant Secretary of Defense for Housing estimates

- Military Department reports on housing inventory
- Privatized housing partner companies housing inventory and work order information
- Statisticians for the statistical sample and projection

We also coordinated with Military Department personnel and privatized housing partner companies to follow up on the status of work orders and to conduct site visits. We did not visit each of the 81 housing locations and inspect each of the 211,826 units due to amount of time and level of resources that would have required. Instead, we conducted a statistical sample of housing units that had at least one open work order as of June 30, 2021, to determine the percentage of PMH units that had a condition that could potentially be unsafe or unhealthy.

Additionally, we conducted site visits at Fort Belvoir, Virginia; Eglin Air Force Base, Florida; Naval Air Station Pensacola, Florida; Naval Air Station Whiting Field, Florida; and Marine Corps Base Quantico, Virginia. We did not enter PMH units that were occupied due to privacy concerns. We toured units that were unoccupied which would allow us to ensure that examples of housing units that were ready for occupancy did not have unsafe or unhealthy conditions. Our travel occurred in the fall of 2021 was limited due to the coronavirus disease–2019 environment. We did not identify any unsafe or unhealthy conditions in housing units ready for occupancy at the locations we visited. We were not able to physically visit any unsafe or unhealthy housing units. Partner maintenance personnel are required to address hazardous conditions as they are reported. It would have been inappropriate for the audit team to request that a housing partner not correct a health or safety concern until we were able to visit and view the condition.

Objective 2. Study the adverse exposures of eligible individuals that relate to residing in an unsafe or unhealthy housing unit and the effect of such exposures on the health of such individuals.⁹

⁹ The FY 2021 NDAA defined the term “unsafe or unhealthy housing unit” as a unit of PMH in which is present, at levels exceeding national standards or guidelines, at least one of the following hazards:

- physiological hazards, including dampness and mold growth, lead-based paint, asbestos and manmade fibers, radiation, biocides, carbon monoxide, volatile organic compounds, infectious agents, fine particulate matter;
- psychological hazards, including ease of access by unlawful intruders, and lighting issues; or
- poor ventilation, safety hazards, or other similar hazards as determined by the Inspector General.

We used multiple online resources and coordinated with medical and environmental personnel to determine if the housing hazards listed in the FY 2021 NDAA have the potential to lead to medical conditions. Specifically, we reviewed information available through Federal agencies related to the hazard and corresponding exposure, which include the:

- Centers for Disease Control and Prevention (CDC)
- Environmental Protection Agency (EPA)
- Consumer Product Safety Commission (CPSC)
- Housing and Urban Development (HUD)
- National Fire Protection Association (NFPA)
- National Institutes of Health (NIH)

We also coordinated with an Occupational Safety and Health official within the Office of the Assistant Secretary of Defense (Readiness), to obtain guidance related to the housing conditions and received an unsolicited compilation of hazard guidance from the privatized housing partners. We coordinated with DHA officials regarding the hazards listed in the FY 2021 NDAA to determine what types of diagnosis codes could indicate potentially hazardous housing conditions (see Appendix B).

Objective 3. Determine, to the extent permitted by available scientific data, the association between such adverse exposures and the occurrence of a medical condition in eligible individuals residing in unsafe or unhealthy housing units and provide quantifiable data on such association.

We coordinated with DHA officials, eMH program officials, and local Military Health Clinic officials to identify data that would associate medical conditions with exposures to unsafe or unhealthy housing units.

eMH Records. We coordinated with eMH program officials, as well as representatives from the Army and Air Force regarding the status of the privatized housing inventory, resident information, and the housing condition documentation.

Medical Codes. We worked with DHA personnel including a senior epidemiologist, as well as officials from the Centralized Clinical Analytics and Evaluation Functional Capability and Occupational and Environmental Health Division. DHA officials internally coordinated to develop a list of medical codes associated with the hazards in the FY 2021 NDAA. The DHA Coding Branch provided a list of ICD-9 and ICD-10 codes to the Armed Forces Health Surveillance Division that were a translation of the medical conditions list that was created by

the DoD Occupational Medicine Working Group based upon the hazards and other requested medical conditions that we provided to the working group. See Appendix B for the list of hazards and the corresponding medical codes.

Medical Data. To obtain medical data for the study, DHA officials used the Defense Medical Surveillance System, which contains medical administrative information. The DHA officials obtained supplemental medical data through the Military Health System Data Repository and General Inquiry of Defense Eligibility Enrollment Reporting System.

Medical Records. During the study, we also received input from the DHA General Counsel regarding HIPAA compliant authorizations being required for access to medical records in the purchased care system. We received the medical records within the DoD health care system from the DHA officials, who requested the medical notes and charts from the local DoD medical officials (Navy Medicine Readiness and Training Command).

Housing Records. During the study, to obtain housing records that may provide an association between a medical event and a housing condition, we coordinated with an eMH program official to obtain complaint records within the eMH system for the residents that had medical events.

Use of Computer-Processed Data

We used housing inventory data from the partner companies' property management systems to perform this audit. To test the reliability and validate the accuracy of the data we held discussions with personnel in the partner companies and DoD officials with knowledge of the information. We identified multiple sources of housing inventory data but found that the inventory varied slightly over time and several sources were solely estimates, outdated, or documented to be incorrect. We determined that the housing inventory was sufficient and appropriate for the purposes of our audit despite being unable to certify that it contained no errors.

Use of Technical Assistance

During the audit, we coordinated with statisticians from our Quantitative Methods Division and the DoD Hotline. The team selected a random sample of 500 from the 28,759 housing units with open work orders as of June 30, 2021. The personnel from the quantitative methods division provided the statistical projection. The DoD Hotline provided allegations and investigations related to the scope of this audit.

Prior Coverage

During the last 5 years, the Government Accountability Office (GAO) and the DoD Office of Inspector General (DoD OIG) issued four reports discussing health and safety in Privatized Military Housing.

Unrestricted GAO reports can be accessed at <http://www.gao.gov>. Unrestricted DoD OIG reports can be accessed at <http://www.dodig.mil/reports.html>.

GAO

Report No. GAO-20-281, "Military Housing: DOD Needs to Strengthen Oversight and Clarify Its Role in the Management of Privatized Housing," March 2020

The GAO found that Military Departments have authority to conduct oversight of the condition of private housing but those efforts are limited in scope. Examples include annual interior walk-throughs are limited to just a few homes at some installations, which many not comprehensively reflect the condition of the housing units at those installations.

DoD OIG

Report No. DODIG-2020-086, "Followup Audit on Department of Defense and Military Department Corrective Actions Taken in Response to Department of Defense Office of Inspector General Reports on Military Housing," June 5, 2020

This audit found that although the DoD improved military housing with the implementation of corrective actions for 91 of 110 recommendations from eight DoD OIG inspection reports, additional improvements are needed to ensure that Service members and their families have access to safe housing.

Report No. DODIG-2020-082, "Evaluation of the DoD's Management of Health and Safety Hazards in Government-Owned and Government-Controlled Military Family Housing," April 30, 2020

At each of the eight military installations visited, the evaluation found deficiencies in the management of health and safety hazards in GO-GC military family housing. Specifically, they found systemic deficiencies in the management of lead-based paint, asbestos-containing material, and radon.

Report No. DODIG-2019-056, "Accounting and Financial Reporting for the Military Housing Privatization Initiative," February 12, 2019

This audit found that the Defense Finance and Accounting Service–Indianapolis personnel did not properly account for and summarize MHPI transactions in DoD financial systems. MHPI program and financial management personnel did

not identify and correct discrepancies between privatized housing inventories or populate the enterprise Military Housing system with all privatized housing records. MHPI program and financial management personnel need to improve funds management and privatized housing inventory management for MHPI projects.

Appendix B

List of Medical Codes Linked to Hazard or Exposure

We provided Defense Health Agency (DHA) officials with a list of environmental hazards, based on the hazards listed in the FY 2021 NDAA.¹⁰ The DHA officials then used the list of hazards to develop a list of medical codes based on the health effects of the hazard condition. DHA officials used these medical codes to obtain medical data for the association review to determine if there was an association between PMH conditions and medical events.

Table 5. List of Medical Codes Used for the Association Review

Hazard / Potential Exposure	Medical Condition	ICD-9	ICD-10
1. Mold	asthma	493.00 – 493.99 Asthma	J45.0 – J45.998 Asthma
	allergic fungal rhinosinusitis	477.8 Allergic rhinitis due to other allergen	J30.89 Other allergic rhinitis
	allergic bronchopulmonary aspergillosis	117.9 Other and unspecified mycoses	B49 Unspecified mycosis
		518.6 Allergic bronchopulmonary aspergillosis	B44.81 Allergic bronchopulmonary aspergillosis
	hypersensitivity pneumonitis	495.9 Unspecified allergic alveolitis and pneumonitis	J67.9 Hypersensitivity pneumonitis due to unspecified organic dust
		495.7 Ventilation pneumonitis	J67.7 Air conditioner and humidifier lung
2. Lead-based paint, lead in drinking water	abnormal lead level in blood	790.6 Other abnormal blood chemistry	R78.71 Abnormal lead level in blood
	lead poisoning	984.9 Toxic effect of unspecified lead compound	T560x1* Toxic Effect Of Lead And Its Compounds, Accidental (Unintentional)), T560x4* Toxic Effect Of Lead And Its Compounds, Undetermined
		984.8 Toxic effect of other lead compounds	
		984.1 Toxic effect of organic lead compounds	
		984.0 Toxic effect of inorganic lead compounds	

¹⁰ List of Hazards: (1) Mold, (2) Lead-based paint, lead in drinking water, (3) Asbestos, (4) Radon, (5) Pesticides such as anti-cholinergic insecticides, rat poison, etc., (6) Carbon monoxide, (7) Volatile organic compounds, (8) Infectious agents, and (9) Other (Glycogen Storage Disease, Raynaud's Disease, and Cancer).

Table 5. List of Medical Codes Used for the Association Review (cont'd)

Hazard / Potential Exposure	Medical Condition	ICD-9	ICD-10
3. Asbestos	mesothelioma	163.9 Malignant neoplasm of pleura, unspecified	C45* Mesothelioma
	asbestosis	501 Asbestosis	J61 Pneumoconiosis due to asbestos and other mineral fibers
			J92.0 Pleural plaque with presence of asbestos
4. Radon	lung cancer	162* Malignant neoplasm of bronchus and lung	C34*.9x Malignant neoplasm of bronchus lung
5. Pesticides such as anti-cholinergic insecticides, rat poison, etc.	organophosphate and carbamate poisoning	989.3 Toxic effect of organophosphate and carbamate	T60.0X1* Toxic effect of organophosphate and carbamate insecticides, accidental (unintentional)
			T60.0X4* Toxic effect of organophosphate and carbamate insecticides, undetermined
	accidental ingestion of rodenticide/pesticide	989.4 Toxic effect of other pesticides, not elsewhere classified	T60.1X1* Toxic effect of halogenated insecticides, accidental (unintentional)
			T60.1X4* Toxic effect of halogenated insecticides, undetermined
			T60.2X1* Toxic effect of other insecticides, accidental (unintentional)
			T60.2X4* Toxic effect of other insecticides, undetermined
			T60.3X1* Toxic effect of herbicides and fungicides, accidental (unintentional)
			T60.3X4* Toxic effect of herbicides and fungicides, undetermined
			T60.4X1* Toxic effect of rodenticides, accidental
			T60.4X4* Toxic effect of rodenticides, undetermined
			T60.8X1* Toxic effect of other pesticides, accidental (unintentional)
			T60.8X4* Toxic effect of other pesticides, undetermined
			T60.91* Toxic effect of unspecified pesticide, accidental (unintentional)
			T60.94* Toxic effect of unspecified pesticide, undetermined

Table 5. List of Medical Codes Used for the Association Review (cont'd)

Hazard / Potential Exposure	Medical Condition	ICD-9	ICD-10
6. Carbon monoxide	carbon monoxide poisoning	986 Toxic effect of carbon monoxide	
		E868.1 Accidental poisoning by other/ unspecified utility gas, or CO from combustion of such gas	T58.11* Toxic effect of carbon monoxide from utility gas, accidental (unintentional)
		E981.8 Poisoning other utility gas, undetermined whether accidentally or purposely inflicted	T58.14* Toxic effect of carbon monoxide from utility gas, undetermined
		E868.3 Accidental poisoning by CO from incomplete combustion of other domestic fuels	T58.2X1* Toxic effect of carbon monoxide from incomplete combustion of other domestic fuels, accidental (unintentional)
			T58.2X4* Toxic effect of carbon monoxide from incomplete combustion of other domestic fuels, undetermined
		E868.8 Accidental poisoning by CO from other sources	T58.8X1* Toxic effect of carbon monoxide from other source, accidental (unintentional)
		E982.1 Undetermined cause of poisoning by other CO source	T58.8X4* Toxic effect of carbon monoxide from other source, undetermined
		E868.9 Accidental poisoning by CO from an unspecified source	T58.91* Toxic effect of carbon monoxide from unspecified source, accidental (unintentional)
			T58.94* Toxic effect of carbon monoxide from unspecified source, undetermined
	E890.2 Other smoke and fumes from conflagration in a private dwelling; includes "CO from conflagration in private building", E891.2 Other smoke and fumes from conflagration in other building; includes "CO from conflagration in building or structure"		X00.1XX* Exposure to smoke in uncontrolled fire in building or structure
	E988.1 Injury by burns or fire, undetermined whether accidentally or purposely inflicted		Y26.078* Exposure to smoke, fire and flames, undetermined intent

Table 5. List of Medical Codes Used for the Association Review (cont'd)

Hazard / Potential Exposure	Medical Condition	ICD-9	ICD-10
		987.0 Toxic effect of liquid petroleum gases	T59.891* Toxic effect of other specified gases, fumes and vapors, accidental (unintentional)
			T59.894* Toxic effect of other specified gases, fumes and vapors, undetermined
			T59.811* Toxic effect of smoke, accidental (unintentional)
			T59.814* Toxic effect of smoke, undetermined
		987.9 Toxic effect of unspecified gas, fume, or vapor	T59.91* Toxic effect of unspecified gases, fumes and vapors, accidental (unintentional)
			T59.94* Toxic effect of unspecified gases, fumes and vapors, undetermined
		E867 Accidental poisoning by gas distributed by pipeline, or CO from combustion of such gas	
		E868.0 Accidental poisoning by liquefied petroleum gas (LPG) in mobile containers, or CO from combustion of such gas	
		E869.9 Accidental poisoning by other gases or vapors, unspecified	
		E981.0 Poisoning by liquefied petroleum gas distributed by pipeline, undetermined whether accidentally or purposely inflicted	
		E981.1 Poisoning by liquefied petroleum gas distributed in mobile containers, undetermined whether accidentally or purposely inflicted	
		987.1 Toxic effect of other hydrocarbon gas	

Table 5. List of Medical Codes Used for the Association Review (cont'd)

Hazard / Potential Exposure	Medical Condition	ICD-9	ICD-10
7. Volatile organic compounds (e.g., formaldehyde)	asthma exacerbation	493.92 Asthma, unspecified, (acute) exacerbation	J45.901 Unspecified asthma, (acute) exacerbation
	toxic effects of formaldehyde	989.89 Toxic effect of other substance chiefly nonmedicinal as to source not elsewhere classified	T592X1* Toxic Effect Of Formaldehyde, Accidental (Unintentional), T592X4* Toxic Effect Of Formaldehyde, Undetermined
8. Infectious agents	Legionnaire's disease	482.84 Pneumonia due to Legionnaire's disease	A48.1 Legionnaire's disease
9. Other	Glycogen Storage Disease	271.0 Glycogen Storage Disease (Glycogenosis)	E74.00 Glycogen Storage Disease unspecified
	Raynaud's Disease	443.0 Raynaud's syndrome	I73.0* Raynaud's syndrome
	Cancer	140-239 Malignant Neoplasm	C00*-C96* Malignant Neoplasm; D00*-D49* In situ, benign and uncertain behavior neoplasm

Source: DoD Occupational Medicine Working Group and Defense Health Agency Coding Branch.

Appendix C

Statistical Sample

Population

The total number of PMH units is 211,826. Among them, the team identified 28,759 units that had active work order as of June 30, 2021. These units had 49,334 active work orders.

Sample Plan and Parameters

The team, with support from Quantitative Methods staff, and taking into consideration the language of the Congressional request, determined that the sampling unit would be a housing unit and all the active work orders associated with that housing unit. Based on the health and safety issues involved, the audit team chose a sample size of 500 housing units for testing. The audit team used a simple random sample (SRS) without replacement selection methodology to draw a sample of 500 housing units for testing. The team used the RAND() function in MS Excel to randomize the housing unit population before selecting the samples for audit.

Sample and Results

Among the sample of 500 housing units, we identified one unit with health or safety issues. Based on the sample results we calculated the following statistical projections at the 99-percent confidence level. The lower bound was 0 percent (0), the point estimate was 0.2 percent (58), and the upper bound was 0.8 percent (233). Since the lower bound was negative, the lower bound of the number of errors in the projection was replaced to zero.

Management Comments

Deputy Assistant Secretary of Defense for Housing



ENERGY, INSTALLATIONS,
AND ENVIRONMENT

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MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR EVALUATIONS AND PROGRAMS, COMBATANT COMMANDS, AND OVERSEAS CONTINGENCY OPERATIONS, OFFICE OF THE DEPARTMENT OF DEFENSE INSPECTOR GENERAL

SUBJECT: Response to DoD Inspector General Draft Report "Audit of Medical Conditions of Residents in Privatized Military Housing," Project No. D2021-D000AX-0105.000

This memorandum provides the Department's response to the recommendations for the Deputy Assistant Secretary of Defense for Housing contained in the subject draft report.

Recommendation 1.a.

Deputy Assistant Secretary of Defense for Housing direct the Army and Air Force to fully populate their entire inventory of privatized military housing (PMH) units in the eMH by a mandatory deadline.

Response: CONCUR. The Deputy Assistant Secretary of Defense for Housing will direct the Army and Air Force to include all privatized military housing (PMH) units on their installations within the DoD enterprise Military Housing (eMH) system by a mandatory deadline of September 30, 2022. Both the Department of the Army (Army) and the Department of the Air Force (DAF) are actively working to complete populating privatized housing in eMH; the Army has uploaded nearly 94 percent and the DAF has uploaded 82 percent, and both expect their remaining privatized housing units to be uploaded in eMH in fiscal year 2022.

Recommendation 1.b.

Deputy Assistant Secretary of Defense for Housing track the implementation of the environmental health and safety module and necessary updates to the eMH management system to ensure completion in February 2022.

Response: PARTIALLY CONCUR. While the Department agrees that the Deputy Assistant Secretary of Defense for Housing should track the implementation of the environmental health and safety (EHS) module in the eMH information management system and associated necessary updates to the eMH system, it does not concur with February 2022 as the date for completion of either the EHS module or the necessary eMH updates. The EHS module is scheduled for release in April 2022, not February 2022 as stated in the subject draft report, and an additional release(s) will be necessary to complete the integration of region and enterprise level data, as well as reports and dashboards required by the Military Departments. The Department expects the EHS module and associated, necessary updates to the eMH information management system to be final by the end of FY 2023.

Deputy Assistant Secretary of Defense for Housing (cont'd)

Recommendation 1.c.

Deputy Assistant Secretary of Defense for Housing require the Army and Air Force to upload current and prior resident information associated with each PMH unit once the inventory is complete.

Response: PARTIALLY CONCUR. The Department agrees that, once the Army and DAF have fully populated their respective privatized housing inventories in eMH, they should each should be required to upload available data they have, or can reasonably obtain, regarding current and prior residents of privatized housing on their installations into eMH, but only to the extent that such PII data handling and storage fully complies with DoD policies and associated requirements for the handling and storage of PII in a DoD system of records. The Department does not agree that this recommendation is capable of fully implementation for a number of reasons, to include the fact that not all of the historic data is available, and this requirement involves significant issues with regards to the handling and storage of PII in a DoD system of records, to include PII data for individuals who are not military members (including private citizens with no DoD affiliation). Neither the Army nor DAF has data on past residents who lived in privatized housing on their installations. While the Army and DAF could attempt to obtain this data from the private sector entities (i.e., Landlords) who own and operate privatized housing on their installations, this would raise significant PII issues for all parties (the Landlords, the Army, and DAF). In addition, whether the Landlords would favorably respond to such a request is outside the control of either Army or DAF. The landlords have no legal obligation to provide such data and considering the time, resources, and associated costs to support such a request, their willingness to do so seems unlikely.

Please contact [REDACTED]

[REDACTED], if additional information is needed.

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Patricia L. Coury
Deputy Assistant Secretary of Defense
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Acronyms and Abbreviations

CDC	Centers for Disease Control and Prevention
CO	Carbon Monoxide
CPSC	Consumer Product Safety Commission
DASD-H	Deputy Assistant Secretary of Defense for Housing
DHA	Defense Health Agency
eMH	enterprise Military Housing
EPA	Environmental Protection Agency
GAO	Government Accountability Office
HHS	Department of Health and Human Services
HUD	Department of Housing and Urban Development
MHPI	Military Housing Privatization Initiative
NFPA	National Fire Protection Association
NIH	National Institutes of Health
PMH	Privatized Military Housing

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