



September 2019

Disaster Response

Federal Assistance and Selected States and Territory Efforts to Identify Deaths from 2017 Hurricanes



Highlights

Highlights of [GAO-19-486](#), a report to Congressional Requesters

Why GAO Did This Study

In 2017, three major hurricanes— Harvey, Irma, and Maria—struck Texas, Florida, and Puerto Rico, causing severe damage and deaths. After Hurricane Maria, questions were raised about how deaths related to the hurricane were identified and documented in Puerto Rico. States and local jurisdictions are responsible for identifying and documenting disaster-related deaths. Additionally, the federal government may play a role in helping to respond to disaster-related deaths, by, for example, providing Funeral Assistance for eligible funeral costs.

GAO was asked to review Puerto Rico’s process for identifying and documenting deaths related to Hurricane Maria, as well as other states’ related processes, and federal agencies’ assistance in this process. This report discusses, among other things, (1) how Florida, Texas, and Puerto Rico identified and documented deaths related to the 2017 hurricanes, and any challenges they experienced, (2) the support selected federal agencies provided to Florida, Texas, and Puerto Rico involving disaster-related deaths, and (3) the number of Funeral Assistance applications FEMA received, approved, and denied for the 2017 hurricanes.

GAO reviewed relevant laws and procedures from Florida, Texas, and Puerto Rico; and FEMA Funeral Assistance procedures and data for the 2017 hurricanes, as of March 2019, the most recent data available. GAO also interviewed state, territory, and federal officials about their efforts to address deaths related to the 2017 hurricanes.

View [GAO-19-486](#). For more information, contact Chris P. Currie at (404) 679-1875 or curriec@gao.gov

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What GAO Found

Florida, Texas, and Puerto Rico reported that they followed their local processes to identify and document deaths related to hurricanes Harvey, Irma, and Maria in 2017. In Florida and Texas, medical examiners or other personnel were to complete death certificates. As of July 2019, Florida and Texas reported 84 and 94 deaths that were related to hurricanes Irma and Harvey, respectively. In Puerto Rico, physicians or medical officers were to complete death certificates, but in cases where cause of death was unknown, medical examiners at a central facility in San Juan completed the certificate. Florida and Texas officials told GAO the hurricanes did not impact their capacities to complete death certificates. However, Puerto Rico officials stated that damaged roads and power outages led to delays and impacted their ability to identify and document deaths related to Hurricane Maria. Puerto Rico officials initially reported 65 deaths in December 2017 directly related to Maria. Subsequently, because disruptions from Hurricane Maria made it difficult for Puerto Rico to identify the number of hurricane-related deaths, Puerto Rico commissioned a study by George Washington University on the number of observed deaths compared to expected deaths had the hurricane not occurred. The study estimated 2,975 excess deaths due to the hurricane as of August 2018, which is Puerto Rico’s current official death count.

Federal agencies—the Department of Homeland Security’s Federal Emergency Management Agency (FEMA), and the departments of Health and Human Services, Veteran Affairs, and Defense—supported Puerto Rico by providing cold storage equipment and other resources to help with disaster-related deaths. Florida and Texas did not need similar support as they did not face similar challenges as Puerto Rico.

FEMA approved a total of 976 out of 4,802 Funeral Assistance applications in Florida, Texas, and Puerto Rico, as of March 2019 (see table).

Information on Funeral Assistance in Florida, Texas, and Puerto Rico for Hurricanes Irma, Harvey, and Maria in 2017, as of March 2019

	Applications received	Applications approved	Applications pending	Applications denied ^a	Amount awarded (\$)
Florida (Irma)	454	64	5	385	252,776
Texas (Harvey)	1,941	55	0	1,886	311,575
Puerto Rico (Maria)	2,403	855	16	1,532	2,053,104
Puerto Rico (Irma)	4	2	0	2	4,350
Total	4,802	976	21	3,805	2,621,805

Source: GAO analysis of Federal Emergency Management Agency data. | [GAO-19-486](#)

Note: These data are not proxies for disaster-related death counts because, among other things, one application may represent more than one deceased person, or may be for a disinterment, or an individual who may qualify may choose not to apply.

^aFor Texas, the number of denied applications includes those that lacked a valid claim (e.g. no disaster-related death), whereas for Florida and Puerto Rico, such applications were categorized as “closed” rather than as denied.



GAO incorporated technical comments from federal agency, state and U.S. territory officials, and academic institutions, as appropriate.

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Abbreviations

Bureau	Bureau of Forensic Sciences
CDC	Centers for Disease Control and Prevention
Commission	Florida Medical Examiners Commission
ESF	Emergency Support Function
DHS	Department of Homeland Security
DOD	Department of Defense
FEMA	Federal Emergency Management Agency
GW	George Washington University Milken Institute School of Public Health
Harvard	Harvard University
HHS	Department of Health and Human Services
HHS Office of the Assistant Secretary	HHS Office of the Assistant Secretary for Preparedness and Response
Penn State	Pennsylvania State University and the University of Texas at San Antonio
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act
VA	Department of Veterans Affairs

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Introduction

September 13, 2019

Congressional Requesters

In 2017, three major hurricanes—Harvey, Irma, and Maria—struck the states of Texas and Florida, and the U.S. territories of Puerto Rico and the U.S. Virgin Islands, causing severe damage and deaths.¹ According to the Department of Homeland Security’s (DHS) Federal Emergency Management Agency’s (FEMA) 2017 after action report, these three hurricanes ranked among the top five costliest hurricanes on record with Hurricane Harvey at \$125 billion, Hurricane Maria at \$90 billion, and Hurricane Irma at \$50 billion.²

After Hurricane Maria, questions were raised about how deaths related to the hurricane were identified and documented in Puerto Rico. In December 2017, the government of Puerto Rico reported that the number of deaths directly related to the hurricane was 65 as of that time. However, subsequent third-party studies provided varying estimates of the likely death count using different methodologies. States and local jurisdictions are responsible for the identification and documentation of disaster-related deaths. Additionally, the federal government may also play a role in helping states and territories respond to disaster-related deaths, by, for example, providing assistance to individuals, through FEMA’s Funeral Assistance, to cover funeral costs associated with a disaster.

You asked us to review Puerto Rico’s process for identifying and documenting deaths related to Hurricane Maria, as well as other states’ processes for identifying and documenting disaster-related deaths, and federal agencies’ assistance in this process. This report discusses:

¹Hurricane Harvey made landfall along the Texas coast in late August of 2017. Hurricane Irma struck southwestern Florida in mid-September of 2017. Hurricanes Irma and Maria made landfall in Puerto Rico and the U.S. Virgin Islands in mid to late September of 2017.

²According to FEMA’s 2017 *Hurricane Season FEMA After-Action Report*, the National Oceanic and Atmospheric Administration identified the other two hurricanes, among the top five, as Hurricane Katrina in 2005 at \$161 billion and Hurricane Sandy in 2010 at \$71 billion.

1. how Florida, Texas, and Puerto Rico identified and documented deaths related to the 2017 hurricanes, and any challenges they experienced in the process;
2. the support selected federal agencies provided to Florida, Texas, and Puerto Rico involving disaster-related deaths, and any actions to support states or territories in addressing disaster-related deaths in the future; and
3. the number of Funeral Assistance applications FEMA received, approved, and denied under the Individual Assistance program for the 2017 hurricanes.

To describe how Florida, Texas, and Puerto Rico identified and documented deaths related to the 2017 hurricanes, and any challenges experienced, we reviewed state and territory laws from Florida, Texas, and Puerto Rico, executive orders from Puerto Rico, as well as policies and procedures for identifying and documenting disaster-related deaths. We selected Florida, Texas, and Puerto Rico, as they experienced the 2017 hurricanes, which were category 4-5 hurricanes, and also had high numbers of Funeral Assistance requests (ranging from hundreds to thousands) submitted to FEMA by individuals affected by the hurricanes. While hurricanes Irma and Maria both made landfall in Puerto Rico, our review focused on Hurricane Maria because the number of Funeral Assistance applications related to Irma in Puerto Rico were less than five. Similarly, although hurricanes Irma and Maria made landfall in the U.S. Virgin Islands, we did not include the territory in our review because the number of Funeral Assistance applications related to both hurricanes in the U.S. Virgin Islands combined was less than 50.³

We conducted a site visit to Puerto Rico in August 2018 to interview officials from two local governments—Ponce and Utuado—as well as from territorial emergency management and public health offices, including the Department of Public Safety, the Department of Health, Puerto Rico's Central Office of the Demographic Registry, and the Bureau of Forensic Sciences (Bureau). We interviewed these officials to discuss their roles in identifying and documenting disaster-related deaths. We selected these two local governments because of their relatively high populations, and high amounts of Other Needs Assistance received—financial assistance provided to individuals that

³These Funeral Assistance applications were as of August 2018, the most recent data available at the beginning of our review.

include funeral and medical assistance—under FEMA’s Individual Assistance program. We also selected them to reflect geographic diversity as Ponce is located in southern Puerto Rico, and Utuado is located in the central part of the island. The information gathered during the site visit is not generalizable to other states or territories, but the details provide insights regarding Puerto Rico’s identification and documentation of disaster-related deaths.

Given the varying estimates from third-party assessments of the number of deaths related to Hurricane Maria in Puerto Rico, we also reviewed three academic studies that estimated the number of “excess deaths”⁴ after the hurricane as well as their respective methodologies, which we describe in more detail later.⁵ We also interviewed academicians from the corresponding academic research institutions to better understand how they conducted these studies. Furthermore, we interviewed state emergency management and health services officials from Florida and Texas to understand their roles and responsibilities in identifying and documenting with disaster-related deaths.

To describe the support selected federal agencies provided to Florida, Texas, and Puerto Rico involving disaster-related deaths, and any future related actions, we reviewed federal laws and guidance related to federal agencies’ roles and the support they may provide to states and Puerto Rico in major disasters. These laws included the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), which establishes federal and state responsibilities during a disaster. We also reviewed the Disaster Recovery Reform Act of 2018, which includes a provision requiring FEMA to contract with the National Academy of Medicine to study and report on disaster-related death

⁴Throughout this report, the term “excess deaths” refers to the number of observed deaths after Hurricane Maria compared to the number of expected deaths if the hurricane had not occurred.

⁵The three studies consist of: (1) Nishant Kishore, et al., “Mortality in Puerto Rico after Hurricane Maria,” *The New England Journal of Medicine*, vol. 379, no.2 (2018): 162-170.; (2) Alexis R. Santos-Lozada and Jeffrey T. Howard, “Use of Death Counts From Vital Statistics to Calculate Excess Deaths in Puerto Rico Following Hurricane Maria,” *The Journal of the American Medical Association*, vol. 320, no.14 (2018); 1491-1493.; (3) Carlos Santos-Burgoa, et al., “Project Report: Ascertainment of the Estimated Excess Mortality from Hurricane Maria in Puerto Rico,” *The George Washington University, Milken Institute School of Public Health in Collaboration with the University of Puerto Rico Graduate School of Public Health*, (August 2018), which was also published in Carlos Santos-Burgoa, et al., “Differential and persistent risk of excess mortality from Hurricane Maria in Puerto Rico: a time-series analysis,” *The Lancet Planetary Health*, Published Online (October 11, 2018).

information. We interviewed FEMA officials to discuss their assistance to Florida, Texas, and Puerto Rico after the 2017 hurricanes. We also discussed any planned actions FEMA had to support the states and Puerto Rico with disaster-related deaths in future disasters. We interviewed officials from headquarters and FEMA regions II, IV, and VI—which are responsible for Puerto Rico, Florida, and Texas, respectively. We also interviewed FEMA officials in Puerto Rico at the Joint Field Office in San Juan.⁶

Additionally, we interviewed headquarters officials from other federal agencies—the Department of Health and Human Services (HHS), the Department of Veterans Affairs (VA), and the Department of Defense (DOD)—about the roles they played in assisting Florida, Texas, and Puerto Rico with disaster-related deaths after the 2017 hurricanes, as well as any planned actions to support states or territories in addressing disaster-related deaths in future disasters. For the VA, we also interviewed officials at the VA Medical Center in San Juan, Puerto Rico. We selected FEMA and the other federal agencies because they provided financial or operational assistance to Florida, Texas, and Puerto Rico involving disaster-related deaths for the 2017 hurricanes. At the state and territory level, we interviewed Florida, Texas, and Puerto Rico government officials to discuss their perspectives on federal support provided related to identifying and documenting disaster-related deaths after the 2017 hurricanes, and any additional planned actions to support these locations' efforts in the future.

To describe the number of Funeral Assistance applications FEMA received, approved, and denied for the 2017 hurricanes, we analyzed FEMA's policies and procedures, fact sheets, and standard operating procedures related to FEMA's Funeral Assistance. We reviewed FEMA's Individual Assistance application form and the agency's guidance for determining whether to award Funeral Assistance, among other relevant documents. We analyzed FEMA's data on Funeral Assistance provided to individuals in Florida, Texas, and Puerto Rico for the 2017 hurricanes from the date the President issued major disaster declarations for hurricanes in those locations, through March 2019, the most recent data available at the time of our review.⁷ To assess the reliability of these data, we reviewed

⁶The Joint Field Office is a temporary coordination center established locally for federal and state agencies to facilitate domestic incident management activities related to prevention, preparedness, response and recovery.

⁷The President issued major disaster declarations for Hurricane Harvey in Texas on August 25, 2017, Hurricane Irma in Florida on September 10, 2017, and hurricanes Irma and Maria in Puerto Rico on September 10 and 20, 2017, respectively.

documentation related to the data sources—such as the standard operating procedures for managing the database—reviewed the data for consistency and completeness, and discussed data quality control procedures with FEMA officials responsible for maintaining the data.⁸ We determined that these data were sufficiently reliable for the purposes of describing information on Funeral Assistance provided related to the 2017 hurricanes, including the number of applications received, approved, and denied, as of March 2019.⁹

Furthermore, we interviewed officials from FEMA headquarters and FEMA regions II, IV, and VI, as well as government officials from Florida, Texas, and Puerto Rico to discuss the Funeral Assistance process. The information we obtained from these interviews is not generalizable to other states or regions, but the information collected provides insights regarding the use and management of Funeral Assistance.

We conducted this performance audit from June 2018 to September 2019 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.

⁸We obtained Funeral Assistance data from FEMA's Information Data and Analysis system, which are generated by FEMA's National Emergency Management Information System.

⁹FEMA's Funeral Assistance data are not intended to reflect the total number of deaths that have resulted from a major disaster because not all deceased persons may have an associated application for Funeral Assistance submitted by family members. Furthermore, a single application may represent more than one deceased person, or an application may be for disinterment.

Background

State and Federal Roles and Responsibilities for Identifying and Documenting Disaster-Related Deaths

States and local jurisdictions are responsible for identifying and documenting deaths, whether disaster-related or not. Regarding disaster-related deaths, federal agencies may play a supporting role in states' or territories' efforts to manage disaster-related deaths in cases where the affected state or local entity needs or requests assistance after a major disaster or emergency has been declared under the Stafford Act.¹⁰

The National Response Framework—established in 2008—designates federal agencies' roles in responding to emergencies. These roles include providing assistance across 14 emergency support functions (ESF) that are considered the most frequently needed capabilities during an emergency, including mass care, public health, medical or other needs (see text box).

Emergency Support Functions

Emergency support functions (ESF) are the federal government's primary coordinating structure for building, sustaining, and delivering response capabilities. There are 14 ESFs, organized by specific functional areas for the most frequently needed capabilities during an emergency. ESFs are designed to coordinate the provision of related assets and services by federal departments and agencies. For each of the 14 ESFs, a federal department or agency serves as the designated ESF coordinator:

ESF #1: Transportation (Department of Transportation)

ESF #2: Communications (Department of Homeland Security/Cybersecurity and Communications)

ESF #3: Public Works and Engineering (Department of Defense/U.S. Army Corps of Engineers)

ESF #4: Firefighting (US Forest Service)

ESF #5: Information and Planning (Federal Emergency Management Agency)

ESF #6: Mass Care, Emergency Assistance, Temporary Housing, and Human Services (Federal Emergency Management Agency)

ESF #7: Logistics (General Services Administration and Federal Emergency Management Agency)

¹⁰In accordance with the Stafford Act, as amended, the President of the United States may declare that a major disaster or emergency exists in response to a Governor's or tribal chief executive's request if the disaster is of such severity and magnitude that effective response is beyond the capabilities of a state, tribe, or territorial government and federal assistance is necessary. See Pub. L. No. 93-288, 88 Stat. 143 (codified as amended at 42 U.S.C. §§ 5121 et seq.).

ESF #8: Public Health and Medical Services (Department of Health and Human Services)
ESF #9: Search and Rescue (Federal Emergency Management Agency)
ESF #10: Oil and Hazardous Materials Response (Environmental Protection Agency)
ESF #11: Agriculture and Natural Resources (Department of Agriculture)
ESF #12: Energy (Department of Energy)
ESF #13: Public Safety and Security (Department of Justice)
ESF# 14: No longer used
ESF #15: External Affairs (Department of Homeland Security)
Source: GAO analysis of FEMA information. | [GAO-19-486](#)

Under the framework, DHS is the lead federal department with primary responsibility for coordinating disaster response and activating these emergency functions, as needed. The federal agencies that had a role under the framework in supporting Florida, Texas, and Puerto Rico in addressing deaths related to the 2017 hurricanes include FEMA and HHS. Specifically,

- FEMA is the coordinating agency for ESF #6—Mass Care, Emergency Assistance, Temporary Housing, and Human Services—which includes providing Funeral Assistance to individuals who incur funeral expenses related to a disaster-related death.
- HHS is the coordinating agency for ESF#8—Public Health and Medical Services. Under this function, HHS is to provide assistance related to public health and mass fatality management such as assessing equipment and space for handling deceased persons, as well as providing guidance on the identification and documentation of disaster-related deaths.

Additionally the departments of Defense (DOD) and Veterans Affairs (VA) had a role in supporting efforts to address deaths related to the 2017 hurricanes.

- DOD is to support civilian authorities (i.e. federal and state entities), through its Defense Support of Civil Authorities mission, when called upon during disasters. Such support can include transporting deceased persons and issuing death certificates.

- VA is responsible for providing medical and funeral assistance to veterans, and in some cases non-veterans, in the event of a disaster.

FEMA's Funeral Assistance under the Individual Assistance Program

The Individual Assistance program provides financial and direct assistance to disaster victims to help with their immediate needs, such as shelter and medical needs in the wake of a Presidentially-declared major disaster or emergency.¹¹ Individual Assistance comprises five programs and one of these is the Individuals and Households Program,¹² which provides assistance to eligible disaster survivors with necessary expenses and serious needs that they are unable to meet through other means, such as insurance.¹³ Within the Individuals and Households Program is Other Needs Assistance, which also includes Funeral Assistance. FEMA may provide Funeral Assistance to help with the cost of funeral services or disinterment caused directly or indirectly by a Presidentially-declared emergency or major disaster.¹⁴

¹¹See 42 U.S.C. § 5170. A major disaster is any natural catastrophe (including any hurricane, tornado, storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought), or, regardless of cause, any fire, flood, or explosion, in any part of the United States, which the president determines causes damage of sufficient severity and magnitude to warrant major disaster assistance to supplement the efforts and available resources of states, local governments, and disaster relief organizations in alleviating damage, loss, hardship, or suffering. See 42 U.S.C. § 5122(2).

¹²The four other Individual Assistance programs consist of the following: (1) The Crisis Counseling Program provides community-based outreach and psycho-educational services to individuals and communities. See 42 U.S.C. § 5183; 44 C.F.R. § 206.171. (2) Disaster Legal Services provides assistance through an agreement with the Young Lawyers Division of the American Bar Association for free legal help to survivors who are unable to secure adequate legal services for their disaster-related needs. See 42 U.S.C. § 5182; 44 C.F.R. § 206.164. (3) The Disaster Case Management Program involves a partnership between a FEMA disaster case manager and a survivor to develop and carry out a Disaster Recovery Plan. See 42 U.S.C. § 5189d. (4) Disaster Unemployment Assistance provides unemployment benefits and reemployment services to individuals who have become unemployed as a result of a major disaster and who are not eligible for regular state unemployment insurance. See 42 U.S.C. § 5177; 44 C.F.R. § 206.141.

¹³See 42 U.S.C. § 5174; 44 C.F.R. §§ 206.110-206.120.

¹⁴The Individual and Households Program's Other Needs Assistance provides financial assistance to individuals and households for other disaster-caused expenses and serious needs such as funeral, medical, and dental assistance, among other assistance. Also, according to FEMA's Funeral Assistance guidance, disinterment

In coordinating with FEMA to receive Funeral Assistance, the affected state, territorial, or tribal government is to establish annually the maximum allowed amount of Funeral Assistance and whether the assistance will be awarded per death or per household. Other Needs Assistance, including Funeral Assistance, is subject to a cost share between FEMA and the state, territorial, or tribal government, where FEMA is responsible for 75 percent of the costs and the state, territorial, or tribal government is responsible for the remaining 25 percent.¹⁵ Additionally, states or territories may select the type of administration for Funeral Assistance, such as the FEMA Option or the Joint Option.¹⁶

- **FEMA Option:** Under this option, a FEMA caseworker is responsible for reviewing applications for Funeral Assistance and verifying the information in the application. Based on the caseworker's and other managers' recommendations to approve an application, FEMA's Federal Coordinating Officer is to review and sign the Funeral Assistance application.¹⁷ For any approved applications, FEMA disburses the awards to applicants, and the state, territory, or tribe is responsible for reimbursing FEMA for its portion of the cost share.
- **Joint Option:** Under the Joint Option, Funeral Assistance is awarded using the same general process as the FEMA Option. However, a state, territorial, or tribal government caseworker is to review and verify the application information, and the state, territory, or tribe—rather than FEMA—is to determine whether to approve applications for awards. Additionally, the state, territory, or tribe provides the initial assistance to applicants and FEMA is responsible for reimbursing them for its portion of the cost share. Figure 1 describes FEMA's Funeral Assistance process for the two options.

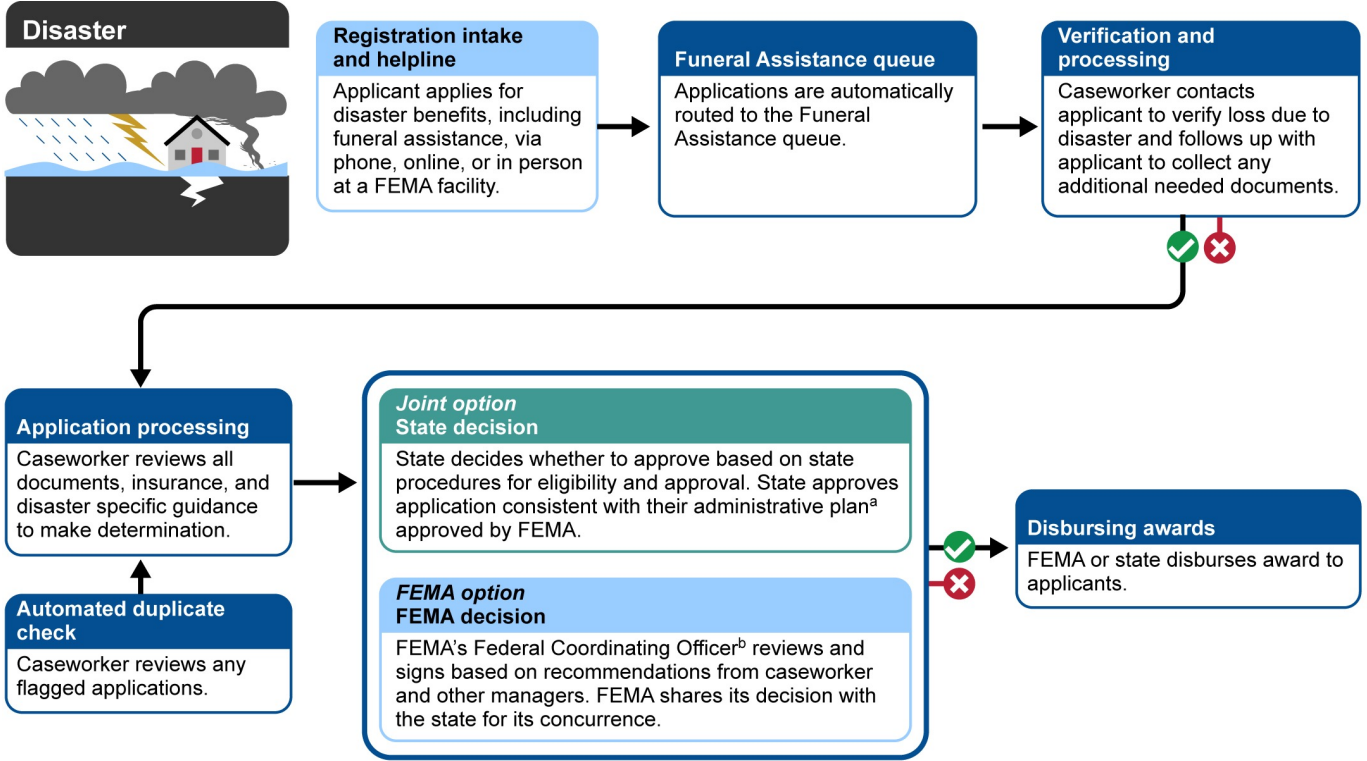
includes disinterment or interment of dislodged or destroyed caskets, tombs, or vaults.

¹⁵See 42 U.S.C. § 5174(g)(2). According to FEMA officials, the maximum amounts of Funeral Assistance for Florida, Texas, and Puerto Rico for the 2017 hurricanes was \$7,500, \$9,000, and \$6,000, respectively.

¹⁶There is also a third type of administration states may select called the State, Territorial, or Tribal Government Option where FEMA provides Other Needs Assistance as a grant to the state, territorial or tribal government, which is then responsible for all tasks associated with its administration.

¹⁷A Federal Coordinating Officer is appointed by the FEMA Administrator to coordinate federal assistance in an emergency or a major declaration.

Figure 1: The Federal Emergency Management Agency's (FEMA) Funeral Assistance Process



Legend

- Action conducted by FEMA
- Action conducted by state
- Action conducted by either FEMA or state
- ✔ Eligible application
- ✘ Ineligible application, applicant may appeal

Source: GAO analysis of FEMA information. | GAO-19-486

Note: The term “state” in this figure is used to refer states, territories and tribes.
^aAn administrative plan is a state, territorial, or tribal government plan submitted to FEMA annually that describes the procedures the state, territorial, or tribal government are to use to administer Other Needs Assistance, which includes Funeral Assistance.
^bFederal Coordinating Officer is appointed by the FEMA Administrator to coordinate federal assistance in a major disaster.

FEMA's Funeral Assistance Eligibility Requirements

Under FEMA's guidance on Funeral Assistance, there are several conditions for applicants to qualify:

- The applicant must be a U.S. citizen, non-citizen national or qualified alien.¹⁸
- FEMA must be able to verify the applicant's identity.
- A state, territorial, tribal, or local government–licensed medical official, such as a medical examiner or coroner, must have attributed the death to the emergency or disaster. In January 2018, FEMA revised the eligibility requirement to include deaths caused either directly or indirectly by a disaster, rather than only those caused directly by a disaster.¹⁹ To verify the above, applicants must be able to provide an official death certificate indicating the death was attributed to the disaster; or a signed statement from a state, territorial, or local government licensed medical official.²⁰

¹⁸A non-citizen national of the United States is a person who, though not a U.S. citizen, owes permanent allegiance to the United States, which can include individuals who were born in American Samoa or in the Commonwealth of the Northern Mariana Islands who have chosen to be U.S. nationals instead of U.S. citizens. See 8 U.S.C. § 1101(a)(22). A "qualified alien" includes individuals who have been granted legal permanent residence, refugee or asylum status, withholding of deportation, conditional entry, parole into the United States for at least 1 year for humanitarian purposes; is a Cuban-Haitian Entrant; or has a pending or approved petition for relief based on battery or extreme cruelty by a family member. See 8 U.S.C. § 1641(b)-(c).

¹⁹According to FEMA officials, this eligibility change was made as a result of new guidance, issued by HHS's Centers for Disease Control and Prevention in October 2017 to assist states with determining disaster-related deaths. The guidance described types of disaster-related deaths—direct and indirect—and provided examples of both types. A directly related death is defined as a death directly attributable to the forces of the disaster or by the direct consequence of these forces, such as structural collapse, flying debris, or radiation or chemical exposure. Indirectly related disaster death occurs when unsafe or unhealthy conditions are present during any phase of a disaster (i.e. pre-event or preparing for the disaster, during the disaster event, or post-event during cleanup after a disaster) and contributed to a death. According to the guidance, examples of direct disaster-related deaths included drowning in flooded areas during a flood or blunt force trauma caused by flying debris during a hurricane; while examples of circumstances leading to indirect disaster-related deaths included a chain-saw injury or falling in a home without power.

²⁰Applicants are not required to reside in the Presidentially-declared major disaster area to qualify for Funeral Assistance.

- The applicant must have incurred, or be expecting to incur, eligible funeral expenses, not covered by other sources. Other sources may include burial insurance or monetary assistance from voluntary agencies, applicable government programs, or other entities. To verify the above, applicants must be able to provide receipts or verifiable estimates indicating the applicant incurred or will incur such expenses. Also, applicants must provide documentation of any burial insurance or forms of funeral assistance received from voluntary agencies, government agencies, charities, or other entities.

In its standard operating procedures for Funeral Assistance, FEMA has also established the various reason categories for case workers to indicate why an application is being denied:²¹

- Application exceeds total Other Needs Assistance maximum amount allowed;²²
- Death not due to the disaster;
- No documentation submitted;
- Insufficient documentation submitted;
- Duplicate application;²³
- Insurance coverage fully covers funeral costs;
- “Other Reason” (e.g., applicant withdrew application).

²¹ FEMA, *Funeral Assistance Standard Operating Procedure (June 2018) and FEMA, Codes, Verifications Request Letters, and Assistance Types (July 2018)*.

²²In general, assistance for an eligible applicant will not exceed the Other Needs Assistance financial assistance maximum award under the Stafford Act, which is adjusted each year based on the Department of Labor Consumer Price Index. See 42 U.S.C. § 5174(h). However, for some categories of Other Needs Assistance, the affected state, territorial, or tribal government will establish the maximum amount of assistance that may be awarded.

²³According to FEMA officials, while duplicate applications may be identified automatically within their data system, a caseworker is to also manually review for any duplicate application.

Major Findings

Florida, Texas, and Puerto Rico Followed Local Processes for Identifying and Documenting Disaster-Related Deaths, but Puerto Rico Officials Reported Challenges

Hurricane Irma in Florida

Florida officials stated that, during and after Hurricane Irma, Florida followed its established state process for identifying and documenting deaths under disaster circumstances, and that this process is similar to their process under non-disaster circumstances, as defined in Florida law.²⁴ Officials from the Florida Division of Emergency Management and the Department of Health also told us that the system worked well and their processes and capacity were not impacted after the hurricane.

Under non-disaster circumstances, Florida's processes typically involve local medical examiners and physicians determining the cause and contributing factors for a death, and then, completing and filing certificates of death. During disaster-related incidents such as Hurricane Irma, local medical examiners primarily carry out this task. State officials stated that local medical examiners in Florida are authorized to attribute deaths to disasters, including whether they were directly or indirectly related, on death certificates.

State officials told us that when determining causes of death, local medical examiners may consult with the Florida Medical Examiners Commission (Commission) as necessary for assistance. Local medical examiners are required to report disaster-related death information to the Commission. The Commission is responsible for ensuring that local medical examiners have reported the deaths accurately and have tied a death to a disaster sufficiently—whether it was directly or indirectly related to a disaster. The Commission then submits the information about the deceased person to the Florida Department of Law Enforcement, which shares it with the state's emergency management leadership and posts the information into the state's crisis management database system. Also, state officials stated that local medical examiners in the state must also submit all death certificates to the state's Bureau of Vital Statistics, regardless

²⁴See Fla. Stat. § 382.008.

of whether deaths in the state are related to disasters.²⁵ According to these officials, this was the process used after Hurricane Irma.

In addition to the above process for identifying and documenting deaths after Hurricane Irma, officials from Florida's Department of Health told us that the state activated the Florida Emergency Mortuary Operations Response System. This system is designed to support local medical examiners with equipment and staff during disasters and can support up to 500 simultaneous deaths. According to Florida officials, the number of deaths related to Hurricane Irma was 84 as of July 2019. Florida officials told us that because of the state's system for identifying and documenting disaster-related deaths, Hurricane Irma did not present challenges related to these processes.

Hurricane Harvey in Texas

Officials from Texas told us that during and after Hurricane Harvey, the state was able to use its processes for death identification and documentation without challenges. Under Texas law, both medical examiners and, in some circumstances, county justices of the peace are authorized to determine causes of death and complete death certificates, including determining whether deaths were directly or indirectly related to disasters during and after such events.²⁶ Larger counties with over 1 million residents have medical examiners who verify cause of death on death certificates. In counties with populations less than 1 million, justices of the peace are responsible for determining cause of death and generating death certificates using physicians' medical records of the deceased person.²⁷ In Texas, according to officials we interviewed, medical examiners have been considering deaths that are either directly or indirectly caused

²⁵The Florida Bureau of Vital Statistics collects official records of birth, death, fetal death, marriage, and dissolution of marriage.

²⁶See Tex. Crim. Proc. Arts. 49.01-49.24. Articles 49.02 and 49.04 provide that inquests into a death that occurs in a county that does not have a medical examiner's office or that is not part of a medical examiner's district shall be conducted by a county justice of the peace occurring in a county that does not have a medical examiner's office or is not part of a medical examiner's district under certain circumstances, such as if the cause of death is unknown and the person is unidentified or if the person dies without have been attended by a physician.

²⁷In counties with justices of the peace, these officials preside over the justice court in cases involving misdemeanors, small civil disputes, landlord/tenant disputes and more. They also conduct inquests, among other things. According to Texas Division of Emergency Management officials, there are 254 counties with approximately 13 local medical examiners and 500 justices of the peace in the state.

by disasters as disaster-related deaths prior to FEMA revising the eligibility rules for its Funeral Assistance in January 2018, as described earlier.

According to a Texas Department of State Health Services official, the state also has specific disaster-related processes to help track the number of deaths related to a major disaster, which they implemented for Hurricane Harvey. For example, the state of Texas provided local medical examiners and justices of the peace with a statewide form to collect preliminary information on disaster-related deaths and assist them in determining whether deaths were directly or indirectly attributable to Hurricane Harvey. Prior to electronically submitting death certificates to the state's Vital Statistics Section, these medical examiners and justices of the peace also received an alert from the state's Vital Statistics electronic death certificate registry reminding them to document disaster-related deaths on the death certificate. Additionally, the state activated a disaster death tracking team to collect disaster-related death information, including death certificate information. Subsequently, the disaster death tracking team shared this information with FEMA and the Texas Division of Emergency Management for situational awareness. According to officials from the Texas Department of State Health Services, as of July 2019, the number of direct and indirect deaths from Hurricane Harvey was 94. Texas Division of Emergency Management officials further stated that they did not encounter challenges in identifying and documenting deaths related to Hurricane Harvey.

Hurricane Maria in Puerto Rico

Puerto Rico officials reported they used an established local process for identifying and documenting deaths after disasters, but that Hurricane Maria overwhelmed this process and therefore caused major disruptions. Challenges such as power outages and damaged roads led the Puerto Rico government to request additional support from the federal government, such as cold storage equipment and additional staff, to help with activities related to managing disaster-related deaths.

In Puerto Rico, an attending physician or a medical officer, if available, is responsible for determining causes of death and completing a death certificate in accordance with the laws of Puerto Rico.²⁸ When

²⁸See P.R. Laws Ann. tit. 24, §§ 1105-06.

no attending physician or medical officer is able or available to determine the cause of death, or if suicide or homicide is suspected, the Puerto Rico's Office of the Prosecutor is to request that the deceased person be transported to the Bureau of Forensic Sciences (Bureau) in San Juan, Puerto Rico, for autopsy by a Bureau medical examiner. The Bureau's medical examiner is to determine the cause of death and complete a death certificate.

Once the Bureau, or a physician or medical officer, completes a death certificate, they are to send the certificate to Puerto Rico's Central Office of the Demographic Registry where it receives a final review and is archived. In December 2017, the government of Puerto Rico reported 65 deaths directly related to the hurricane, based on certified causes of death by the Department of Public Safety.²⁹ At that time, Puerto Rico determined that this was the official death count, according to Puerto Rico officials.

Officials from Puerto Rico told us that they experienced various challenges that affected their ability to identify and document disasters-related deaths after Hurricane Maria. Such challenges are described below.

- **Limited staffing capacity:** The Bureau had five pathologists conducting medical examinations after Hurricane Maria. According to the Secretary of the Department of Public Safety, prior to the hurricane the Bureau processed, on average, about 73 deceased persons per week, including autopsies in its pre-hurricane operation. However, officials told us that, in response to Hurricane Maria, they were receiving, on average, about 145 deceased persons per week. As a result, the Bureau officials stated that Hurricane Maria exacerbated backlogs of medical examinations that already existed before the hurricane. According to Puerto Rico officials, the backlog of medical examinations was one reason why the government of Puerto Rico requested more cold storage units from the federal government as well as staff augmentation.
- **Infrastructure damage:** According to a Puerto Rico Department of Public Safety official, inaccessible roads damaged by Hurricane Maria also led to delays. This made it difficult for local government staff to physically deliver completed death certificates or transport deceased persons to the Bureau in San Juan. Also, officials from

²⁹The Bureau of Forensic Sciences is housed within the Puerto Rico Department of Public Safety.

the Puerto Rico's Central Office of the Demographic Registry stated that death certificates are to be physically brought to the central office for entry into the data system as they become available. But because of transportation disruptions, officials had to adjust the process to receive them on a weekly basis, which delayed final review and archiving. Further, power outages caused by the hurricane also led to delays in processing death certificates electronically at Puerto Rico's Central Office of the Demographic Registry. As described in more detail later in the report, the government of Puerto Rico has a plan to work with HHS's Centers for Disease Control and Prevention (CDC), to develop a better data system and a more automated process that can still operate in exigent circumstances.

- **Limited local equipment capacity:** According to a Bureau official, there was a shortage of refrigerators used for storing deceased persons across the island due to Hurricane Maria. As a result, many of the deceased persons were sent to the Bureau for storage, even if the cause of death was already determined by a physician. According to officials from the Department of Public Safety, the processing and storage of these additional deceased persons caused them delays in responding to other deceased persons requiring medical examinations by the Bureau. The Bureau had the largest operational cold storage facility in Puerto Rico after Hurricane Maria according to an official from the Bureau and that storage was increased with federal support after the hurricane.

These challenges experienced by Puerto Rico in identifying and documenting deaths also had impacts for families in Puerto Rico. For example, families who chose cremation for deceased family members faced delays because death certificates are required to be entered into the demographic registry before cremations can take place.

Given the challenges Puerto Rico faced in identifying and documenting disaster-related deaths for Hurricane Maria, in February 2018, the government of Puerto Rico commissioned a study by the George Washington University Milken Institute School of Public Health (GW) to identify deaths associated with the hurricane. Additionally, in light of public interest in the number of disaster-related deaths in Puerto Rico resulting from Maria, two academic institutions estimated

the number of “excess deaths,” resulting from the hurricane as discussed in more detail in appendix I.³⁰

These academic studies used different methodologies and calculated different estimates of “excess deaths” after Hurricane Maria. For example, in May 2018, Harvard University published a study estimating that from September 20 through December 31, 2017, there were 4,645 excess deaths (95 percent confidence interval: 793 to 8,498 deaths) in Puerto Rico as compared to the same period in 2016.³¹ The study was based on a population-based survey of a representative random sample of 3,299 households across Puerto Rico. Also, in October 2018, researchers from the Pennsylvania State University and the University of Texas at San Antonio used monthly death count data from the Puerto Rico Vital Statistics System to estimate that there were 1,139 excess deaths (95 percent confidence interval: 1,006 to 1,272 deaths) in Puerto Rico from September 2017 through November 2017 as compared to the expected number of deaths estimated from monthly death counts from 2010 through 2016.³²

The GW study commissioned by Puerto Rico estimated that from September 2017 through February 2018 there were 2,975 excess deaths (95 percent confidence interval: 2,658 to 3,290 deaths) in Puerto Rico as compared to the expected number of deaths had the hurricane not occurred. The researchers estimated the expected number of deaths using Puerto Rico vital records data, population census data, and data on monthly net domestic migration. In August 2018, Puerto Rico revised its official death count to reflect the estimate by GW’s study.

In November 2018, Puerto Rico created a committee—the 9/20 Committee—to review implementation of the GW findings and recommendations on disaster-related deaths after Hurricane Maria.³³ The goals of the committee are to not only build capacity

³⁰As described earlier, “excess deaths” refer to the number of observed deaths after Hurricane Maria compared to the number of expected deaths if the hurricane had not occurred.

³¹Confidence intervals are used to indicate the precision of estimates. This is the interval that, with repeated sampling, would be expected to contain the actual population value for 95 percent of the samples we could have drawn.

³²The Puerto Rico Vital Statistics System is a database that contains vital registration data (e.g. births, deaths, marriages, divorces, and fetal deaths).

³³GW recommended that excess death methodology should be considered as a way to assess mortality after disasters and that the government of Puerto Rico should fully staff the Puerto Rico Department of Health, strengthen coordination between the

for Puerto Rico in the event of another disaster, but to serve as a model for other states, territories and local governments.³⁴ The Committee is to submit a report every 60 days to the governor, until the recommendations are implemented. In January 2019, the 9/20 Committee issued its first report, which described actions taken to implement recommendations, including engaging in interagency communication and designating a project manager to oversee the implementation of the study recommendations, among other things.

Selected Federal Agencies Provided Resources to Puerto Rico, and Have Plans to Provide Training and Other Support to States and Puerto Rico

Federal Agencies Provided Assistance to Puerto Rico including Equipment and Staff Support

Selected federal departments and agencies, consisting of FEMA, HHS, VA, and DOD, supported Puerto Rico with equipment, staff and other resources to help address the disruption to its processes for identifying and documenting disaster-related deaths caused by Hurricane Maria.³⁵ Below are descriptions of the types of support provided by these federal agencies to Puerto Rico.

- **FEMA:** FEMA coordinated with HHS to provide equipment such as trailers to assist with storing deceased persons after the hurricanes and to deploy HHS pathologists to augment the Bureau of Forensic Sciences' medical examiners. FEMA also coordinated with DOD to deploy support such as moving deceased persons to a morgue provided by a U.S. Army Reserve unit. FEMA also provided financial assistance to individuals from Florida, Texas, and Puerto Rico in the form of Funeral Assistance through its Individual Assistance program.

Puerto Rico's Central Office of the Demographic Registry and the Bureau of Forensic Sciences, create a new crisis and emergency risk communication plan and more individualized research relative to specific cases of excess death reporting in Puerto Rico that led to the circumstances related to an individual's death, among other things.

³⁴The 9/20 Committee was created in accordance with the Puerto Rico governor's executive order 2018-43.

³⁵According to Florida and Texas officials, their states did not need similar support as they did not face similar challenges as Puerto Rico.

- **HHS:** According to HHS officials, they provided support to Puerto Rico, before, during, and after Hurricane Maria. HHS Office of the Assistant Secretary for Preparedness and Response (HHS Office of the Assistant Secretary) provided direct support to Puerto Rico's Bureau of Forensic Sciences (Bureau) by providing pathologists and refrigerated trailers. Officials from HHS Office of the Assistant Secretary stated that existing staff at the Bureau were faced with processing more deceased persons a week than many local entities process in a month. The refrigerated trailers were used to accommodate the storage of 160 deceased persons. HHS Office of the Assistant Secretary also facilitated planning with the government of Puerto Rico to reduce the number of deceased persons being sent to the Bureau. HHS Office of the Assistant Secretary, in coordination with FEMA and the Puerto Rico Department of Health, among others, also assisted with the relocation of about 3,600 human remains from the Lares Municipal Cemetery, which was damaged in a landslide during Hurricane Maria.
- **VA:** According to VA officials, upon the government of Puerto Rico's request, the VA cared for five veteran and nonveteran patients who were admitted to its hospital in San Juan during Hurricane Maria; two of the three nonveteran patients died at the hospital. For patients who died in the VA's care, VA physicians were responsible for helping to document and process death-related documentation for these patients. Additionally, VA officials stated that they provided direct support to Puerto Rico's Bureau of Forensic Sciences by providing body bags for deceased persons.
- **DOD:** According to a U.S. Navy official, the USNS Comfort took in patients from October through November 2017 in response to Hurricane Maria when there was no bed space available in local hospitals. Some patients died aboard the ship and subsequently, Naval medical staff determined causes of death, recorded them on Puerto Rico death certificates, and provided the certificates to the government of Puerto Rico. DOD officials reported that the 246th Quartermaster Company, a U.S. Army Reserve company, provided support by moving the deceased persons to the Bureau of Forensic Sciences or to morgues, and helping to prepare them for autopsy and burial.³⁶

³⁶The 246th Quartermaster Company is a U.S. Army Reserve company in Puerto Rico consisting of a number of military specialties including mortuary affairs.

FEMA and CDC Reported Plans to Provide Additional Support to States and Puerto Rico for Identifying and Documenting Disaster-Related Deaths

FEMA Commissioned a Study

In accordance with the Disaster Recovery Reform Act of 2018, FEMA entered into a contract with the National Academy of Medicine in December 2018 to conduct a study and prepare a report on best practices in disaster-related mortality counts.³⁷ The purpose of the study is to identify best practices to help states, tribes, and territories to address disaster-related deaths in the future. According to the statement of work, the academy is to provide a report that will:

- Describe the current state of the field and the various systems and processes used to capture and share mortality data,
- Identify challenges to collecting, recording, and reporting mortality data after disasters, including, as feasible, challenges related to lack of standardization for data collection and disaster attributions, coordination, and training,
- Highlight best practices for collecting, recording, and reporting mortality data after a disaster, and
- Recommend priority areas of emphasis and allocation of resources to enhance state, local, tribal and territorial mortality data collection and reporting after disasters.

The statement of work directs the National Academy of Medicine to convene a committee of about 15 multi-disciplinary members to conduct the study and develop the report, with a specific focus on presidentially-declared major disasters.³⁸ Under the statement of work, the National Academy of Medicine is to provide a final report by November 2020.

³⁷See Pub. L. No. 115-254, div. D, § 1244 (2018).

³⁸According to the statement of work, the National Academy of Medicine shall submit a quarterly progress report to FEMA that includes detailed descriptions and status of activities; and summarizes all work accomplished and problems encountered, as well as planned activities for the upcoming quarter. Additionally, the National Academy of Medicine may post on its website the following information as appropriate under its procedures: notices of meetings open to the public, brief descriptions of projects, committee appointments if any, report information, and any other pertinent information.

CDC Is Providing Training and Funding on Documenting Disaster-Related Deaths

CDC is conducting a pilot project to train officials in Texas, Puerto Rico, and the U.S. Virgin Islands on the CDC's reference guide³⁹ for certifying deaths in the event of a natural, human-induced, or chemical/radiological disaster.⁴⁰ Subsequently, those officials are to then train certified medical officials in their respective state or territory. The training includes topics such as the definition of a disaster-related death and how to determine one, the importance of accurate death certification, and the steps for completing death certificates for disaster-related deaths, including specific examples. According to CDC officials, as of April 2019, more than 120 individuals, including medical officials, funeral home directors, and staff from Puerto Rico's Department of Health, had been trained, and the goal was to train an additional 250 officials over the next 6 months. Also, CDC officials told us that during the training in Puerto Rico, they provided the training in English but are in the process of translating all training materials into Spanish. According to CDC officials, they expect to conclude the pilot training program by the end of September 2020. Furthermore, CDC officials stated that they used 2017 disaster supplemental appropriations for the pilot training program. Also, officials stated that they plan to use fiscal year 2019 funding to expand their training to one or two additional states, and they expect the funds to be awarded in September 2019.

In addition to providing training, CDC officials stated that they have also provided funding through 2017 disaster supplemental appropriations to assist the government of Puerto Rico to develop an integrated electronic reporting system for vital records at the Puerto Rico's Central Office of the Demographic Registry. Puerto Rico's current Vital Statistics System is paper-based, and the process is not

³⁹U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics, *A Reference Guide for Certification of Deaths in the Event of a Natural, Human-induced, or Chemical/Radiological Disaster*, (Hyattsville, MD: Oct. 2017).

⁴⁰According to CDC officials, they selected these three states and territories for training based on a demonstrated need, the condition of existing public health infrastructure, status of mortality surveillance, ability to register death certificates, work plan clarity, and ability to sustain improvement. CDC officials also stated that training was conducted in Puerto Rico and Texas in March 2019, and the U.S. Virgin Islands in May 2019.

integrated. The demographic data and the cause of death data are entered in two different systems, delaying the process of tracking and coding death data not only during regular operation, but also during disasters, according to officials from the Puerto Rico's Central Office of the Demographic Registry. As Puerto Rico's recovery plan states, an integrated electronic reporting system for vital records will help improve the accuracy of reports through timely data entry and more complete vital records, which will also support public health surveillance systems.⁴¹

FEMA Received over 4,800 Funeral Assistance Applications and Approved Nearly 1,000 for Florida, Texas, and Puerto Rico as of March 2019

FEMA Approved Nearly 1,000 Funeral Assistance Applications, Totaling about \$2.6 million for Florida, Texas, and Puerto Rico as of March 2019

FEMA approved 976 of 4,802 Funeral Assistance applications it received—totaling about \$2.6 million—in Florida, Texas, and Puerto Rico, as of March 2019, the most recent data available at the time of our review. As shown in table 1, in Florida for Hurricane Irma, FEMA received 454 applications, of which 64 applications were approved (14 percent). In Texas for Hurricane Harvey, FEMA received 1,941 applications and approved 55 applications (3 percent). In Puerto Rico for hurricanes Maria and Irma, FEMA received 2,407 applications, and approved 857 (36 percent).⁴² According to FEMA officials, Funeral Assistance data are not intended to serve as proxies for disaster-related death counts because a single application may represent more than one deceased person or an application may be for a disinterment. Additionally, an applicant may have applied for Funeral Assistance whether a disaster-related death occurred in their family or not, or an individual who may qualify for Funeral Assistance may choose not to apply.

⁴¹Puerto Rico Central Office for Recovery, Reconstruction and Resiliency, *Transformation and Innovation in the Wake of Devastation: An Economic and Disaster Recovery Plan for Puerto Rico* (San Juan: Aug. 2018). The Recovery Plan established an initial "road map" that described and justified the need for resources and identified ways for recovery investments.

⁴²For Hurricane Irma in Puerto Rico, FEMA received four applications for Funeral Assistance.

Table 1: Information on Funeral Assistance in Florida, Texas, and Puerto Rico for Hurricanes Irma, Harvey, and Maria in 2017, as of March 2019

	Applications Received	Applications Approved	Applications Pending ^a	Applications Denied ^b	Amount Awarded (\$)
Florida (Irma)	454	64	5	385	252,776
Texas (Harvey)	1,941	55	0	1,886	311,575
Puerto Rico (Maria)	2,403	855	16	1,532	2,053,104
Puerto Rico (Irma)	4	2	0	2	4,350
Total^c	4,802	976	21	3,805	2,621,805

Source: GAO analysis of Federal Emergency Management Agency (FEMA) data. | [GAO-19-486](#)

Note: According to FEMA officials, Funeral Assistance data are not intended to serve as proxies for disaster-related death counts because a single application may represent more than one deceased person or an application may be for a disinterment. An applicant may have applied for Funeral Assistance whether a disaster-related death occurred in their family or not, or an individual who may qualify for Funeral Assistance may choose not to apply.

^aApplications may be pending while awaiting FEMA’s review or final processing. Additionally, an application may be pending to allow additional time for the applicant to obtain the necessary documentation, such as documentation from funeral homes.

^bAccording to officials from FEMA headquarters, in Florida and Puerto Rico, two FEMA Option states (Funeral Assistance is primarily managed by FEMA), applications that lack a valid claim (e.g. no disaster-related death or application withdrawal) are not counted as denied applications in FEMA’s data as they are considered “closed”. On the other hand, in Texas, a Joint Option state (Funeral Assistance is primarily managed by the state), applications that lack a valid claim are counted as denied applications in the data.

^cAs of May 2019, FEMA officials said applications are no longer being accepted for the 2017 hurricanes in Florida, Texas, or Puerto Rico.

As shown in table 1, in Florida for Hurricane Irma, 385 applications were denied (85 percent). In Texas for Hurricane Harvey, 1,886 applications were denied (97 percent), and in Puerto Rico for Hurricane Maria, 1,532 applications were denied (64 percent). Reasons for application denials varied across Florida, Texas and Puerto Rico.

In Texas, denials were largely because of insufficient documentation submitted. In Florida and Puerto Rico, “Other reasons” was the most frequently used category for explaining application denials. Based on FEMA’s Funeral Assistance guidance and standard operating procedures, the “Other reasons” category may include a variety of reasons such as a death was not caused by a disaster, an applicant withdrew his or her application, an applicant was insured, the funeral expenses in question were paid by another source, or the

expenses being covered—such as flowers—were ineligible for Funeral Assistance, among other reasons. Caseworkers may also write in a reason for the denial. In both Florida and Puerto Rico, duplicate application was the next most common reason for a denial.

FEMA Made Changes to Some Funeral Assistance Eligibility Requirements in 2018

FEMA made changes in January and November 2018 to some of the requirements for applicants to qualify for Funeral Assistance. According to FEMA officials, its data on approved and denied Funeral Assistance applications, as of March 2019, take into account these changes. As described earlier, in January 2018, FEMA officials issued revised guidance for Funeral Assistance to include deaths that were indirectly related to disasters. Prior to the revision, only directly-related deaths were eligible. According to FEMA officials, the change was intended to better align FEMA's policy with CDC's October 2017 guidance for identifying and documenting deaths. In that guidance, CDC described types of disaster-related deaths—direct and indirect—and provided examples of common causes for both types of disaster-related deaths. FEMA's revised eligibility requirements applied to all major disasters declared on or after August 25, 2017.

In addition to revising its guidance in January 2018, FEMA issued a waiver in November 2018 to allow flexibility for Puerto Rico in the type of documentation individuals are required to submit in order to qualify for Funeral Assistance. For example, the waiver allowed a family member, or other person with first-hand knowledge of the circumstances of the deceased person's death, to provide a factual firsthand written statement that tied the cause of death to the hurricane, whether directly or indirectly. According to language accompanying FEMA's waiver, following Hurricanes Irma and Maria, many local morgues and medical officials were overwhelmed with the number of deceased persons, including persons who died of disaster-related conditions as well as those who died of other causes. In the November waiver, FEMA identified a number of circumstances where deaths could be indirectly attributed to a disaster, but would not typically be captured on a death certificate, such as damaged roads delaying ambulances, extended power outages, and lack of potable water. See appendix II for more information on the November waiver. When asked why this November waiver was not extended to Florida and Texas, FEMA officials said that those states were less impacted in their ability to process death certificates, a necessary piece of documentation to qualify for Funeral Assistance.

FEMA officials told us that, after the eligibility changes took place in January and November 2018, they had reassessed all of the relevant applications that had been denied or were pending at that time. Particularly in the case of Puerto Rico, officials stated that with the November 2018 waiver, they reassessed all denied applications by contacting applicants to obtain more information about the circumstances of death, including whether a death may have been indirectly related to the disasters. According to FEMA officials, they subsequently revised application determinations as appropriate.

Agency Comments, Third-Party Views, and Our Evaluation

We provided a draft of this report to DHS, the Department of Health and Human Services, the Department of Defense, and the Department of Veterans Affairs as well as Florida, Texas, and Puerto Rico for their review and comment. We also provided excerpts of our draft report to the three research teams from the academic institutions—the George Washington University, Pennsylvania State University and the University of Texas at San Antonio, and Harvard University—relevant to the studies conducted by each of the research teams. DHS provided written comments noting that the draft report clarified the responsibilities of the federal government and states and local jurisdictions regarding the identification and documentation of disaster-related deaths. DHS written comments are reproduced in full in appendix III. We also received technical comments from DHS, the Department of Health and Human Services, Texas, Puerto Rico, and each of the three research teams from the George Washington University, Harvard University, Pennsylvania State University and the University of Texas at San Antonio, which we incorporated into the report as appropriate.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Homeland Security, the Secretary of Health and Human Services, the Secretary of Defense, the Secretary of Veterans Affairs, the FEMA Administrator, and other interested parties. 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 (404) 679-1875 or curriec@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix IV.



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The Honorable Rosa DeLauro
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Appendixes

Appendix I: Three Academic Studies' Estimates of the Number of Excess Deaths in Puerto Rico Following Hurricane Maria

We conducted a review of studies that estimated the number of excess deaths in Puerto Rico following Hurricane Maria. We identified three peer-reviewed studies that provide estimates of the number of excess deaths in Puerto Rico following Hurricane Maria: (1) a study by researchers from the Milken Institute School of Public Health at George Washington University (GW study) in collaboration with the University of Puerto Rico Graduate School of Public Health, (2) a study by researchers from the Pennsylvania State University and the University of Texas at San Antonio (Penn State study), and (3) a study by researchers from Harvard University (Harvard study).⁴³ The Puerto Rico government commissioned the GW study, the findings of which were published in a project report in August 2018, and later in the peer-reviewed literature. We identified the Penn State and Harvard studies through conducting searches of various databases, such as Social SciSearch, National Technical Information Service, and the New England Journal of Medicine to identify peer-reviewed studies that estimated the number of excess deaths. GAO statisticians and a social science analyst reviewed the study methods and findings of all three studies to identify differences in methodology. We also interviewed academicians from the corresponding academic research institutions to better understand how they conducted these studies. Table 2 identifies these studies, the outcomes of interest from each study, the study design and data sources, and the time period covered by the study data.

⁴³The three studies consist of: Nishant Kishore, et al., "Mortality in Puerto Rico after Hurricane Maria," *The New England Journal of Medicine*, vol. 379, no.2 (2018): 162-170.; Alexis R. Santos-Lozada and Jeffrey T. Howard, "Use of Death Counts From Vital Statistics to Calculate Excess Deaths in Puerto Rico Following Hurricane Maria," *The Journal of the American Medical Association*, vol. 320, no.14 (2018): 1491-1493.; Carlos Santos-Burgoa, et al., "Project Report: Ascertainment of the Estimated Excess Mortality from Hurricane Maria in Puerto Rico," *The George Washington University, Milken Institute School of Public Health in Collaboration with the University of Puerto Rico Graduate School of Public Health*, (August 2018), which was also published in Carlos Santos-Burgoa, et al., "Differential and persistent risk of excess mortality from Hurricane Maria in Puerto Rico: a time-series analysis," *The Lancet Planetary Health*, Published Online (October 11, 2018).

Table 2: Studies That Estimate the Number of Excess Deaths in Puerto Rico Following Hurricane Maria

Author(s) and publication date	Time period evaluated	Study design	Estimated number of excess deaths (95% confidence interval)	Time period used to establish expected number of deaths
George Washington University (August 2018) ^a	September 2017 through February 2018	Analysis of vital records data from the Puerto Rico Vital Statistics System and other government data	Displacement scenario (accounts for population migration after the hurricane): 2,975 (2,658 to 3,290) Census scenario (assumes population composition remained unchanged after the hurricane): 1,191 (836 to 1,544)	July 2010 to August 2017
Pennsylvania State University and University of Texas at San Antonio (October 2018) ^b	September 2017 through December 2017	Analysis of vital statistics data from the Puerto Rico Vital Statistics System	1,139 (1,006 to 1,272)	2010-2016
Harvard University (May 2018) ^c	September 20, 2017 through December 31, 2017	Population-based stratified cluster sample of 3,299 households	4,645 (793 to 8,498)	September 20 to December 31, 2016

Source: GAO analysis of published studies. | [GAO-19-486](#)

^aCarlos Santos-Burgoa, et al., “Project Report: Ascertainment of the Estimated Excess Mortality from Hurricane Maria in Puerto Rico,” *The George Washington University, Milken Institute School of Public Health in Collaboration with the University of Puerto Rico Graduate School of Public Health*, (August 2018), which was also published in Carlos Santos-Burgoa, et al., “Differential and persistent risk of excess mortality from Hurricane Maria in Puerto Rico: a time-series analysis,” *The Lancet Planetary Health*, Published Online (October 11, 2018).

^bAlexis R. Santos-Lozada and Jeffrey T. Howard, “Use of Death Counts From Vital Statistics to Calculate Excess Deaths in Puerto Rico Following Hurricane Maria,” *The Journal of the American Medical Association*, vol. 320, no.14 (2018): 1491-1493.

^cNishant Kishore, et al., “Mortality in Puerto Rico after Hurricane Maria,” *The New England Journal of Medicine*, vol. 379, no.2 (2018): 162-170.

Studies Used Different Methodologies and Found Different Estimates of Excess Deaths

While the three studies estimated excess deaths by comparing observed deaths that occurred during a period of time after Hurricane Maria with the estimates of the expected number of deaths had the disaster not occurred, they used different methodologies and found different estimates of excess deaths. Specifically, two of the studies—the GW study and the Penn State study—were based on vital registration records data, while the Harvard study was based on survey data.

GW Study. The GW study used vital registration mortality data from the Puerto Rico Vital Statistics Records division of the Puerto Rico Department of Health, population census data, and data on monthly net domestic migration to estimate excess deaths in Puerto Rico from September 2017 through February 2018. Specifically, using vital registration data by age, sex, and municipality of residence, the researchers modeled mortality from July 2010 to August 2017, taking into account changes in the population at risk over time, and projected these estimates forward to estimate the number of deaths that would have been expected had the hurricane not occurred.⁴⁴

The researchers developed two counterfactual scenarios to estimate expected deaths had the hurricane not occurred. The first scenario, which they label the ‘census’ scenario, assumed trends in the population size, composition, and distribution were the same before and after the hurricane. They used the census annual estimates of population size by age, sex, and residence by municipal-level socioeconomic development to derive population size estimates in each month from July 1, 2010, to July 1, 2017. The second scenario, labeled the ‘displacement’ scenario, attempts to account for migration from Puerto Rico after the hurricane. The researchers estimated cumulative excess net migration from Puerto Rico from September 2017 through February 2018, and subtracted this from the census population estimates in these months. The researchers estimated cumulative monthly population displacement after the hurricane using net domestic air travel data from August 2017 through February 2018 from the U.S. Bureau of Transportation Statistics and data from a Puerto Rico Planning Board survey of airline travelers. For both the census and displacement scenarios, the researchers compared the estimates of expected death rate to the actual death rate from September 2017 through February 2018.

⁴⁴The population at risk is the population that is exposed to the occurrence of a vital event, for example, the total population in the case of deaths.

Penn State study. The Penn State study used data from the Puerto Rico Vital Statistics System to estimate the number of excess deaths in Puerto Rico following Hurricane Maria. In contrast to the GW study, which modeled death rates accounting for changes in the population, the Penn State study used data on total death counts. To estimate the expected number of deaths had the hurricane not occurred, the researchers used monthly death counts from 2010 through 2016 to estimate the average number of deaths per month and historical ranges of variability (95 percent confidence intervals) around these numbers. They then compared monthly death counts for September 2017 through December 2017 to the upper 95 percent confidence interval bounds of the expected number of deaths.

Harvard study. While the GW and Penn State studies were based on vital registration records data, the Harvard study was based on household survey data. To estimate the observed death rate in Puerto Rico after the hurricane (from September 20, 2017 through December 31, 2017), the researchers used data from a sample survey. Specifically, researchers conducted a survey of 3,299 randomly selected households in Puerto Rico. Households were randomly sampled using a stratified cluster sample design. Barrios (neighborhoods) were classified into 8 strata by the level of remoteness. Within each stratum, 13 barrios were randomly selected (from a sampling frame of 900 barrios). Within each barrio, 35 households were randomly selected. The survey was administered to one adult respondent per household. It included questions on known deaths in the household and neighborhood that occurred after the hurricane, household composition, and hurricane-related movement out of the household or barrio, among other things. The researchers used data from the survey to estimate the death rate after the hurricane.

To estimate the expected death rate had the hurricane not occurred, they used official monthly mortality data between September 20, 2016 through December 31, 2016 from the Puerto Rico Department of Health. To estimate excess deaths, the researchers compared the estimated death rate after the hurricane with the expected death rate. They used the population size estimated from their survey to convert the excess death rate to the number of excess deaths.

Different Migration Scenarios and Study Designs Affected the Estimates of Excess Death

The GW study produced two different estimates of excess deaths from models with different assumptions about migration after Hurricane Maria. The study's displacement scenario considered the effect of migration after Hurricane Maria in the estimates of excess deaths. After modeling the monthly death rate from 2010 through 2017 in the census scenario, the displacement scenario further accounted for migration after Hurricane Maria using additional data from the Bureau of Transportation Statistics and a survey of airline travelers. Accounting for the migration after Hurricane Maria resulted in a higher estimate of excess deaths, 2,975 excess deaths in the displacement scenario compared to the 1,191 in the Census scenario.

The effect of different migration scenarios was less clear in the Penn State and Harvard studies because of other differences in the studies (e.g. study design). The Harvard study accounted for migration after Hurricane Maria by calculating the excess deaths using population estimates obtained from their survey. The study used the survey rather than Census population estimates to account for the possibility that the population size was reduced due to hurricane-related out-migration. After seeing seasonal but stable trends in the death rates from 2010 to 2016, the researchers used death rates between September 20, 2016 and December 31, 2017, the most recent prior to the hurricane, to estimate the expected number of deaths. Researchers in the Penn State study observed the same seasonal but stable trends in deaths from 2010 to 2016 and used the average monthly death rates to obtain the expected number of deaths. The researchers were aware of Puerto Rico's population decline in recent years and after Hurricane Maria, but said that the number of deaths remained stable despite the population decline. In addition, they noted that those who remained in Puerto Rico during and after the hurricane were likely to be more vulnerable on average.

The different study designs affected the precision of the estimates of excess deaths. The confidence interval surrounding an estimate is a measure of the precision of the estimate: the more precise the estimate, the smaller the confidence interval. Estimates from the Penn State and GW studies had similar levels of precision compared to that of the Harvard study. The Penn State study had the smallest confidence intervals and the most precision, 1,006 to 1,272, while the Harvard study had the largest confidence intervals and the least precision, 793 to 8,498. Penn State and GW used a study design based on vital records to estimate the number of deaths following Hurricane Maria. Vital records are nominally a census of all deaths and are a relatively precise method of estimating the number of

deaths in Puerto Rico. In contrast, Harvard used a study design based on a sample survey. The sample survey design resulted in sampling error, which occurs because a portion and not the entire population is surveyed. In addition, the sample design involved cluster sampling, which generally decreases precision compared to a simple random sample or stratified design. The survey design, combined with the small number of deaths in the sampled population, resulted in a relatively less precise method of estimating excess deaths.

Sources of Error in the Estimates of Excess Death

Any estimate, derived from either a household sample or a modeling procedure, will be subject to various sources of error, some of which can be difficult to quantify. The precision of statistical estimates are often expressed as a margin of error or confidence interval. Harvard's estimate is based on the responses from a random sample of 3,299 households. Researchers at Harvard noted that Puerto Rico's vital registry data was not available at the time of the study, and as a result, the Harvard team conducted their study based on survey data. They also chose this design because they were able to deploy it quickly after Hurricane Maria and in advance of the 2018 hurricane season, and did not have to rely on death registry data, which the researchers stated could be incomplete or lagging. All estimates derived from random samples are subject to sampling error. Because they followed a procedure based on random selections, their sample is only one of a large number of samples that might have been drawn. In a multistage survey with clustering and stratification, the households sampled have an unequal probability of being selected.⁴⁵

The use of weights is a generally accepted analysis procedure when deriving generalizable estimates from a multistage sample. Each sampled element should be subsequently weighted in the analysis to account statistically for all the members of the population, including those who were not selected. The Harvard study did not apply weights in the paper published in the *New England Journal of Medicine*, although the researchers reported a weighted analysis in a supplemental appendix made available online.⁴⁶ Household surveys

⁴⁵Multistage surveys such as this one include stratification, a technique that ensures representation across geographic areas, and clustering of villages, a typical practice for household surveys in developing countries that reduces the cost of conducting a survey by reducing the number of locations to which interviewers must travel.

⁴⁶The weighted analysis was made available by Kishore, et al., in *Hurricane Maria Mortality Study (NEJM online, Kishore et al., May 29, 2018)*: Technical FAQ, in GitHub, a

also have sources of non-sampling error that are not reflected in a confidence interval. For example, differences in how a particular question is interpreted or the types of people who do not respond to a question can introduce errors into the survey results. The survey followed generally accepted survey design principles to minimize coverage, nonresponse, and measurement error.

The Penn State and GW researchers also have margins of error on their estimates; however, their sources of error are different from Harvard's household survey estimate. The margin of error for Penn State's estimate is derived solely from fluctuation of official death counts from vital records for prior years. The GW estimate has a margin of error that takes into account fluctuations of official death counts, population migration, and a statistical model.


public online collaboration website, accessed December 21, 2018, https://github.com/c2-d2/pr_mort_official/blob/master/misc/technical-faq.pdf.

Appendix II: Federal Emergency Management Agency (FEMA) Documentation Policy Waiver for Funeral Assistance Requests for the 2017 Hurricanes in Puerto Rico

In November 2018, Federal Emergency Management Agency (FEMA) issued a policy waiver to allow modification of some of the documentation requirements for Funeral Assistance in Puerto Rico for Hurricanes Irma and Maria (see fig. 2). Under the waiver, FEMA officials are allowed to consider factual written statements submitted by a family member or other person with first-hand knowledge of the circumstances of the disaster-related death, in conjunction with the official death certificate or statement from a medical official (e.g. medical examiner or coroner).

Figure 2: Federal Emergency Management Agency's (FEMA) Documentation Policy Waiver for Funeral Assistance Requests for the 2017 Hurricanes in Puerto Rico

U.S. Department of Homeland Security
Washington, DC 20472



MEMORANDUM FOR: Michael Byrne
Federal Coordinating Officer
FEMA-DRs 4336 and 4339-Puerto Rico

FROM: Christopher B. Smith CHRISTOPHER B
Director SMITH
Individual Assistance Division

Digitally signed by CHRISTOPHER
B SMITH
Date: 2018.11.26 15:26:27 -05'00'

SUBJECT: Funeral Determination Authority Request and Documentation Policy
Waiver for FEMA-DRs 4336 and 4339-Puerto Rico

This memorandum is in response to your request, dated January 29, 2018, for authority to approve Funeral Assistance requests for FEMA-DRs 4336 and 4339-PR.

On January 19, 2018, the Individual Assistance (IA) Division issued the Funeral Assistance Policy Waiver for disasters declared on or after August 25, 2017, in order to align FEMA's designation of disaster-related deaths with Centers for Disease Control and Prevention (CDC) guidance¹ and Department of Homeland Security Office of Inspector General (OIG) recommendations. The OIG routinely audits FEMA's Individuals and Households Program (IHP) to ensure policy adherence and has previously emphasized the importance of developing criteria and guidelines for determining disaster-related deaths². The CDC guidance, which was released on October 23, 2017, provides examples and recommendations for more accurate reporting of disaster-related deaths, and outlines parameters for classifying deaths as directly or indirectly attributed to a disaster by a licensed medical official. The FEMA policy requirement for a licensed medical official to attribute a death to a disaster did not change with the January interim Funeral Assistance Policy Waiver memo.

Due to the disaster-caused situation in Puerto Rico, the IA Division will allow modification of some of the documentation requirements in current policy and guidance (FP 104-009-3, Individuals and Households Program Unified Guidance, Chapter 6, Section II and the January 19, 2018 Funeral Assistance Policy Waiver memorandum). Following Hurricanes Irma and Maria, many local morgues and medical officials were overwhelmed with decedents, including individuals who died of disaster-related conditions as well as those who died of other causes. Additionally, a number of circumstances have been identified that indirectly attribute deaths to the disaster, but would not typically be captured on a death certificate, such as damaged roads delaying ambulances, extended power outages, and lack of potable water.

¹ Centers for Disease Control and Prevention *Reference Guide for Certification of Deaths in the Event of a Natural, Human-Induced, or Chemical/Radiological Disaster* in October 2017:
<https://www.cdc.gov/nchs/data/myss/vsrg/vsrg01.pdf>

² OIG 05-20, Department of Homeland Security Office of Inspector General Audit of FEMA's Individuals and Households Program in Miami-Dade County, Florida, for Hurricane Frances, May 2005
www.fema.gov

Source: FEMA. | GAO-19-486

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When reviewing Funeral Assistance requests for FEMA-DRs 4336 and 4339-PR only, FEMA IHP staff will also consider factual written statements submitted by a family member or other person with first-hand knowledge of the circumstances of the decedent's death, in conjunction with the official death certificate or statement from a medical provider. The statement should provide additional information regarding the circumstances of the death, including the disaster-related conditions that exacerbated or contributed to the death. Statements provided by the family member or other person that contradict the death certificate or medical provider's statement, or present significantly different circumstances surrounding the death, will not be considered sufficient for FEMA staff to approve Funeral Assistance. The statement must be based on facts related to the disaster and not personal opinions.

The following examples represent a sample of situations where Funeral Assistance may be approved if supported by a statement in the file:

- Deaths that can be tied to utility outage, such as the decedent was unable to power necessary life-sustaining medical equipment, unable to refrigerate medication such as insulin, or was in a hospital without power;
- Infections caused by conditions following the disaster, such as septicemia;
- Decedent was unable to obtain medical equipment, prescriptions, or other items needed to manage a health condition, such as insulin, due to the disaster;
- Decedent had a pre-existing condition that was exacerbated by the disaster, such as anemia (due to lack of ability to get supplements, food high in iron, etc.); or
- Decedent was not able to obtain emergency medical care in time because of disaster-caused obstructions, such as the ambulance could not reach them or they could not travel to the hospital due to road closures/obstructions.

Situations that would not be eligible for Funeral Assistance include:

- Self-inflicted or self-induced deaths not related to the disaster conditions;
- Death due to factors not related to the disaster; or
- Death due to pre-existing condition and statement only indicates the death may have been due to the disaster (i.e. stress).

If the medical documentation indicates the death is directly or indirectly related to the disaster, the statement is not required; the statement is only necessary if the death certificate or medical documentation does not indicate the death was disaster-related.

All other eligibility factors and documentation requirements outlined in the IHP Unified Guidance remain in effect. The IA Division will coordinate a review of Funeral Assistance requests for FEMA-DRs 4336 and 4339-PR denied prior to the approval of this policy waiver, to determine if the request meets the current eligibility requirements.

In order to maintain consistent application of the policy, all Funeral Assistance requests must continue to be reviewed for final processing by the IHP staff, especially in light of the recent policy changes.

Should you have any questions or need additional information, please contact Monty LeMaire, IHP Service Delivery Branch Chief.

cc: Jeffrey Byard, Associate Administrator, Office of Response and Recovery
Keith Turi, Assistant Administrator, Recovery Directorate
Thomas Von Essen, Regional Administrator, Region II
Monty LeMaire, Branch Chief, Individuals and Households Program Delivery Branch,
Individual Assistance Division

Appendix III: Comments from the Department of Homeland Security

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



**Homeland
Security**

August 26, 2019

Chris P. Currie
Director, Homeland Security and Justice
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Re: Management Response to Draft Report GAO-19-486, "DISASTER RESPONSE: Federal Assistance and Selected States and Territory Effort to Identify Deaths from 2017 Hurricanes"

Dear Mr. Currie:

Thank you for the opportunity to review and comment on this draft report. The U.S. Department of Homeland Security appreciates the work of the U.S. Government Accountability Office's (GAO) work in planning and conducting its review and issuing this report.

The Department is pleased to note the draft report clarifies for Congress and the public that states and local jurisdictions are responsible for identifying and documenting disaster-related deaths, not the federal government. While the Federal Emergency Management Agency (FEMA) has the lead role in responding to disasters, it is important to recognize that FEMA relies on information obtained from its state, local, and other partners to help determine what aid survivors are eligible for through the Individual Assistance program.

FEMA is committed to the whole community concept in meeting survivors' needs. Preparedness is a shared responsibility; it calls for the involvement of everyone — not just the government — in preparedness efforts. By working together, everyone can help keep the nation safe from harm and help keep it resilient when struck by hazards, such as natural disasters, acts of terrorism, and pandemics.

Again, thank you for the opportunity to review and comment on this draft report. Technical comments were previously provided under separate cover. Please feel free to contact me if you have any questions. We look forward to working with you in the future.

Sincerely,

A handwritten signature in black ink, appearing to read "Jim H. Crumpacker".

JIM H. CRUMPACKER, CIA, CFE
Director
Departmental GAO-OIG Liaison Office

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact

Chris P. Currie, (404) 679-1875 or curriec@gao.gov

Staff Acknowledgments

In addition to the contact named above, Joel Aldape (Assistant Director), Su Jin Yon (Analyst-In-Charge), Pedro Almoguera, Aditi Archer, Lorraine Ettaro, Justin Fisher, Eric Hauswirth, Susan Hsu, Heidi Nielson, Jerome (Jerry) Sandau, Hunter Stephan, and Sirin Yaemsiri made significant contributions to this report.

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