

Testimony of Charley E. Willison before the United States Commission on Civil Rights: Federal Emergency Management Agency (FEMA)'s role in disaster preparedness and response to Hurricanes María in Puerto Rico and Harvey in Texas

I. Introduction:

Director Marik Xavier-Brier and Dr. Julie Greico, thank you for inviting me to participate in this discussion of the Federal Emergency Management Agency (FEMA)'s role in disaster preparedness and response to Hurricanes María in Puerto Rico and Harvey in Texas. My focus today is on the federal responses to Hurricanes María and Harvey and considerations for improving equity in future federal disaster responses.¹ I will discuss two main points of interest to the Commission – 1) Disparities or inequities associated with access to relief aid; 2) Accessibility of requests for aid and any barriers.

The outcomes and choices governments make in disaster responses are increasingly important as we face the ongoing COVID-19 pandemic and anthropogenic climate change that increases the likelihood of public health disasters. Racial or ethnic minority group members and low-income individuals are most at risk of adverse health and economic consequences during disasters (C. Willison and Holmes 2020). Recognizing these risks and addressing accessibility barriers during federal aid deliberations will help the federal government prepare for future disasters and reduce the risk of exacerbating inequities in future disaster responses.

II. Federal Disaster Responses and the 2017 Hurricanes:

How the United States federal government responds to public health disasters became increasingly salient and important in 2020. While the COVID-19 pandemic is by magnitudes the most devastating and challenging public health crisis since the 1918 influenza pandemic, the United States is not new to responding and managing other types of public health emergencies. Learning from past events may help us understand why the federal government responds effectively or ineffectively to public health emergencies and offer opportunities to improve policymaking to mitigate future inequities. In 2017, the federal government responded on a larger scale and much more quickly across measures of federal money and staffing to Hurricanes Harvey and Irma in Texas and Florida, compared with Hurricane María in Puerto Rico (C. E. Willison et al. 2019). The variation in the responses was not commensurate with storm severity and need after landfall in the case of Puerto Rico compared with Texas and Florida. If disaster responses vary in their effectiveness across communities, health equity is affected (C. E. Willison et al. 2019, 2021).

As a result of anthropogenic climate change, we will continue to see increasing and concurrent: natural disasters, adverse weather events, and threats from emerging infectious diseases (Shukla et al. 2019). Racial or ethnic minority groups, as a result of centuries of political and economic oppression, are at highest risk adverse consequences, morbidity, and mortality from natural disasters (Sovacool, Tan-Mullins, and Abrahamse 2018; Substance Abuse and Mental Health Service Administration 2017). Assuming that disaster responses should be at least commensurate to the degree of severity and need of the population, insufficient disaster responses, such as in the case of Hurricane María in Puerto Rico, raise concern for increases in health disparities and adverse health outcomes (C. E. Willison et al. 2019; Orengo-Aguayo et al. 2019). Political institutions, including participation and representation in debates over disaster aid influence accessibility of requests for aid. Comprehensive disaster planning and response must take equity into account in order to prevent and reduce future inequities.

¹ Portions of the text and figures come directly from published, peer reviewed and currently under-peer-review, publications authored by myself and my colleagues on the topic of discussion.

III. Examining the federal response to Hurricanes María and Harvey:

Disparities and inequities associated with access to relief aid:

Research conducted by my colleagues and I in 2019 show that the federal response was faster and more generous across measures of money and staffing to Hurricanes Harvey and Irma in Texas and Florida, compared with Hurricane María in Puerto Rico (C. E. Willison et al. 2019).² This result would be unsurprising if Hurricane María was less damaging than Irma and Harvey. However, Hurricanes Harvey and Irma made landfall as category four hurricanes (Cangialosi, Latto, and Berg 2018; Blake and Zelinsky 2017), and María hit Puerto Rico as a ‘high-end’ category 4, or just below the threshold of a category 5 hurricane (Pasch, Penny, and Berg 2018). María caused more damage in Puerto Rico than Irma in Florida or Harvey in Texas in terms of loss of electricity and housing destruction (Blake and Zelinsky 2017; Pasch, Penny, and Berg 2018; Cangialosi, Latto, and Berg 2018), with overall damage estimates comparable to Harvey, and greater than estimates for Irma (Cangialosi, Latto, and Berg 2018). Assuming that infrastructure costs are higher in Texas and Florida, and therefore more expensive to repair, compared with Puerto Rico, the high damage estimates in Puerto Rico emphasize the severity of storm damage. Thus, assuming that disaster responses should be commensurate to the degree of storm severity and need of the population, the federal response is questionable and the degree of variation between the disaster responses is problematic (C. E. Willison et al. 2019).

Figure 1³

² Our analysis spanned from landfall to 6 months after landfall for each hurricane (C. E. Willison et al. 2019). To examine differences in disaster responses across the hurricanes, we focused on measures of federal spending, federal resources distributed and direct and indirect storm-mortality counts. Federal spending estimates came from congressional appropriations and Federal Emergency Management Agency (FEMA) records. Resource estimates came from FEMA documents and news releases. Mortality counts came from National Oceanic and Atmospheric Administration (NOAA) reports, respective vital statistics offices and news articles. Damage estimates came from NOAA reports. In each case, we compared the responses and the severity at critical time points after the storm based on FEMA time logs (C. E. Willison et al. 2019).

³ Cumulative dollars scaled in millions (C. E. Willison et al. 2019). For example, 5480 million dollars is equal to 5.48 billion dollars. Federal Emergency Management Agency (FEMA) money refers to FEMA assistance to individuals and families (Federal Emergency Management Agency 2018). This includes applications by individuals currently residing in the USA post-Maria, as well as persons in Puerto Rico. In Survivor’s Pockets includes total count of federal aid to survivors by days post-landfall, including FEMA aid to individuals and families, Small Business Association Loans and National Flood Insurance payouts (Federal Emergency Management System 2018). Data references included in the [online supplementary appendix 1](#). The authors recognize that line plots are the standard for reporting temporal data. Due to the gaps in data available from FEMA, line plots did not read well. The authors chose to instead report the data in bar charts in a series of critical time points (C. E. Willison et al. 2019).

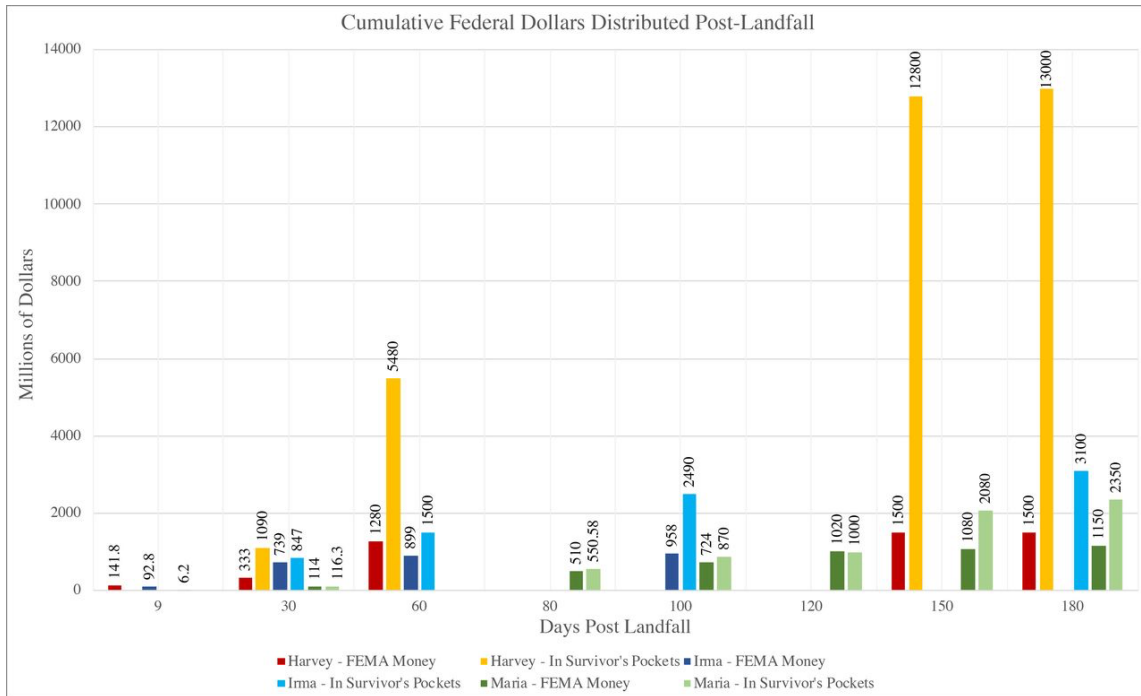
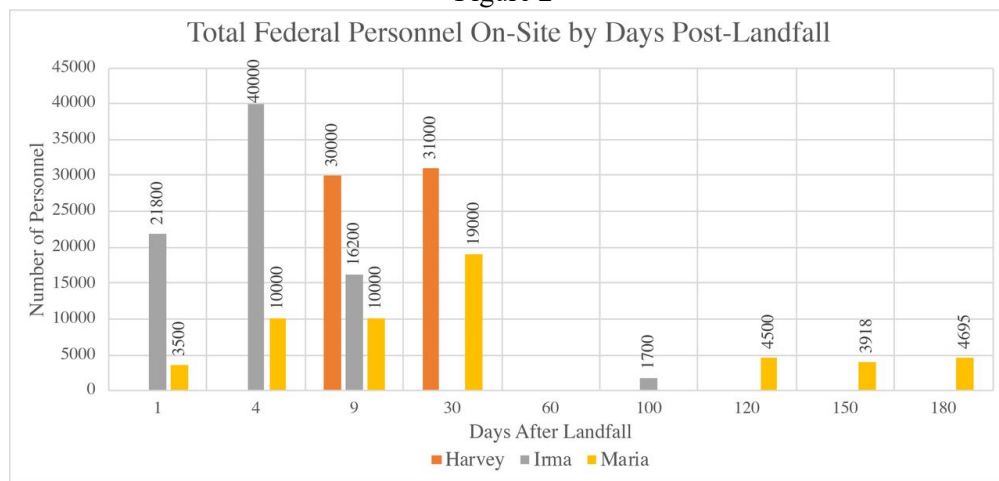


Figure 1 shows measures of FEMA dollars awarded to individuals and families by the number of days after landfall (C. E. Willison et al. 2019). Within the first 9 days after the hurricanes hit, both Harvey and Irma survivors had already received nearly US \$100 million in FEMA dollars awarded to individuals and families, whereas María survivors had only received slightly over US \$6 million in recovery aid. Within the first 2 months post-landfall, Harvey and Irma survivors both received nearly US \$1 billion (figure 1, Harvey US \$1.28 billion and Irma US \$899 million). María funds did not hit 1 billion until 4 months after landfall. The same trend holds for total federal dollars received by survivors, including FEMA dollars, national flood-insurance payouts and loans from the Small Business Association (C. E. Willison et al. 2019).

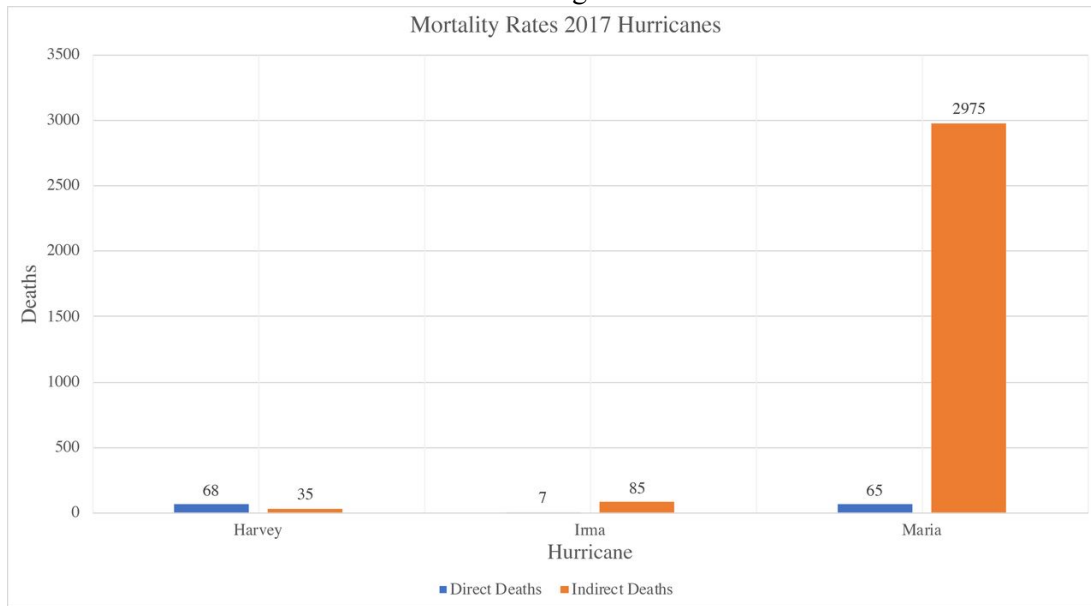
Figure 2⁴



⁴ This figure uses all data currently available from Federal Emergency Management Agency (FEMA) hurricane recovery progress records. If data are not recorded for a marked time point, this does not indicate a zero, but an absence of that data. Data references are included in the [online supplementary appendix](#). The authors recognize that line plots are the standard for reporting temporal data. Due to the gaps in data available from FEMA, line plots did not read well. The authors chose to instead report the data in bar charts in a series of critical time points.

Federal staffing can also indicate response to natural disasters and is critical to recovery efforts, acutely in terms of rescue, as well as long-term stabilization (C. E. Willison et al. 2019). Examples of staffing efforts include FEMA employees and the National Guard. Long-term staffing efforts are determined by ongoing need for recovery and repair. Figure 2 shows staffing levels by the number of days post-landfall. Within 9 days of landfall, there were 30,000 federal employees posted in Texas, 16,200 posted in Florida and 10,000 posted in Puerto Rico. At the peak, 19,000 federal employees were posted in Puerto Rico, 1 month after landfall, well short of the peak for Texas of 31,000 (C. E. Willison et al. 2019).

Figure 3⁵



Disparities in staffing and funding are underscored by the mortality counts across each hurricane (C. E. Willison et al. 2019). Hurricane deaths are measured by direct and indirect deaths. NOAA defines direct deaths as ‘[d]eaths occurring as a direct result of the forces of the tropical cyclone’ (Cangialosi, Latto, and Berg 2018). These would include individuals who drowned in storm surge, rough seas, rip currents and freshwater floods (Cangialosi, Latto, and Berg 2018). Indirect deaths are defined as, ‘[d]eaths occurring from such factors as heart attacks, house fires, electrocutions from downed power lines, vehicle accidents on wet roads, etc’ (Cangialosi, Latto, and Berg 2018). As shown in Figure 3, Hurricane Harvey was responsible for 68 direct deaths (Blake and Zelinsky 2017) and 35 indirect deaths from electrocution, motor-vehicle crashes and isolation from necessary medical services (Blake and Zelinsky 2017). Hurricane Irma caused a total of seven direct deaths, with an additional 85 indirect deaths (Cangialosi, Latto, and Berg 2018). Of the deaths Irma caused that occurred in the USA, four direct deaths and 80 indirect deaths were in Florida (Cangialosi, Latto, and Berg 2018). The indirect deaths were primarily caused by falls during preparations for Irma’s approach, vehicle accidents, carbon monoxide poisoning from generators, chainsaw accidents and electrocutions, with 14 occurring from overheating due to air conditioner failure in a nursing home (C. E. Willison et al. 2019; Cangialosi, Latto, and Berg 2018).

⁵ Indirect deaths for Maria are 6 months post-landfall (Audi et al. 2018), actual deaths may be higher over extended time frame (Pasch, Penny, and Berg 2018; Robles et al. 2017; Santos-Lozada 2018). Indirect deaths for Harvey and Irma are totals; ongoing death counts after the storm are not significantly different from previous years, indicating that the totals for indirect deaths are correct (Blake and Zelinsky 2017; Cangialosi, Latto, and Berg 2018). Deaths/mortality counts in the data and in the article text refer to absolute deaths (not mortality rates as number of deaths per unit person-time). Data references included in the [online supplementary appendix](#).

For Hurricane María in Puerto Rico, NOAA notes that the death toll is highly uncertain (C. E. Willison et al. 2019). The count for direct deaths by the federal government in 2018 was listed as 65, with federal reports listing an unknown number for indirect deaths (Pasch, Penny, and Berg 2018). The Puerto Rican Government and George Washington University reviewed mortality data, and in August 2018 released updated, official mortality estimates (Audi et al. 2018). Total excess mortality is used as the most accurate available proxy for indirect deaths from Hurricane María. It is a modelled number based on changes in the mortality rate pre-disaster and post-disaster rather than careful examination of death certificates, due to inaccuracies in reporting cause of death, on death certificates in Puerto Rico. This research indicates that total excess mortality post-landfall between September 2018–February 2019 total 2975 (Audi et al. 2018).⁶ Even taking the official death toll at face value, the mortality counts for María—as an indicator of need and severity—are commensurate with both Harvey and Irma, requiring a response at least on par with both prior responses. Considering the severe undercount of indirect deaths associated with María, the federal response was inadequate (C. E. Willison et al. 2019).

Accessibility of requests for aid, and any barriers:

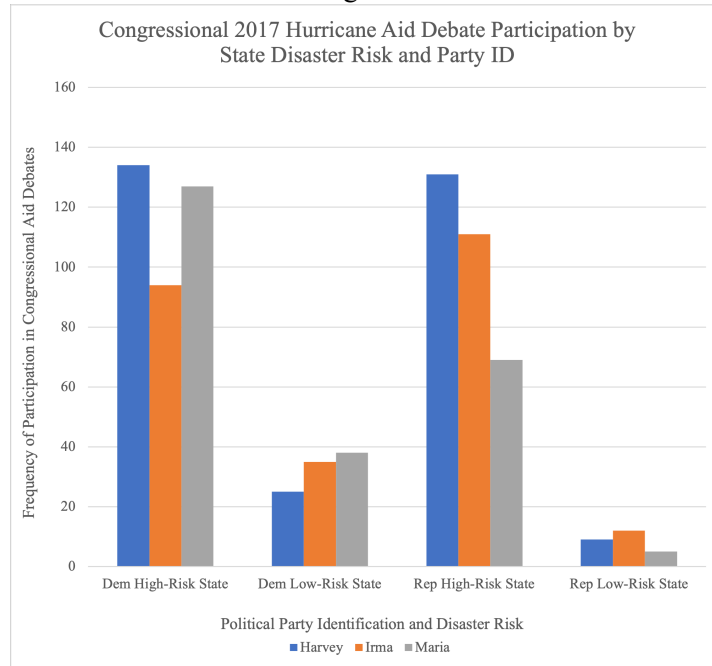
Overall, congress responded to the hurricane disasters across the course of three separate spending bills from September to December 2017 (C. E. Willison et al. 2019). In September 2017, Congress authorized US\$15.25 billion in Hurricane Harvey and Irma disaster aid, with US\$7.4 billion allocated for FEMA’s Disaster Relief Fund, US\$450 million for the SBA’s Disaster Loans Program Account and US\$7.4 billion for HUD’s Community Development Block Grant (CDBG) program to support local relief for Irma and Harvey (Lowey and 115th Congress 2017). The second bill was passed on 26 October 2017, providing additional supplemental appropriations for disaster relief requirements for all three hurricanes (Conyers and 115th Congress 2017). The bill provided US\$18.67 billion for the Disaster Relief Fund, where US\$10 million must be transferred to the Department of Homeland Security Office of Inspector General for audits and investigations related to disasters and cancelled US\$16 billion of the debt held by the National Flood Insurance Program (Conyers and 115th Congress 2017). In this October bill, up to US\$4.9 billion was allocated for Puerto Rico in the form of a Community Disaster Loan, as opposed to the CDB grants allocated in September to Texas and Florida (Conyers and 115th Congress 2017; Dayen 2017). On 9 January, Puerto Rico was denied that US\$4.9 billion loan from the October bill, for having a cash balance deemed too high to receive the loan, with the Treasury Department seeking further proof of lack of liquidity (Dayen 2018). The third bill, which was passed in both chambers in December but was not signed until 9 February 2018, contributed to the delayed payout in funds to Puerto Rico (Severino 2018). Sec. 21 210 of the third bill established that the Governor of Puerto Rico must establish a 12-month and 24-month recovery plan (Larson and 115th Congress 2018) endorsed by the Oversight Board (PROMESA 2018) established under Puerto Rico Oversight, Management and Economic Stability Act requiring monthly reports to Congress. Texas and Florida were able to receive funds without conditional approval of recovery plans (C. E. Willison et al. 2019).

Table 1: Partisan Federal Congressional Discourse of 2017 Hurricanes

Hurricane	Total Mentions	Total Mentions by Republicans	Total Mentions by Democrats
María	252	76	166
Irma	259	122	131
Harvey	305	142	160
Total	816	340	457

⁶ The risk of death was found to be 45% higher, persisting through the end of the study period for individuals living in municipalities of low socioeconomic development, greatly exacerbating pre-existing health inequalities (Audi et al. 2018). There were no other substantial changes in acute threats to mortality besides Hurricane María that may account for the significant increase in deaths immediately post-landfall (Audi et al. 2018; Robles et al. 2017).

Figure 4



Research conducted by my colleagues and I in 2021 (currently under peer-review with an academic journal) analyzes federal, congressional aid deliberations as measured in congressional floor debates over funding and disaster aid relief for the 2017 hurricanes for six months after landfall⁷. Congressional floor debate speeches are a unique method to begin to identify factors that may have influenced why aid (speed, staffing and federal dollars) was significantly faster and greater for Texas and Florida compared to Puerto Rico, despite comparable need and unprecedented mortality in Puerto Rico (C. E. Willison et al. 2019; Audi et al. 2018). We find bipartisan participation in floor debates over aid to Texas and Florida, but a mostly Democrat participation for Puerto Rican aid (see Table 1) (C. E. Willison et al. 2021). Overall, deliberation and participation in debate was strongly related to whether a state or district was at-risk of natural disasters (see Figure 4). Nearly 30% of all states did not participate in any aid debate for the 2017 hurricanes during the time period (see Appendix 1 of this testimony) (C. E. Willison et al. 2021).

Our results suggest that the deaths of thousands of Americans may not be enough to mobilize congressional participation in disaster aid deliberations, and that legislators may be more incentivized to participate in debates if they perceive disaster risk to their districts. This may exacerbate disparities where some states have more advocacy for federal disaster aid than others (C. E. Willison et al. 2021). These disparities are exacerbated by existing political structures. Puerto Ricans are American citizens, but Puerto Rico lacks congressional representation. Puerto Rico is one of five U.S. territories. The territories are granted Congressional Delegates—one per each territory, and only in the House—with no voting power on the floor of Congress. Previous scholarship demonstrates that delegate presence on the floor, as opposed to voting membership, obscures territorial interests in broader congressional deliberations

⁷ Congressional floor debates were collected from the publicly available Congressional Record for floor debates in both congressional chambers (House and Senate) (United States Congress 2020). Search terms included terms specific to each hurricane: ‘hurricane, location (Texas, Florida, Puerto Rico), hurricane name (Harvey, Irma, Maria)’. Although there was some overlap of documents that discuss one or more hurricanes (e.g. disaster relief bill debates), we identified discourse specific to each individual hurricane in order to parse deliberations over aid to the hurricanes individually rather than hurricane aid, generally. Instances of overlap between hurricanes were primarily short references or comparisons to prior federal action in response to a disaster.

(Sparrow 2006; Holtzman 1986; Brown 1950; Lewallen and Sparrow 2018). Puerto Rico has been a U.S. colony, without independent political status, or integrated representation and political power in the U.S. since 1898 (Peón 2020). As a result of these institutional constraints and colonial status, Puerto Rico faces accessibility barriers to federal disaster aid debates. *According Puerto Rico greater voting power would likely reduce future barriers to accessibility of requests for disaster aid* (C. E. Willison et al. 2021).

The Trump Administration often argued that the delay of money and goods to Puerto Rico was based on geographic limitations (C. E. Willison et al. 2019). Yet, disaster appropriation funding to Puerto Rico took over 4 months post-landfall to reach a comparable amount of money received by Florida and Texas in half the amount of time. The additional 2 months to distribute critical aid is not likely explained by geography, but likely a product of the congressional negotiations outlined above, seeking to demonstrate that Puerto Rico had no sufficient assets to deploy and required financial assistance and accessibility barriers to aid requests in Congress as a result of limited representation. Similarly, federal staffing rates in Puerto Rico reached comparable levels in three times the amount of time as Texas and 30 times the amount of time for Irma. The magnitude of this variation seems difficult to explain by geography (C. E. Willison et al. 2019).

IV. Concluding Remarks

Understanding drivers of governmental responses to public health emergencies is important for policy decision-making, planning, and equity. If disaster responses vary in their effectiveness across communities, health equity may decrease. Our research shows that the federal government responded on a larger scale and much more quickly across measures of federal money and staffing to Hurricanes Harvey and Irma in Texas and Florida, compared with Hurricane María in Puerto Rico (C. E. Willison et al. 2019). The variation in the responses was not commensurate with storm severity and need after landfall in the case of Puerto Rico compared with Texas and Florida (C. E. Willison et al. 2019). Participation in congressional deliberations over federal disaster aid for the 2017 hurricanes was bipartisan in floor debates over aid to Texas and Florida, but mostly Democrat participation for Puerto Rican aid (C. E. Willison et al. 2021). Yet, deliberation and participation in debate was strongly related to whether a state or district was at-risk of natural disasters. Nearly 30% of all states did not participate in any aid debate for the 2017 hurricanes (see Appendix 1) (C. E. Willison et al. 2021). Narrow participation paired with limited representation for U.S. territories may exacerbate accessibility barriers in deliberations over congressional requests for aid.

Assuming that disaster responses should be at least commensurate to the degree of storm severity and need of the population, the insufficient response received by Puerto Rico raises concern for growth in health disparities and increases in adverse health outcomes (C. E. Willison et al. 2019; Sovacool, Tan-Mullins, and Abrahamse 2018; Audi et al. 2018). *Remedying accessibility barriers regarding participation and representation in federal disaster aid deliberations may reduce inequities in future disaster responses* (C. E. Willison et al. 2021). Addressing these disparities becomes *increasingly important as the risk of disasters grows continually with climate change* (Shukla et al. 2019).

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VI. Appendix 1.

I. Search Criteria:

To understand and identify factors directly or indirectly shaping disaster aid prioritization in disaster aid debates, colleagues and I analyzed public federal, congressional floor debates of the hurricanes and disaster responses from landfall of each hurricane in 2017 until 6 months out from landfall of each hurricane (C. E. Willison et al. 2021). Congressional floor debates were collected from the Congressional Record utilizing the search terms specific to each hurricane: ‘hurricane, location (Texas, Florida, Puerto Rico), hurricane name (Harvey, Irma, Maria)’. The frequencies include counts of substantive (statement made in reference to or about, regardless of length (one sentence or longer), any of the 2017 hurricanes; does not include mentions as referenced in a list or without substantive context. Bill texts are omitted, and only congressional member deliberations are counted (total N).

Table 1: Frequency of Congressional Member Deliberations in Hurricane Aid Debates by State

	Harvey	Irma	Maria	Higher Puerto Rican Population ⁸	Disaster Risk ⁹
Alabama	6	2	2	N	Y
Arizona	1	3	3	N	N
Arkansas	2	1	1	N	Y
California	14	10	17	N	Y
Colorado	0	0	1	N	Y
Georgia	4	9	3	N	Y
Idaho	0	1	0	N	N
Indiana	1	0	0	N	Y
Iowa	1	1	1	N	Y
Kansas	2	2	0	N	Y
Kentucky	3	5	4	N	Y
Louisiana	6	9	3	N	Y
Maine	2	3	2	N	N
Michigan	0	0	0	N	N
Minnesota	3	2	3	N	N
Mississippi	0	1	1	N	Y
Missouri	5	0	0	N	Y
Montana	1	6	1	N	N
Nebraska	2	8	2	N	Y
New Mexico	3	0	0	N	N
North Dakota	0	0	0	N	N
Oklahoma	3	0	0	N	Y
Oregon	8	11	6	N	N
South Carolina	0	0	5	N	Y
South Dakota	1	1	1	N	N

⁸ U.S. Census data estimates for 2017 were utilized to identify states with higher populations of persons identifying as Puerto Rican (U.S. Census Bureau 2017). States were counted as having a higher proportion of persons of Puerto Rican territorial citizenship if 1% or greater of the population identified as Puerto Rican.

⁹ We used the National Oceanographic and Atmospheric Administration data on geographic disaster risk to identify areas at high-risk of disasters (National Oceanographic and Atmospheric Administration: National Centers for Environmental Information 2020). We identified the cut off for low risk of disasters as states with less than or equal to 35, 1 billion-dollar (or more) disaster events from 1980-2019 (National Oceanographic and Atmospheric Administration: National Centers for Environmental Information 2020) in order to control for states that have experienced an increase in major natural disasters in recent years (California, New Jersey).

Tennessee	0	0	0	N	Y
Texas	159	63	45	N	Y
Utah	0	0	0	N	N
Vermont	6	4	6	N	N
Washington	1	2	4	N	N
West Virginia	1	1	0	N	N
Wisconsin	0	0	2	N	N
Wyoming	1	2	0	N	N
Alaska	1	1	1	Y	N
Connecticut	0	3	8	Y	N
Delaware	0	1	1	Y	N
Florida	22	50	33	Y	Y
Hawaii	2	2	1	Y	N
Illinois	3	4	9	Y	Y
Maryland	6	8	8	Y	Y
Massachusetts	3	2	5	Y	N
Nevada	0	1	0	Y	N
New Hampshire	0	0	0	Y	N
New Jersey	10	7	11	Y	Y
New York	21	18	35	Y	Y
North Carolina	2	1	0	Y	Y
Ohio	2	2	7	Y	Y
Pennsylvania	7	0	2	Y	Y
Rhode Island	1	6	5	Y	N
Virginia	0	4	2	Y	N
Total states <i>not</i> participating in Congressional hurricane aid debates	14	13	15		

Figure 1¹⁰:

¹⁰ Data for Figure 1 taken from Table 1.

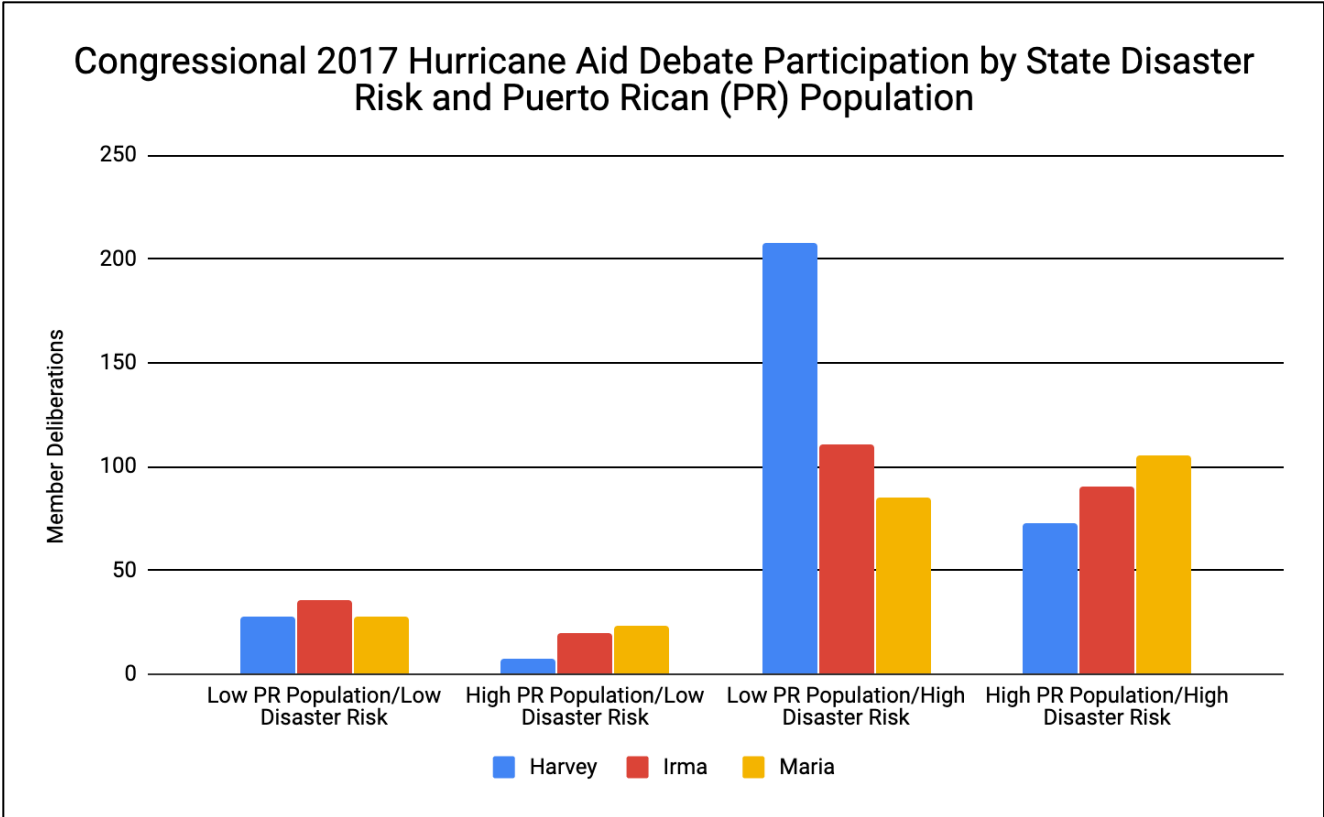


Figure 2¹¹:

¹¹ Data for Figure 2 sourced from the complete methodology described in the main article.

Congressional 2017 Hurricane Aid Debate Participation by Partisanship, State Disaster Risk and Puerto Rican (PR) Population

