

Evacuation Social Support Among New Orleans Households: Implications for Evacuation Management Systems

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ABSTRACT

This study reports findings from a survey administered in 2023 to investigate New Orleans households' social support networks: family and friends who can provide them with accommodations and other assistance during evacuations caused by hurricanes and other hazards. Findings describe the demographics and evacuation destination and accommodation intentions of households with and without social support, as well as the factors these households consider when choosing an evacuation destination. Preliminary findings show that 86% of respondents report at least one relative or friend with whom they can stay during an evacuation. However, the range and size of respondents' social support networks vary and influences where they will go and stay during an evacuation. In contrast, 14% of respondents lack social support and these respondents are most likely to stay at a hotel or public shelter during an evacuation. Implications for the design of evacuation management systems are discussed, including systems that support the discovery of vulnerable households and coordination with community organizations that provide transportation and temporary housing during evacuations.

Keywords

Disaster management, evacuation, social capital, survey, vulnerability.

INTRODUCTION

This work-in-progress study examines the social support networks of Greater New Orleans households: family and friends who can provide them with accommodations and other assistance during an evacuation. While prior survey research examines where households travel during an evacuation, and whether they stay at the homes of family and friends, hotels, or public shelters (Lindell et al., 2019), these studies do not examine the extent to which households can obtain accommodations with friends and relatives, and the demographic characteristics and evacuation intentions of households with and without social support. Lacking insight into households' social support networks presents two problems for research attempting to understand large-scale evacuation behavior and design information systems that can support household and community evacuation planning.

First, survey studies show that evacuees overwhelmingly rely on family and friends for temporary accommodations, but seldom examine households' social support networks to identify vulnerable groups who, lacking assistance from family and friends, may require assistance from community organizations during an evacuation. Surveys of intended and actual accommodations show that the majority of evacuees stay at the homes of family and friends, fewer stay in hotels, and far fewer stay in public shelters (Lindell et al., 2011; Mesa-Arango et al., 2013; Mitchell et al., 2017; Wong et al., 2018; Wu et al., 2012; Zeigler et al., 1981). Although emerging studies highlight unequal access to social support among households (Grace & Na, 2024; Na & Grace, 2022), empirical studies of households' social support networks are needed to characterize vulnerable groups that likely require transportation and accommodation assistance from public authorities and community groups during an evacuation.

Second, survey studies show that evacuees travel to diverse in-county, in-state, and out-of-state destinations (Morrow & Gladwin, 2005; Smith & McCarty, 2009; Wong et al., 2018; Wu et al., 2012), but do not adequately

explain why households travel to one destination over another. Beyond hazard proximity and related risk perceptions, such as residence in coastal counties threatened by hurricanes (Huang et al., 2016), studies observe weak or inconsistent correlations between evacuation destination and demographic variables such as age, disability, home ownership, income, race, and social vulnerability (Adeola & Picou, 2017; Asfaw et al., 2019; Baker, 1991; Bolin & Kurtz, 2018; Wu et al., 2012; Yabe & Ukkusuri, 2020). Understanding where households can travel to stay with family and friends can provide insight into households' likely evacuation destinations and, in turn, predict demand for accommodations such as hotels and public shelters.

These gaps in our knowledge of households' social support networks limit, in turn, our ability to design decision-support, simulation, and geographic information systems that can help emergency managers plan community evacuations by, for example, predicting the time of departure, routes of travel, destinations, and types of accommodations evacuees will require after leaving an evacuation zone (Lindell & Prater, 2007a; Yang et al., 2019). Simulating evacuation behavior requires empirically validated models of household evacuation destination and accommodation decision-making (Lindell et al., 2019; Murray-Tuite & Wolshon, 2013). These models and simulations support emergency management planning that involves coordinating public transportation and locating public shelters. Furthermore, knowledge of social support network availability and accessibility can inform the design of systems that can help identify and connect vulnerable households with transportation services and temporary accommodations.

To address these gaps in the literature, we report findings from an intended response survey administered to households in the Greater New Orleans area (n=305). Survey respondents were asked where they could go to stay with family or friends during an evacuation, where they would go and stay in the event of a future evacuation, and what factors they consider when choosing an evacuation destination and accommodations. We answer three research questions in this work-in-progress paper:

1. *To what extent can households stay at the homes of family or friends during an evacuation?* We identify households with and without social support networks, i.e., family and friends who can provide them with temporary accommodations during an evacuation.
2. *What are households' intended evacuation destinations and accommodations?* We compare where households with and without social support intend to travel and stay during an evacuation.
3. *What factors do households consider when choosing an evacuation destination?* We compare the relative importance of decision-making factors such as cost, transportation, and destination familiarity to households with and without social support.

The following sections describe, first, prior research on the relationship between social support and evacuation intentions and behaviors. Second, we describe the methods of survey design and data analysis. Lastly, we report our results in answer to the three research questions above and discuss implications for technologies that can support evacuation planning.

BACKGROUND

Prior research informs our knowledge of the availability of social support and the relationship between social support and evacuation intentions and behaviors. This research includes studies that examine households' (i) social support and related concepts like social capital, (ii) accommodations, and (iii) destinations observed during actual and planned evacuations from areas threatened by hurricanes, wildfires, nuclear accidents, and other disasters.

Definition of Social Support

Social support refers to informational, material (e.g., accommodations), and emotional assistance that households receive or expect to receive from their friends and relatives, i.e., social support network, during an evacuation (Asfaw et al., 2019). Studies of evacuation have long realized the importance of social support networks during evacuations. Quarantelli (1985), for instance, discusses "social support systems" as the family and friends who provide evacuees with temporary shelter (short-term accommodations) and housing (long-term accommodations), observing that the characteristics of households' social support systems (what we refer to as social support networks) make them more or less resilient when forced to remain away from home for varying lengths of time.

The concepts of social support and social support networks respectively distinguish the type and source of assistance that households receive or expect during an evacuation. By doing so, they unpack individual-level measures of social capital (Meyer, 2018), which can describe evacuees' "access to and use of resources embedded in social networks" (Lin, 2001, p. 5). In this study, we refer to social support networks and social support rather than social capital to understand the geographic distribution of households' family and friends and the types of

resources these social network ties can locally provide to households, respectively. While households can receive information and some material assistance (e.g., money) from remote family and friends, in this study we focus on the provision of local assistance, namely accommodations.

Social Support and Evacuation Accommodations

Accommodations are arguably the most important and common type of material assistance that evacuees receive from their social support networks. Prior survey studies examine where respondents traveled during a past evacuation (i.e., actual response) or where they intend to travel for a future evacuation (i.e., intended response). Actual response surveys typically find 50-90% of evacuees staying with family and friends, fewer staying in hotels or motels, and the fewest staying at public shelters (Table 1). These studies also show that evacuees tend to stay with relatives versus friends (Siebeneck & Cova, 2012; Wong et al., 2018). Wong et al. (2018), for instance, surveyed 368 evacuees from Hurricane Irma to find that 44% of respondents stayed with relatives while only 16% stayed with friends. Additionally, these studies note that some respondents stayed at “other” locations such as peer-to-peer rentals (e.g., Airbnb, etc.), churches, and workplaces (Mesa-Arango et al., 2013; Wong et al., 2018).

Table 1. Actual and intended (in gray) evacuation accommodations of U.S. survey respondents.

Disasters	Family/Friends	Hotel	Shelter	Other	Unknown
Three Mile Island nuclear accident in PA (Brunn et al., 1979) ¹	81%	17%	0%	4%	
Hypothetical nuclear accident in PA (Brunn et al., 1979) ¹	70%	15%	9%	5%	
Hurricane Bonnie in NC (Whitehead et al., 2000)	70%	16%	5%	9%	
Future hurricane in NC (Whitehead et al., 2000)	60%	24%	12%	4%	
Hurricane Katrina in LA (Wu et al., 2012)	54%	31%	3%	13%	
Hurricane Katrina in LA (Mitchell et al., 2017) ¹	54%	30%	6%	9%	
Future hurricane in LA (Mitchell et al., 2017)	51%	33%	5%	8%	3%
Future hurricane in LA (Morrow & Gladwin, 2006)	57%	27%	5%	3%	8%
Hurricane Harvey in TX (Bierling et al., 2020)	58%	33%	1%	8%	

¹Values reported in the original study do not equal 100%.

Intended response surveys ask respondents about their planned evacuation accommodations and destinations for future evacuation scenarios, such as a “major hurricane like Katrina” (Morrow & Gladwin, 2006). Table 1 also describes the findings of intended response surveys administered to U.S. households threatened by hurricanes and, in the case of Three Mile Island, the partial meltdown of a nuclear reactor. These and other studies suggest that respondents’ accommodation intentions correspond with actual accommodation decisions observed during prior or future evacuations (Kang et al., 2007). For instance, in a survey of Southeastern Louisiana residents, Mitchell et al. (2017) observe that respondents’ accommodation intentions for a future hurricane generally match the actual accommodations they obtained during Hurricanes Katrina and Gustav.

Studies also investigate the relationship between evacuees’ actual and intended accommodations and demographic and evacuation factors. Some studies observe that low-income households with young children, elderly persons, or persons with disabilities/special needs are more likely to evacuate to homes of family or friends or stay at a public shelter than stay at a hotel (Whitehead et al., 2000; Wong et al., 2018). Studies also observe that whites, large families, and high-income households are more likely to stay in hotels and less likely to stay in shelters (Lindell et al., 2011; Wu et al., 2012). Lastly, other studies observe a relationship between households’ home city/state and choice of accommodations. For example, Wu et al. (2012) find that Louisiana households were more likely to stay in hotels than Texas households during Hurricane Katrina.

Evacuation Destinations

Studies show that most U.S. residents of the Gulf and Atlantic Coasts evacuate to in-state and out-of-state

destinations in response to hurricanes, but some evacuate to destinations within their home county or parish (Lindell & Prater, 2007b). Table 2 reports the actual destinations of surveyed evacuees, showing that respondents reported a wide range of in-county (1-49%), in-state (30-81%), and out-of-state (0-56%) destinations. These measures vary significantly depending on the geographic area surveyed. Dash and Morrow (2000), for example, surveyed residents of the Florida Keys and observed that none evacuated the 400+ miles required to leave the state of Florida. In contrast, many New Orleans residents surveyed by Mitchell et al. (2017) and Wu et al. (2012) traveled to relatively close out-of-state destinations in Texas and Mississippi.

Table 2. Actual and intended (in grey) evacuation destinations of U.S. survey respondents.

Evacuation	Evacuation destinations		
	In county	In state	Out of state
Hurricane Georges in FL (Dash & Morrow, 2000)	19%	81%	0%
Hurricane Floyd in SC (Dow & Cutter, 2002)	9%	32%	56%
Hurricane Ivan (Morrow & Gladwin, 2005)	32%	37%	31%
Multiple hurricanes in FL (Smith & McCarty, 2009)	49%	30%	21%
Hurricane Katrina (Wu et al., 2012)	1%	80%	19%
Hurricane Rita (Wu et al., 2012)	1%	47%	52%
Hurricane Katrina/Gustav/Isaac (Mitchell et al., 2017)	14%	34%	52%
Hurricane Irma (Wong et al., 2018)	17%	34%	49%
Future hurricane in LA (Mitchell et al., 2018) ¹	-	27%	73%

¹Did not report in-county evacuation destinations.

Lastly, research explores relationships between households' evacuation destinations and demographic and non-demographic factors such as social support. In general, demographic factors such as age, disability, home ownership, income, race, and social vulnerability fail to predict evacuation destinations and distances (Adeola and Picou, 2017; Asfaw et al., 2019; Bolin and Kurtz, 2018; Howard et al., 2017; Yabe and Ukkusuri, 2020; Wu et al., 2012). However, emerging studies that examine social support from family and friends observe that evacuees plan to travel shorter distances when evacuating to destinations where they can receive assistance from family and friends but travel farther when planning to evacuate to destinations lacking social support (Na & Grace, 2022).

METHODS

Although prior evacuation research examines the accommodations and destinations of households fleeing natural hazards like hurricanes, a gap exists in our understanding of social support available to households and how the availability of social support influences where households choose to go and stay during an evacuation. To address this gap, we surveyed Greater New Orleans households about their social support networks and evacuation intentions. We describe the design of the survey and methods of data analysis below. This survey research was approved by a university institutional review board (IRB2023-735).

The survey was administered to an online panel (n=305) composed of Southeast Louisiana residents mostly located in New Orleans Parish, but including respondents from surrounding areas, including St. Charles, Jefferson, and St. Tammany Parishes. Respondents completed a 34-question survey that included demographic, evacuation, and social support-related questions. These questions were based on prior survey research on evacuation behavior (Bierling et al., 2020; Mitchell et al., 2017) and FEMA's National Household Survey (2023).

Our analysis of the survey data addresses the following research questions: (RQ1) To what extent can households stay at the homes of family or friends during an evacuation? (RQ2) What are households' intended evacuation accommodations and destinations? (RQ3) What factors do households consider when choosing an evacuation destination? We cross-tabulated the survey data to understand the number and demographics (RQ1), accommodation and destination intentions (RQ2), and destination decision-making factors (RQ3) of respondents with and without social support.

RESULTS

In this section, we report survey findings to compare the demographics, evacuation intentions, and destination decision-making factors of respondents with and without social support networks that vary in range and size.

Availability of Social Support

Of 305 survey respondents, 263 (86%) identified at least one relative or friend who could provide them with accommodations during an evacuation, while 42 (14%) did not identify a source of social support (Table 1). These two groups represent households for whom social support is available and unavailable.

The demographics of respondents with and without social support are roughly similar (Table 4). Respondents with social support are more likely to be female, married, and in early and middle adulthood (25-65), whereas respondents without social support are more likely to be male, unmarried, and elderly (65+). Additionally, there are more respondents with social support who earn less than \$55k or more than \$100k annually than respondents without social support who are more likely to be middle-income earners. Respondents with social support tend to have more evacuation experience than respondents without social support. Importantly, however, the two groups are roughly similar in terms of race, educational attainment, employment status, and household size.

Table 4. Demographics of respondents with and without social support.

Characteristic		All (n=305)	Social Support	
			Available (n=263)	Unavailable (n=42)
Age	18-24	39 (13%)	33 (13%)	6 (14%)
	25-65	204 (67%)	183 (70%)	21 (50%)
	65+	62 (20%)	47 (18%)	15 (36%)
Gender	Female	199 (65%)	175 (67%)	24 (57%)
	Male	105 (34%)	87 (33%)	18 (43%)
Race	Black	92 (30%)	78 (30%)	14 (33%)
	White	183 (60%)	158 (60%)	25 (60%)
	Other	30 (10%)	27 (10%)	3 (7%)
Relationship status	Married	99 (32%)	90 (34%)	9 (21%)
	Single	92 (30%)	80 (30%)	12 (29%)
	In a relationship	50 (16%)	41 (16%)	9 (21%)
	Other (e.g., widowed)	64 (21%)	52 (20%)	12 (29%)
Educational attainment	High school or less	126 (41%)	109 (41%)	17 (40%)
	Associate degree or vocational training	79 (26%)	66 (25%)	13 (31%)
	Bachelor's degree or higher	100 (33%)	88 (33%)	12 (29%)
Employment status	Unemployed	33 (11%)	30 (11%)	3 (7%)
	Employed (full or part-time)	169 (55%)	146 (56%)	23 (55%)
	Student	19 (6%)	16 (6%)	3 (7%)
	Retired	84 (28%)	71 (27%)	13 (31%)
Income	\$0-49k	148 (49%)	135 (51%)	13 (31%)
	\$50-99K	102 (33%)	79 (30%)	23 (55%)
	\$100k+	55 (18%)	49 (19%)	6 (14%)
Prior evacuation experience	No	56 (18%)	45 (17%)	11 (26%)
	Yes	249 (82%)	218 (83%)	31 (74%)
Persons in household	1 person	90 (30%)	76 (29%)	14 (33%)
	2-4 persons	183 (60%)	157 (60%)	26 (62%)
	5+ persons	32 (10%)	30 (11%)	2 (5%)

Accommodation Intentions

Asked where they would stay in the event of a future one-week evacuation, respondents with and without social support indicated they would stay in different types of accommodations. Table 5 shows the intended accommodations of respondents according to the range of their social support networks, i.e., the in-county, in-

state, or out-of-state location of the most distant family or friend who can provide them with a place to stay during an evacuation. Respondents with social support are most likely to stay family or friends (58%), however, respondents with out-of-state social support (61%) are more likely to stay with family or friends than respondents with in-county (42%) or in-state (49%) social support. However, respondents with only local, in-county social support are more likely to stay at hotels (42%) than respondents with more expansive social support networks. In contrast, respondents without social support are most likely to stay at hotels (60%) or public shelters (21%).

Table 5. Intended accommodations of respondents by range of social support network.

Accommodation	Social Support		Range of Social Support Network		
	Unavailable	Available	In County ¹	In State	Out of State
House of family/friend	0 (0.0%)	152 (57.8%)	8 (42.1%)	19 (48.7%)	125 (61.0%)
Hotel or motel	25 (59.5%)	75 (28.5%)	8 (42.1%)	10 (25.6%)	57 (27.8%)
Other (RV, 2 nd home, etc.)	5 (11.9%)	15 (5.7%)	2 (10.5%)	6 (15.4%)	7 (3.4%)
Peer-to-peer rental	3 (7.1%)	16 (6.1%)	0 (0.0%)	2 (5.1%)	14 (6.8%)
Public shelter	9 (21.4%)	5 (1.9%)	1 (5.3%)	2 (5.1%)	2 (1.0%)
Overall	42 (100.0%)	263 (100%)	19 (100.0%)	39 (100.0%)	205 (100.0%)

¹For comparison with prior research that reports in-county destinations, we refer to counties rather than parishes.

Table 5 also reveals that some respondents who have social support choose not to use it. Among 263 respondents with at least one family or friend with whom they can stay during an evacuation, 111 (42%) intend to stay in a hotel or other accommodations. Not shown in Table 5, 32 (12%) respondents plan to stay in a hotel or other accommodation at a destination where they could stay at the home of a friend or relative. These “locally supported” households have not been identified before in prior survey studies.

Table 6 shows the intended accommodations of respondents according to the size of their social support networks, i.e., the number of family and/or friends who can provide them with a place to stay during an evacuation. Respondents with larger social support networks are more likely to stay with family and friends: over 50% of respondents with social support networks of 1-2 persons intend to stay with these family and friends, while 100% of respondents with three persons in their social support networks intend to stay in these accommodations. In contrast, as reported in Table 5, most respondents without social support intend to stay in hotels or public shelters.

Table 6. Intended accommodations of respondents by size of social support network.

Accommodation	Size of Social Support Network		
	1 Person	2 Persons	3 Persons
House of family/friend	34 (50.7%)	85 (52.1%)	33 (100%)
Hotel or motel	22 (32.8%)	53 (32.5%)	0 (0%)
Other (RV, second home, etc.)	4 (6.0%)	11 (6.7%)	0 (0%)
Peer-to-peer rental	4 (6.0%)	12 (7.4%)	0 (0%)
Public shelter	3 (4.5%)	2 (1.2%)	0 (0%)
Total	67 (100%)	163 (100%)	33 (100%)

Destination Intentions

Table 7 shows the intended evacuation destinations of respondents according to the range of their social support networks. Among 305 respondents, 205 (67%) can travel out of state to stay with a family/friend, 39 (13%) can travel somewhere within the state of Louisiana, 19 (6%) can only access social support within their home parish, and 42 (14%) have nowhere to go for help from family/friends.

Significantly, and related to the preference of staying at the homes of family/friends, where respondents plan to evacuate relates to the range of their social support networks. Households with only in-county social support tend to remain within the county/parish (58%), households with in-state social support tend to evacuate within the state (49%), and households with out-of-state social support tend to evacuate to destinations in the neighboring states of Alabama, Mississippi, and Texas (85%). Importantly, unlike respondents with out-of-state support, respondents with no support (24%), in-county support (16%), and in-state support (13%) are more likely to not know where they would evacuate.

Table 7. Intended evacuation destinations by range of social support network.

Evacuation Destination	Social Support		Range of Social Support Network		
	Unavailable	Available	In County	In State	Out of State
In County	7 (16.7%)	14 (5.3%)	11 (57.9%)	1 (2.6%)	2 (1.0%)
In State	2 (4.8%)	40 (15.2%)	1 (5.3%)	19 (48.7%)	20 (9.8%)
Out of state	23 (54.8%)	193 (73.4%)	4 (21.1%)	14 (35.9%)	175 (85.4%)
Unknown	10 (23.8%)	16 (6.1%)	3 (15.8%)	5 (12.8%)	8 (3.9%)
Total	42 (100%)	263 (100%)	19 (100%)	39 (100%)	205 (100%)

Table 7 also shows that respondents with local support often evacuate outside of their social support networks by planning to travel to out-of-state destinations where they intend to stay at a hotel or other accommodation. Among 39 respondents with in-state social support, 14 (36%) intend to evacuate outside Louisiana where they lack family/friends who can provide them with accommodations. Overall, most respondents plan to evacuate to an out-of-state destination (Figure 1).

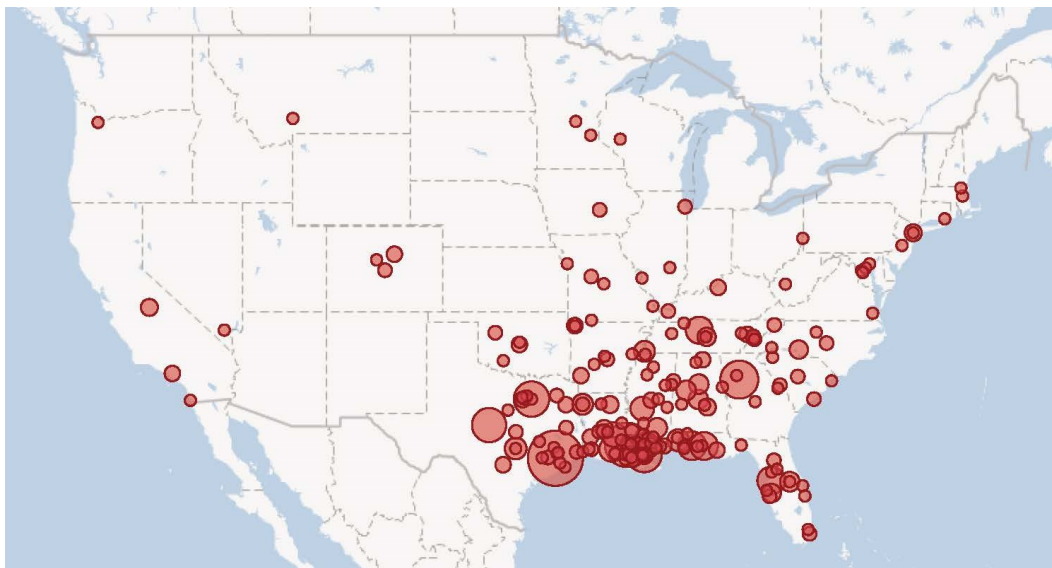
**Figure 1. Intended destinations of survey respondents.**

Table 8 shows the intended evacuation destinations of respondents according to the size of their social support networks. While out-of-state destinations are the most common among respondents with 1-3 family and/or friends who can provide them with a place to stay during an evacuation, respondents with more family/friends are more likely to evacuate out of state than respondents with smaller social support networks. Approximately 88% of respondents with 3 family/friends intend to travel out of state compared to 69% of respondents with one family/friend and 55% of respondents without social support.

Table 8. Intended evacuation destinations by size of social support network.

Evacuation Destination	Size of Social Support Network		
	1 FF	2 FF	3 FF
In County	6 (9.0%)	7 (4.3%)	1 (3.0%)
In State	11 (16.4%)	27 (16.6%)	2 (6.1%)
Out of State	46 (68.7%)	118 (72.4%)	29 (87.9%)
Unknown	4 (6.0%)	11 (6.7%)	1 (3.0%)
Total	67 (100%)	163 (100%)	33 (100%)

Decision-making Factors

Table 8 shows the factors that respondents consider when choosing an evacuation destination. Among the nine factors surveyed, respondents most often identified accommodation availability, destination distance, and financial

cost as important when deciding where to go during a future evacuation. However, respondents with social support (68%) are more likely to consider the availability of accommodations when choosing an evacuation destination than respondents without social support (43%). Furthermore, respondents with social support are more likely to consider the recommendations of family and friends (19%) than unsupported respondents (5%), as well as their familiarity with the destination (32%) compared to unsupported respondents (19%). In contrast, respondents without social support are more likely to consider cost (55%) and transportation (48%) to destinations than respondents with social support (49% and 38% respectively).

Table 8. Factors considered when choosing an evacuation destination.

Factor	Social Support		Range of Social Support		
	Unavailable	Available	Local	State	Out of State
Accommodations	18 (43%)	179 (68%)	10 (53%)	22 (56%)	119 (58%)
Distance	21 (50%)	151 (57%)	11 (58%)	24 (62%)	144 (70%)
Cost	23 (55%)	130 (49%)	12 (63%)	10 (26%)	77 (38%)
Transportation	20 (48%)	99 (38%)	7 (37%)	18 (46%)	71 (35%)
Traffic congestion	14 (33%)	96 (37%)	5 (26%)	16 (41%)	109 (53%)
Familiarity	8 (19%)	83 (32%)	5 (26%)	6 (15%)	38 (19%)
Family/friends advice	2 (5%)	49 (19%)	3 (16%)	5 (13%)	33 (16%)
Officials/media advice	4 (10%)	41 (16%)	3 (16%)	12 (31%)	67 (33%)
Other	4 (10%)	13 (5%)	1 (5%)	0 (0%)	12 (6%)

DISCUSSION

The preliminary survey results provide insight into the availability of social support among Greater New Orleans households and the relationship between social support, namely a place to stay with family and friends, and households' evacuation accommodation and destination intentions. The first of its kind, these results show that:

- Among survey respondents from Greater New Orleans (n=305), 263 (86%) report at least one friend or relative at whose home they can stay during an evacuation, however, 42 (14%) report no sources of social support.
- The ranges of social support networks vary among respondents (n=263): 19 (7%) report only friend/relative(s) inside their home parish, 39 (15%) report someone elsewhere in the state of Louisiana, and 205 (78%) report someone outside the state.
- The sizes of social support networks vary among respondents (n=263): 67 (22%) report one friend/relative with whom they can stay during an evacuation, 163 (53%) report two persons, and 33 (11%) report three persons.
- Respondents with social support are most likely to stay at the home of a friend or relative (58%), while respondents without social support are most likely to stay at a hotel (60%) or public shelter (21%). In contrast, 29% of respondents with social support intend to stay at a hotel and 2% intend to stay at a public shelter.
- Although they might stay with a friend or relative, 42% of respondents with social support intend to stay at a hotel, peer-to-peer rental, RV, public shelter, or other accommodation.
- Most respondents with and without social support intend to evacuate to out-of-state destinations, but respondents with social support are most likely to evacuate to in-parish, in-state, and out-of-state destinations where they can stay at the homes of family and friends.
- Respondents with social support are more likely to consider the availability of accommodations and recommendations of friends/relatives when choosing an evacuation destination than respondents without social support.

These results, by describing the availability, range, and size of households' social support networks, provide context to prior survey research that examines actual and intended evacuations destinations and accommodations (Adjei et al., 2022; Bierling et al., 2020; Huang et al., 2016; Lindell et al., 2011; Mitchell et al., 2017; Smith & McCarty, 2009; Wong et al., 2018; Wu et al., 2012). Importantly, the findings suggest that differences in social support networks may be better indicators of household vulnerability than demographic and other risk factors observed in previous studies (Adeola & Picou, 2017; Asfaw et al., 2019; Baker, 1991; Bolin & Kurtz, 2018; Wu

et al., 2012; Yabe & Ukkusuri, 2020).

By describing the friends/relatives who can provide households with accommodations during an evacuation, the preliminary results suggest that the range/geographic distribution and size of households' social support networks influences where they go and stay during an evacuation. Consequently, by improving our understanding of households' social support networks, we can better explain and predict where people go during an evacuation, their logistics requirements, and identify vulnerable groups who lack social support or the means to access social support during a large-scale evacuation.

Limitations of the present study include the non-representative sample of Greater New Orleans residents, biases introduced through the use of an online panel to administer the survey, and possible differences between respondents intended and actual response to an evacuation (Kang et al., 2007; Lindell et al., 2019). Future studies can address these limitations through different survey designs and recruitment procedures, as well as complementary methods, such as interviews, that can help explain the patterns of intentional and actual behavior observed through survey research. As described in the next section, future research can also explore the implications of these findings for the design of evacuation management systems.

Implications for Evacuation Management Systems

Information systems can support the management of large-scale evacuations at community and household levels. This study and future research can inform the design of such systems by describing and predicting household vulnerability and exposure to hurricane and evacuation-related hazards based on the availability and accessibility of households' social support. In addition to often-studied technologies, such as decision-support systems (DSS) for emergency managers (Davidson et al., 2020), this study suggests the need for systems that help households plan to access social support for likely evacuation scenarios, as well as seek assistance from government and non-government agencies (NGOs) when social support is unavailable or inaccessible during an evacuation.

At the community level, prior research focuses on evacuation and transportation modeling and simulation, and the design of DSS and intelligent transportation systems (ITS) for emergency managers and other decision-makers responsible for planning and managing evacuation and return-entry processes (Davidson et al., 2020; Iliopoulou et al., 2020; Murray-Tuite & Wolshon, 2013). As Lindell and Prater (2007a) explain, emergency managers in New Orleans and other hurricane-threatened areas depend on DSS for insight into "the behavior of the hurricane that is relevant to evacuation and the behavior of evacuees that is relevant to the hurricane" (p. 627). By providing insight into households' social support networks and evacuation destination and accommodation intentions, this work-in-progress paper and future research can inform models of evacuation behavior that, in turn, can inform the design of DSS that can guide emergency managers in evacuation planning, including the allocation and location of public shelters (Lindell & Prater, 2007a; Yang et al., 2019).

However, our findings also suggest opportunities for systems that support the discovery of vulnerable households that lack social support to connect these households with government agencies and/or NGOs poised to help during an evacuation. For instance, our preliminary results suggest that Greater New Orleans residents who are male, unmarried, and elderly are more likely to lack social support than other demographic groups. Designs might include social media listening and public information campaigns that target users who likely lack social support to direct them to web-based resources for obtaining transportation and accommodations ahead of a possible evacuation. In New Orleans, for example, city-assisted evacuation coordinates transportation out of the city using a system of pre-established pick-up areas and designated evacuation destinations with public shelters. Importantly, residents need to reach these pick-up points with the proper provisions and at the proper times. Future research can partner with community partners to co-design systems that identify and initiate communications with vulnerable households to effectively coordinate the use of such public transportation systems.

At the household level, insights from this study suggest the need for systems that support evacuation planning for different hurricane scenarios, particularly those in which a household may not be able to access accommodations from family or friends. This study finds that Greater New Orleans households have social support networks that vary in range and size, which suggests that the exposure of households' social support networks to hurricane hazards and evacuation orders will vary depending on the location of households' family and friends. Consequently, households may need to stay at a hotel or public shelter when social support is unavailable, as observed among the 14% of respondents who could not identify a friend or relative with whom they could stay during an evacuation, or inaccessible, such as when the path of a storm or road conditions restrict travel to available homes of friends and relatives.

As few households proactively plan for an evacuation (Vásquez et al., 2016), systems might support households in contingency planning for scenarios when they may need to stay in a hotel or other accommodations when social

support is available but inaccessible. Similar to DSSs emergency managers use to predict evacuation zones based on likely storm paths and intensities (Lindell et al., 2019), a system might help households plan where to go and stay based on the availability and accessibility of social support during likely hurricane scenarios. As DSS research has not focused on household use contexts, future work is required to understand households' evacuation planning needs and co-design and evaluate systems that can support destination, accommodations, and logistics planning ahead of future disasters.

CONCLUSION

This study reports preliminary findings from a survey administered in 2023 to investigate New Orleans households' social support networks: friends and relatives who can provide them with accommodations and other assistance during evacuations caused by hurricanes and other hazards. While most respondents report at least one relative or friend with whom they can stay during an evacuation, some respondents lack social support, and these respondents are most likely to stay at a hotel or public shelter during an evacuation. These findings and future research can improve understanding of the relationship between social support and evacuation behavior and inform the development of systems that can support community and household evacuation planning.

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