

PUBLIC RESPONSE TO HURRICANE THREATS IN MASSACHUSETTS

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Two Studies

- ▣ New England Hurricane Evacuation Study (HES) Behavioral Analysis
- ▣ Hurricane Earl Real-Time Survey

HES Behavioral Analysis

- ▣ Whether people will evacuate their homes
- ▣ When evacuees will depart
- ▣ What sort of refuge evacuees will seek
- ▣ Where geographically evacuees will go
- ▣ What transportation evacuees will use

Survey Sample

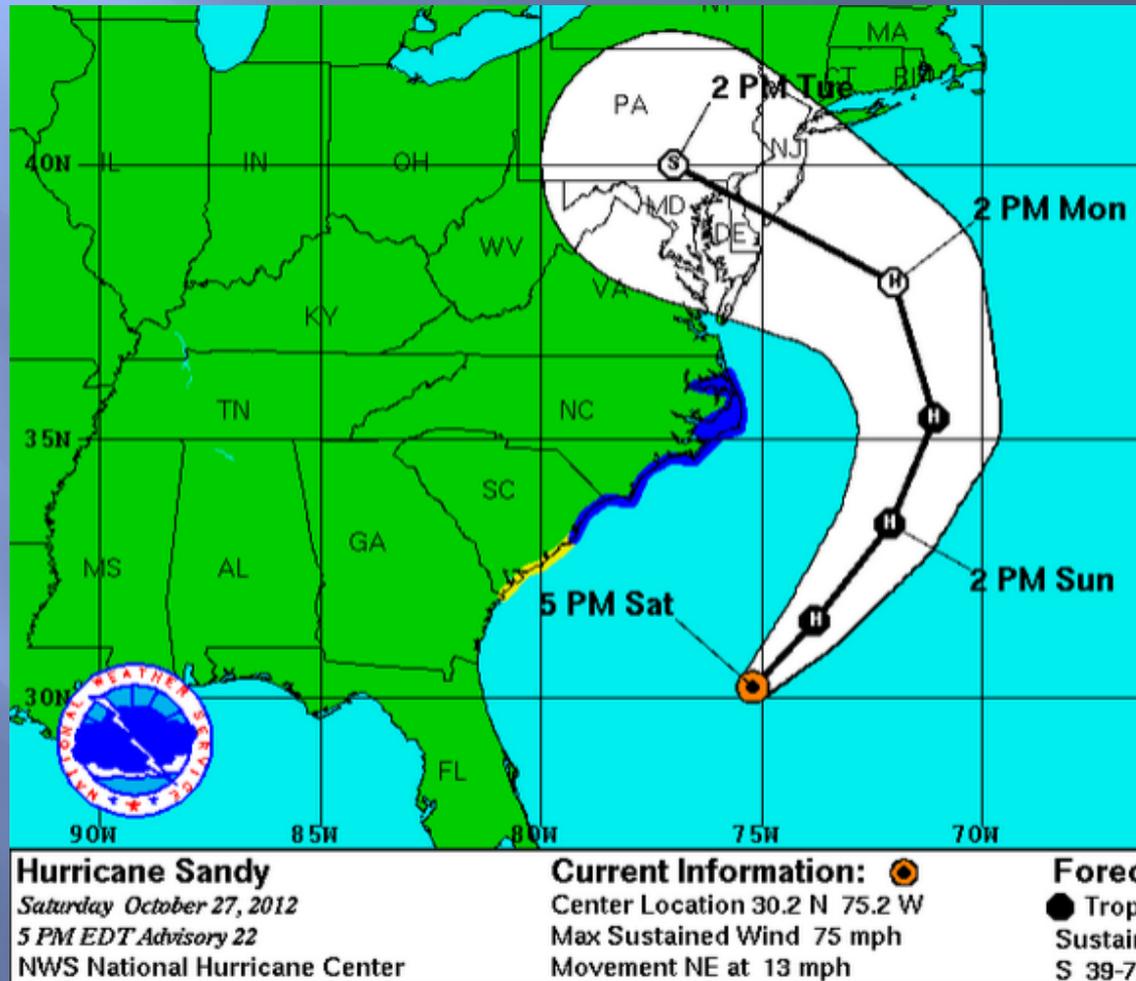
- ▣ 300 interviews in Inundation Zones 1 and 2
- ▣ 200 interviews in Inundation Zones 3 and 4
- ▣ 100 interviews in non-surge areas of adjacent coastal communities

Survey Data Report Sections

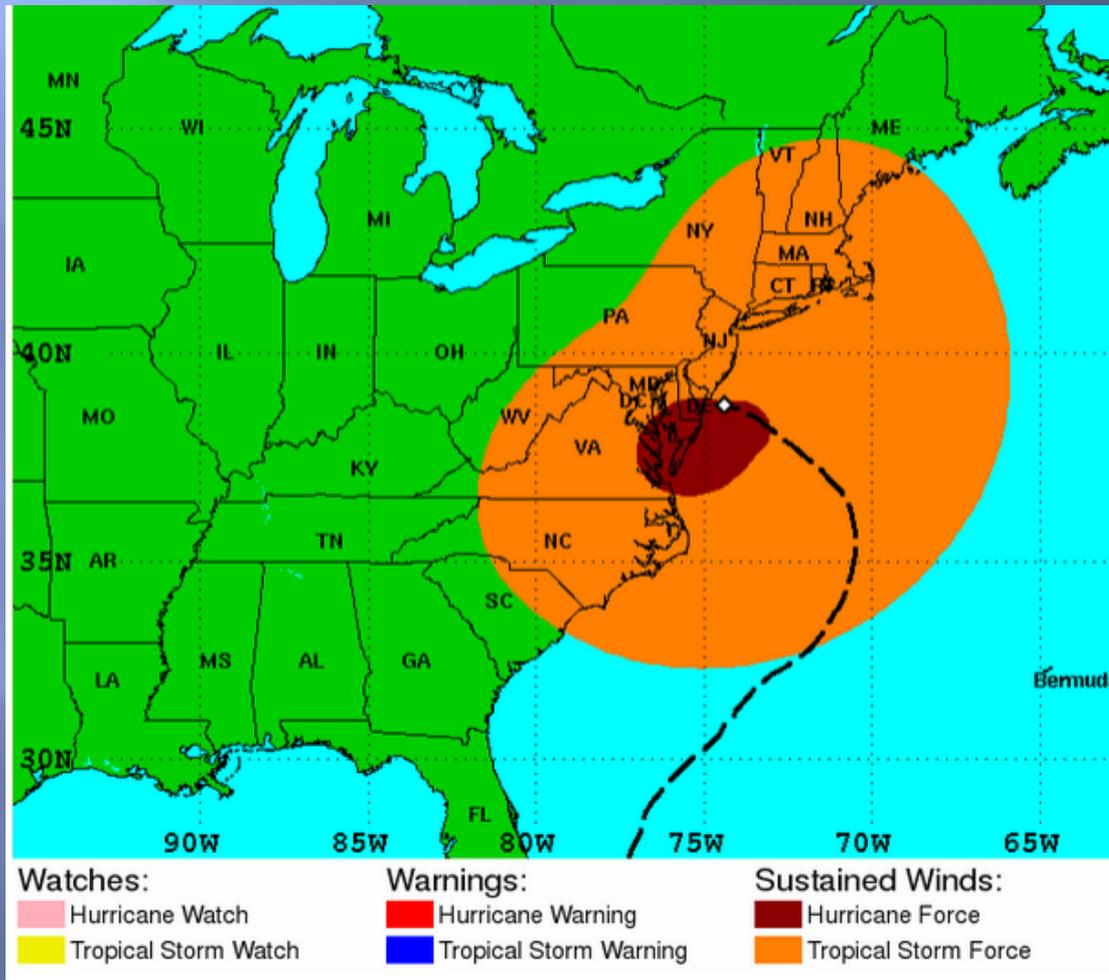
- ▣ Response in Sandy
- ▣ Response in Irene
- ▣ Response in Earl
- ▣ Perceived Vulnerability
- ▣ Expectation of Evacuation Notices
- ▣ Intention to Evacuate
- ▣ Reasons for Intention to Evacuate or Not
- ▣ Intended Refuge
- ▣ Intended Location of Refuge
- ▣ Intended Transportation
- ▣ Obstacles to Evacuation
- ▣ Planning, Information Access, and Home Characteristics

Response in Past Storms

Response in Sandy

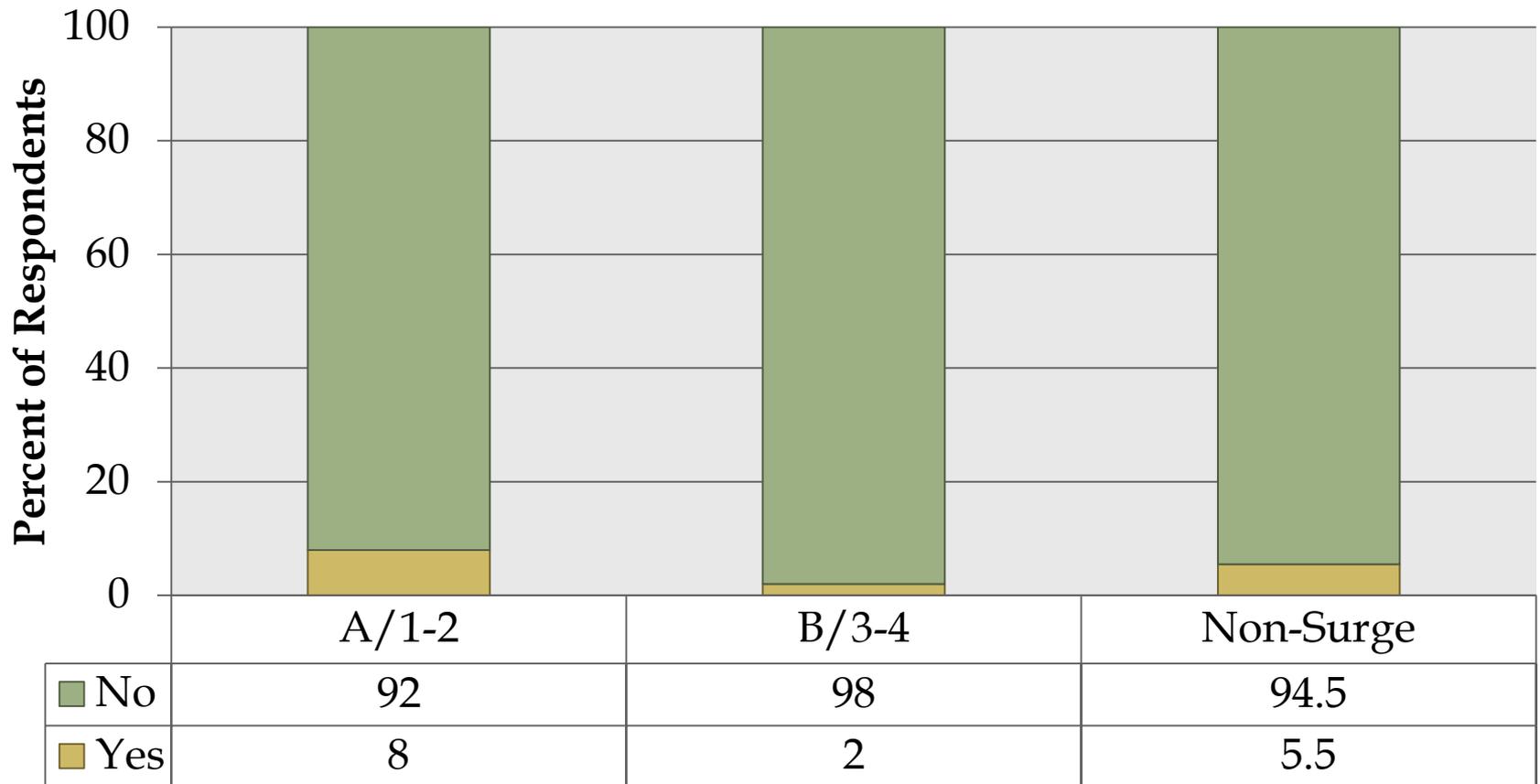


Response in Sandy



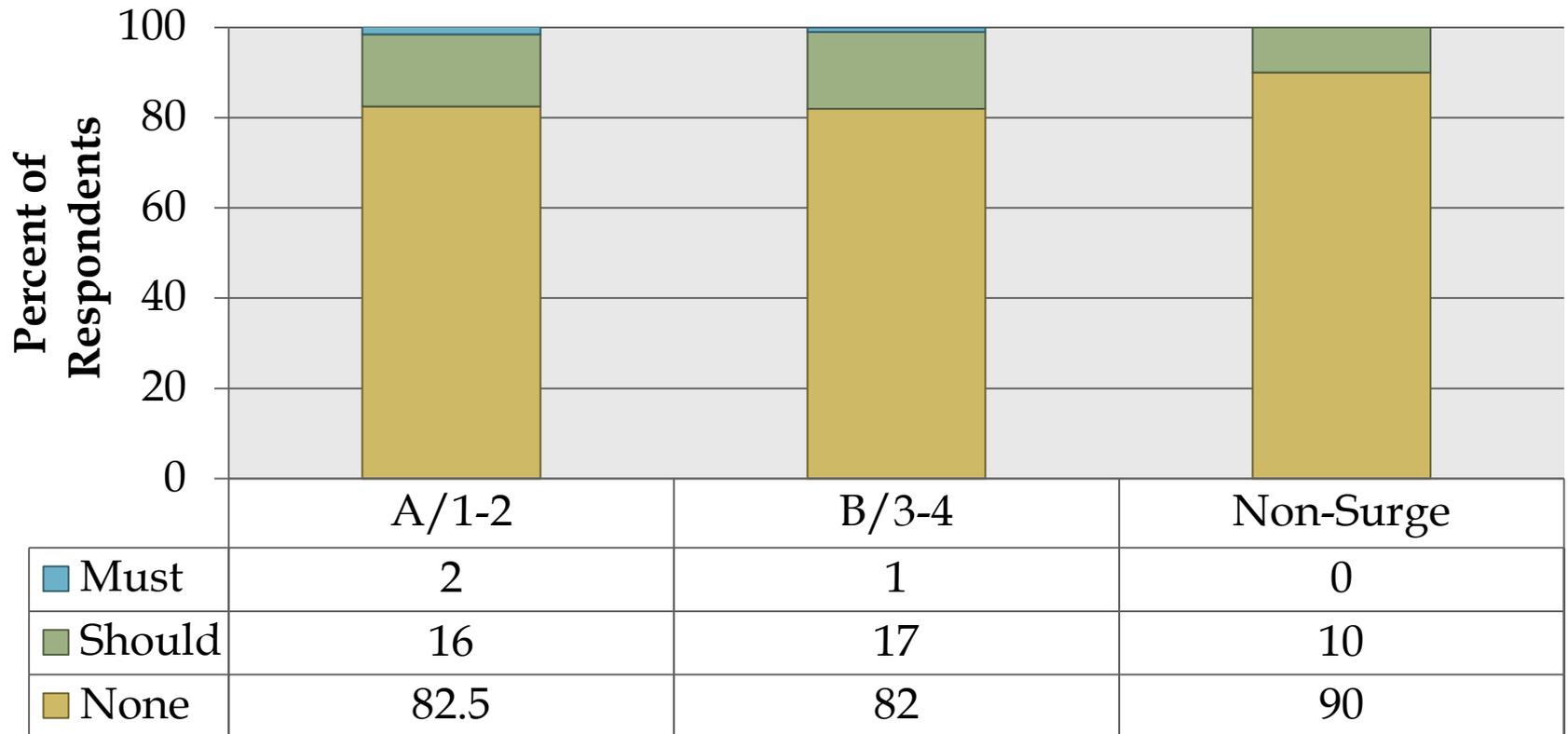
Response in Sandy

Evacuated in Sandy



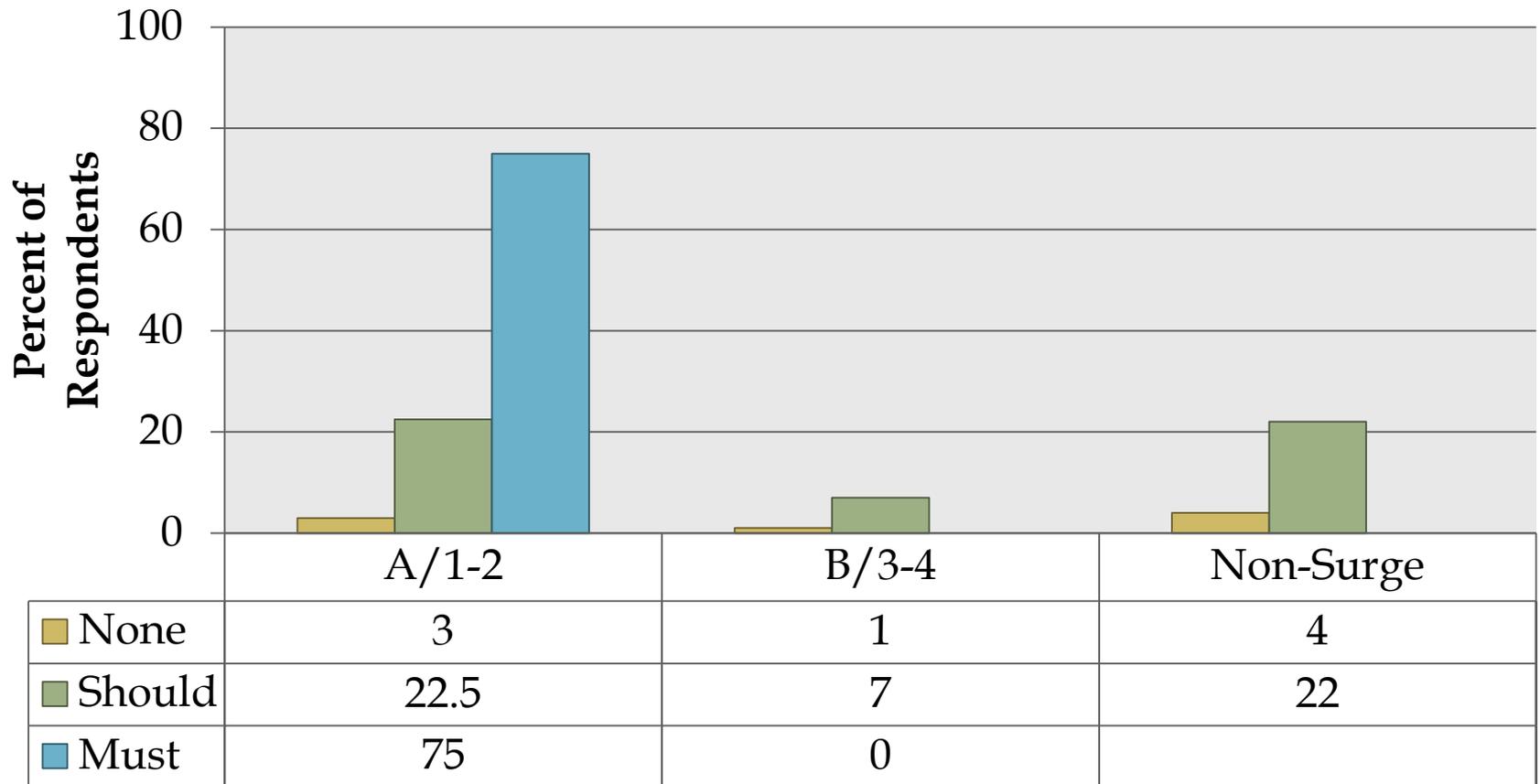
Response in Sandy

Type of Evacuation Notice Heard in Sandy



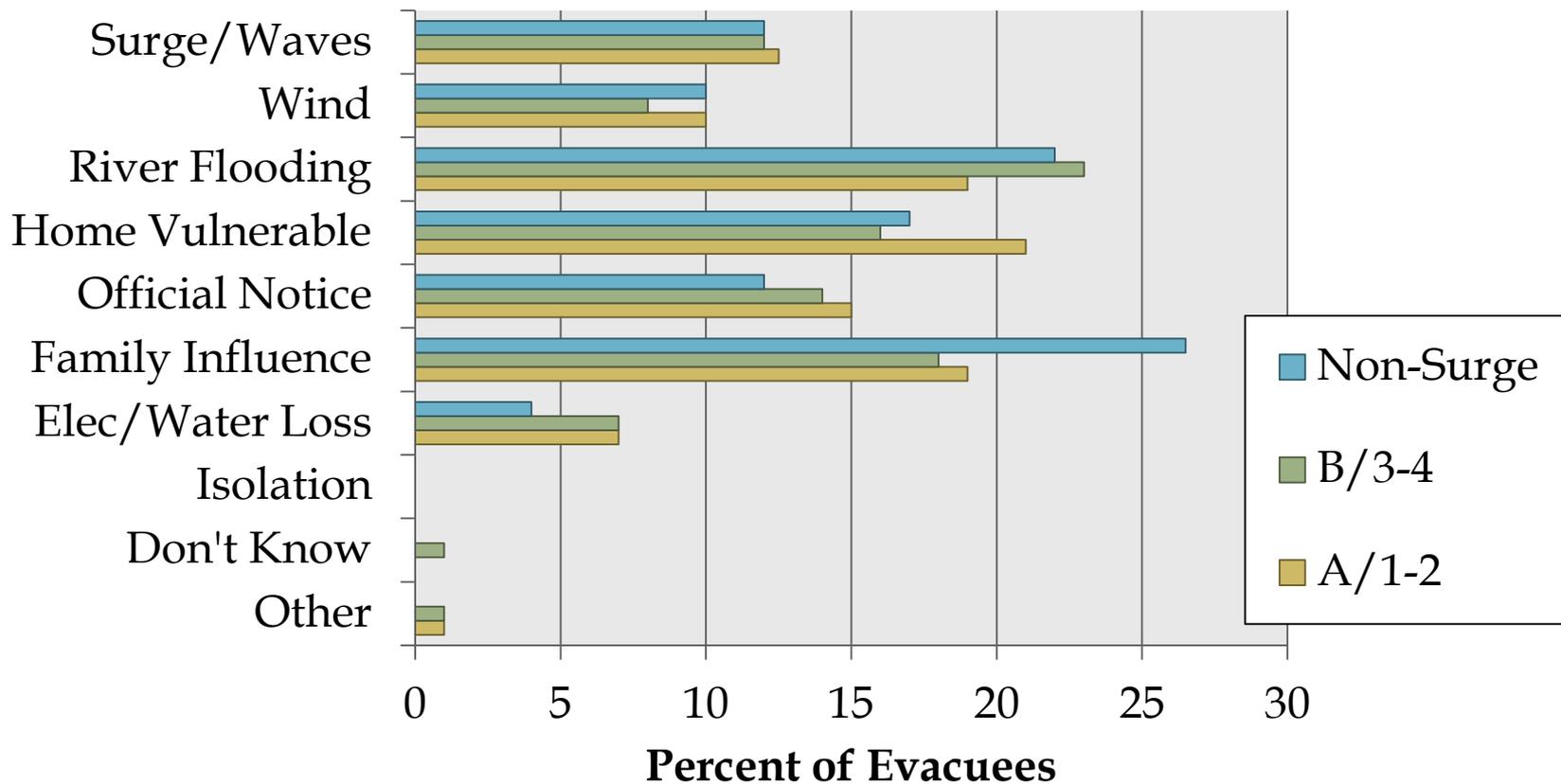
Response in Sandy

Evacuation in Sandy by Type of Notice Heard



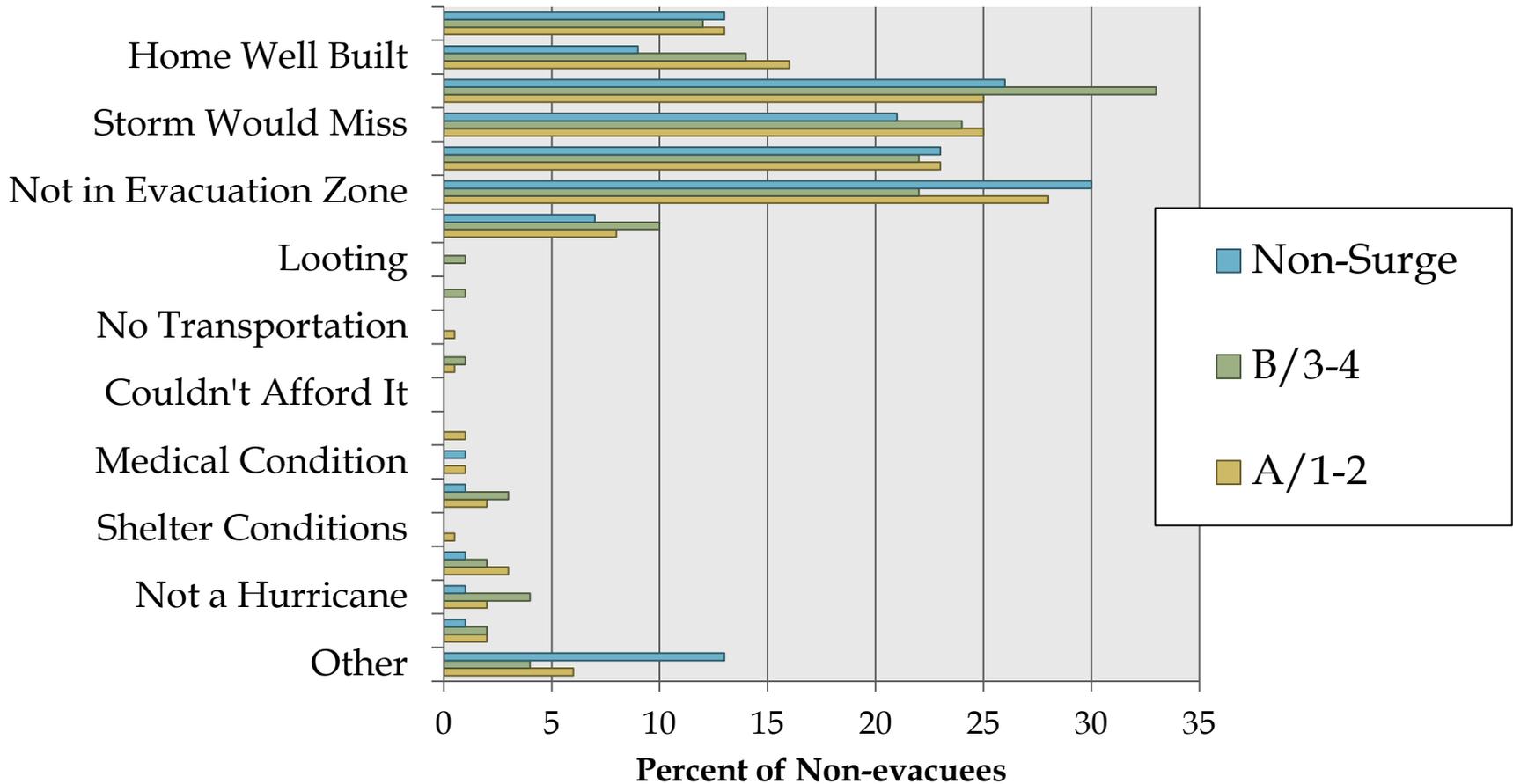
Response in Sandy

Reasons Given for Evacuating in Sandy



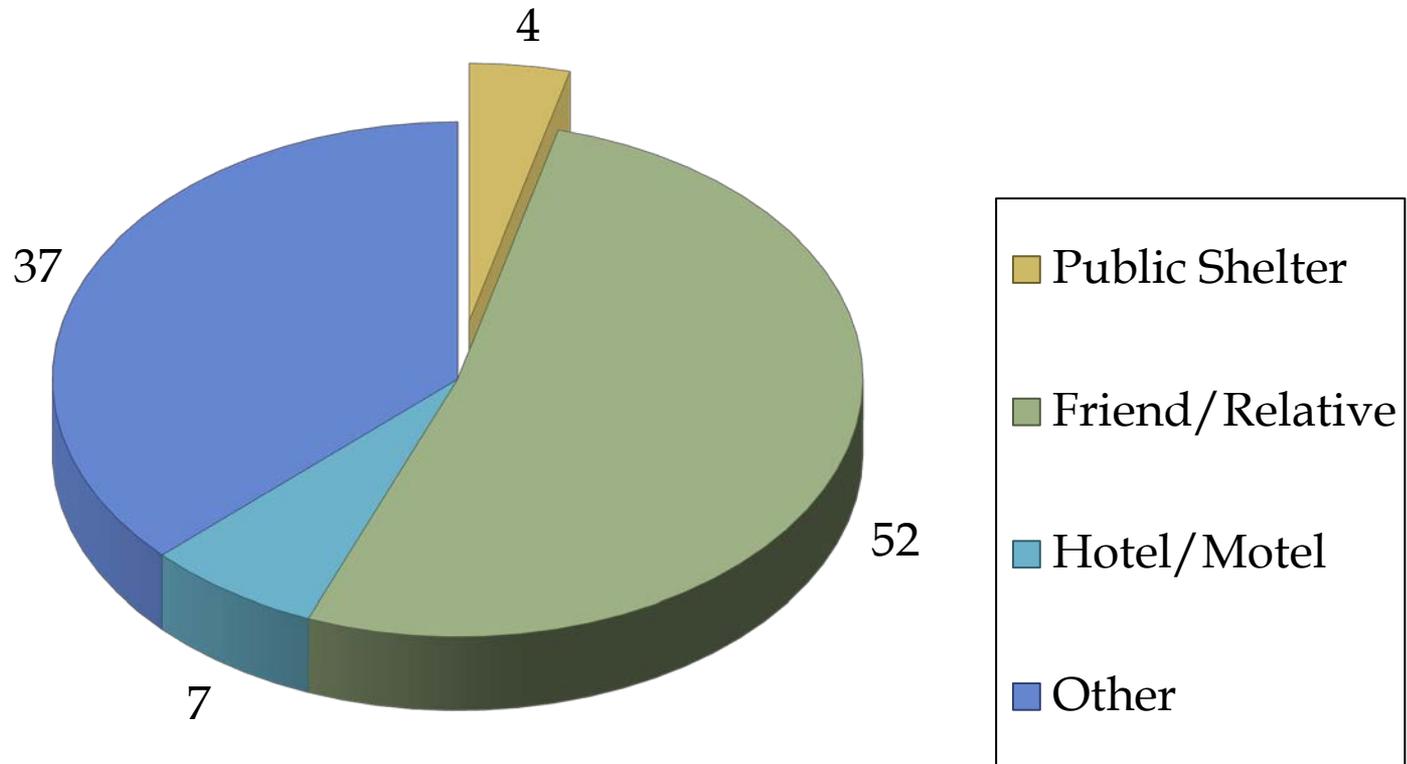
Response in Sandy

Reasons Given for Not Evacuating in Sandy



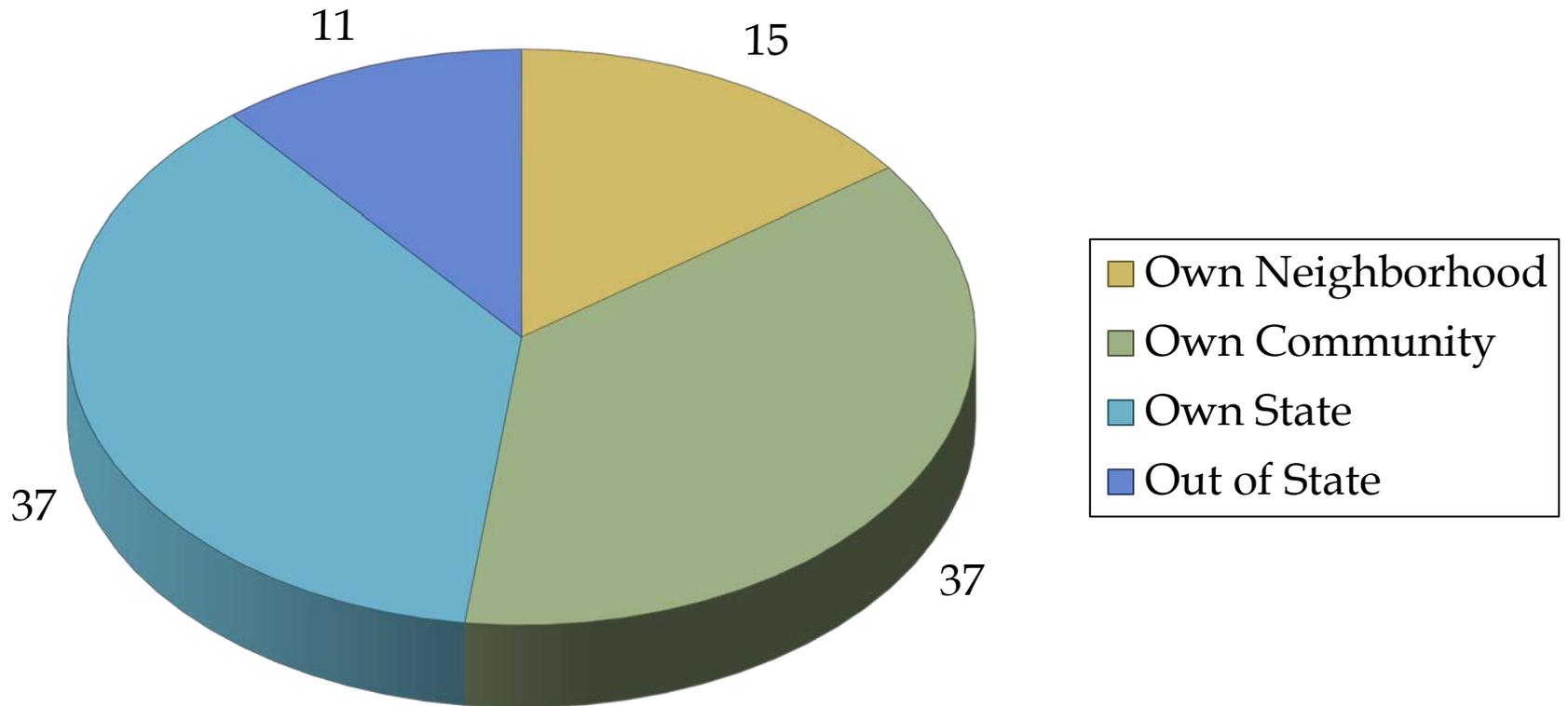
Response in Sandy

Type of Refuge in Sandy (%)

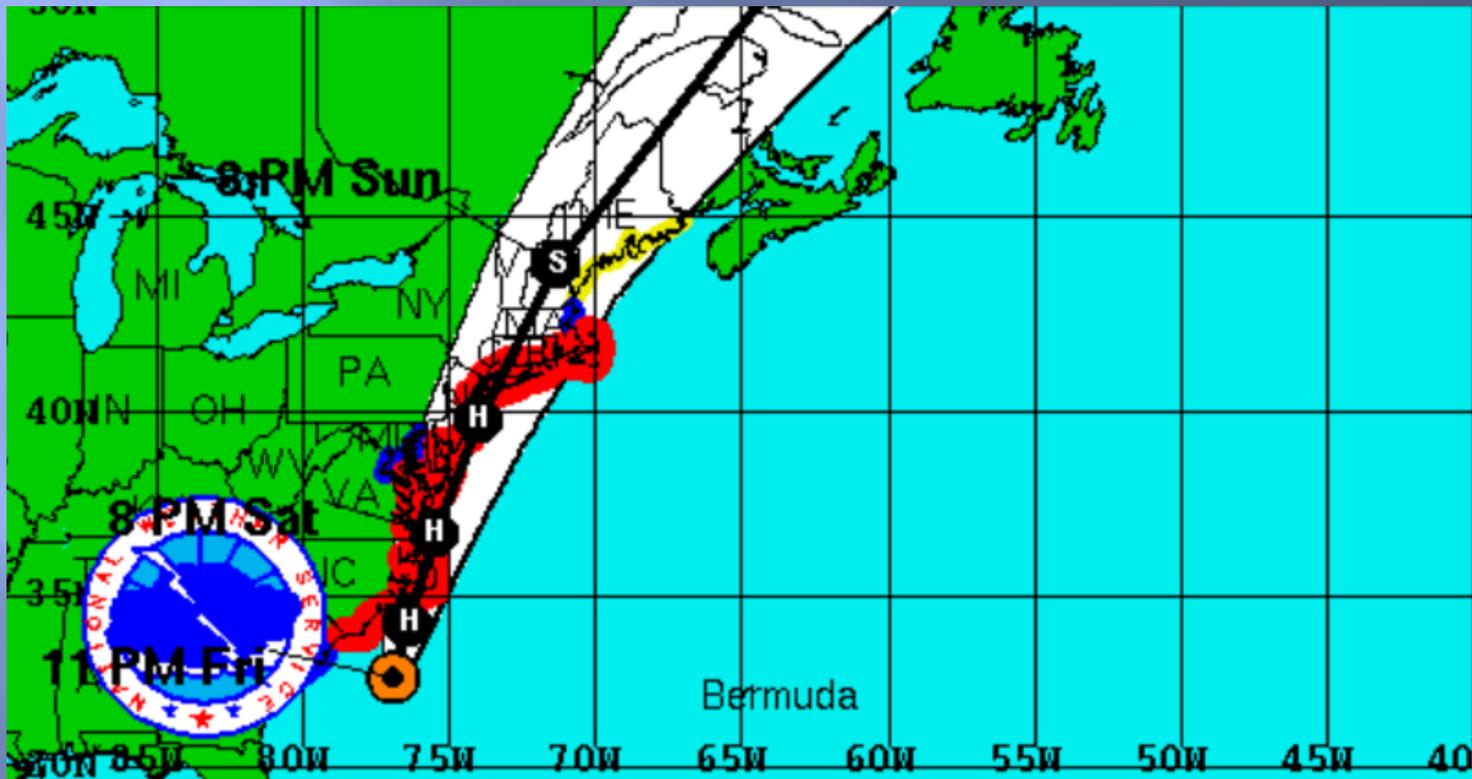


Response in Sandy

Location of Refuge in Sandy (%)



Response in Irene



Hurricane Irene

Friday August 26, 2011

11 PM EDT Advisory 27

NWS National Hurricane Center

Current Information:

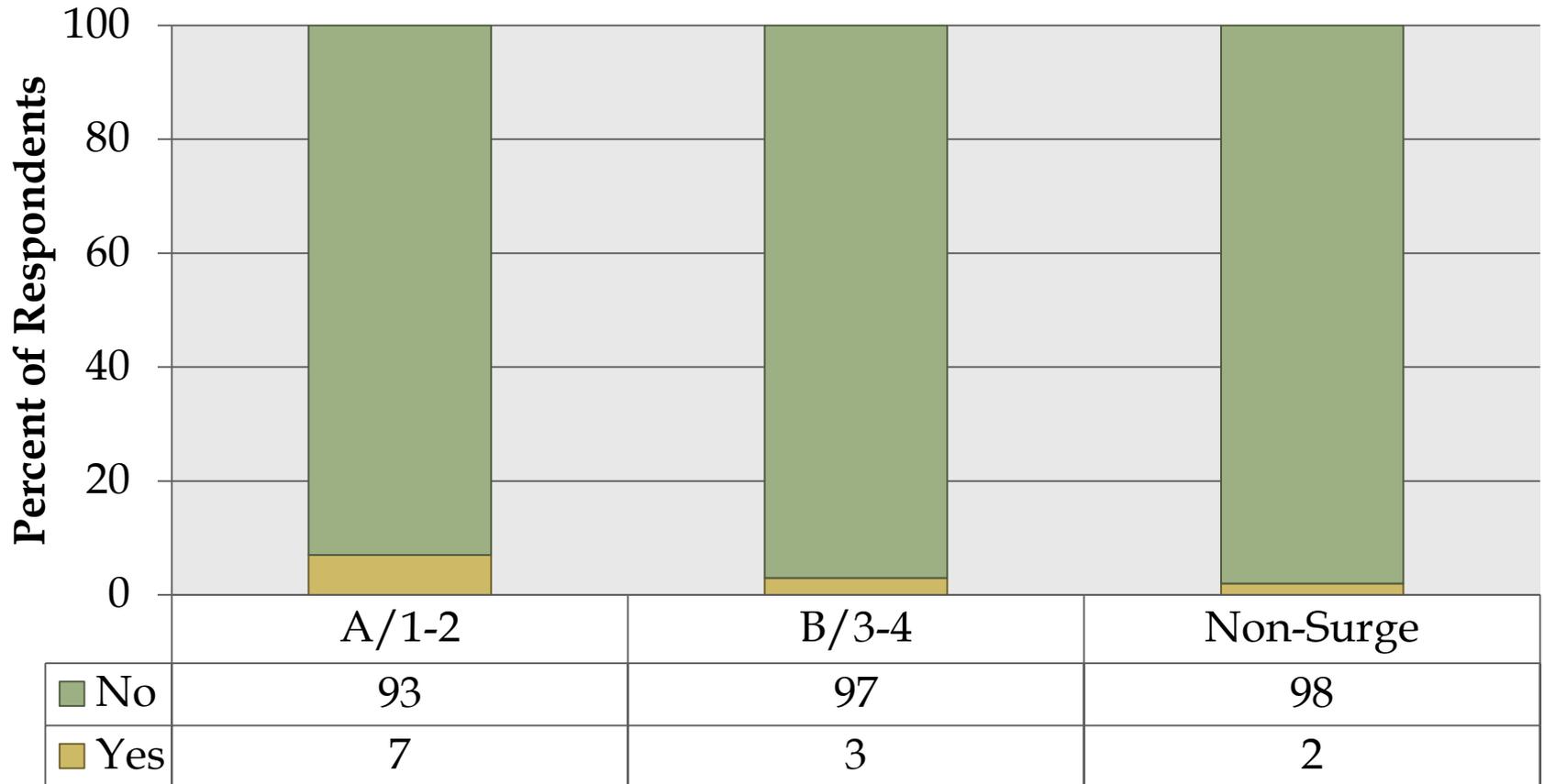
Center Location 32.6 N 76.9 W

Max Sustained Wind 100 mph

Movement NNE at 13 mph

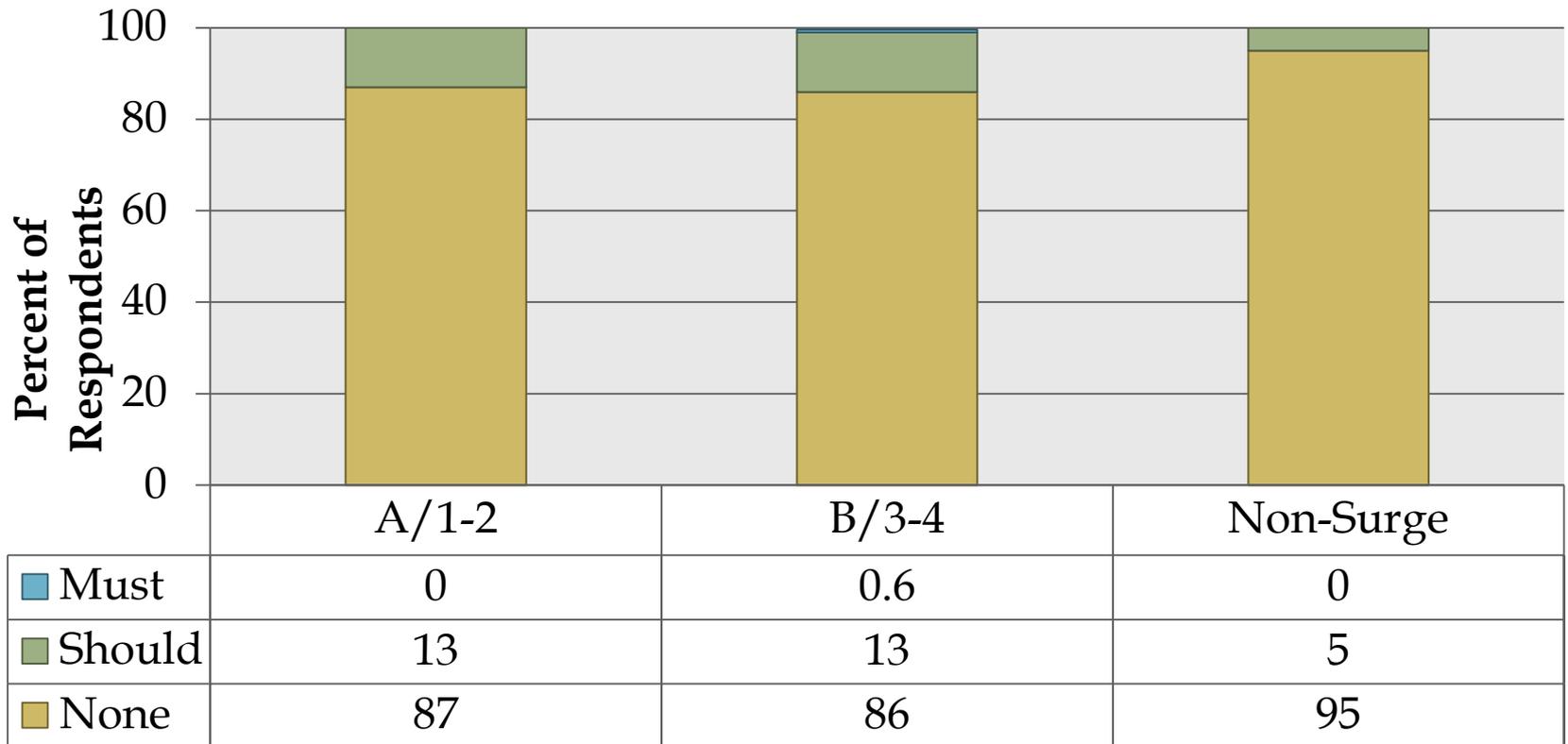
Response in Irene

Evacuation in Irene



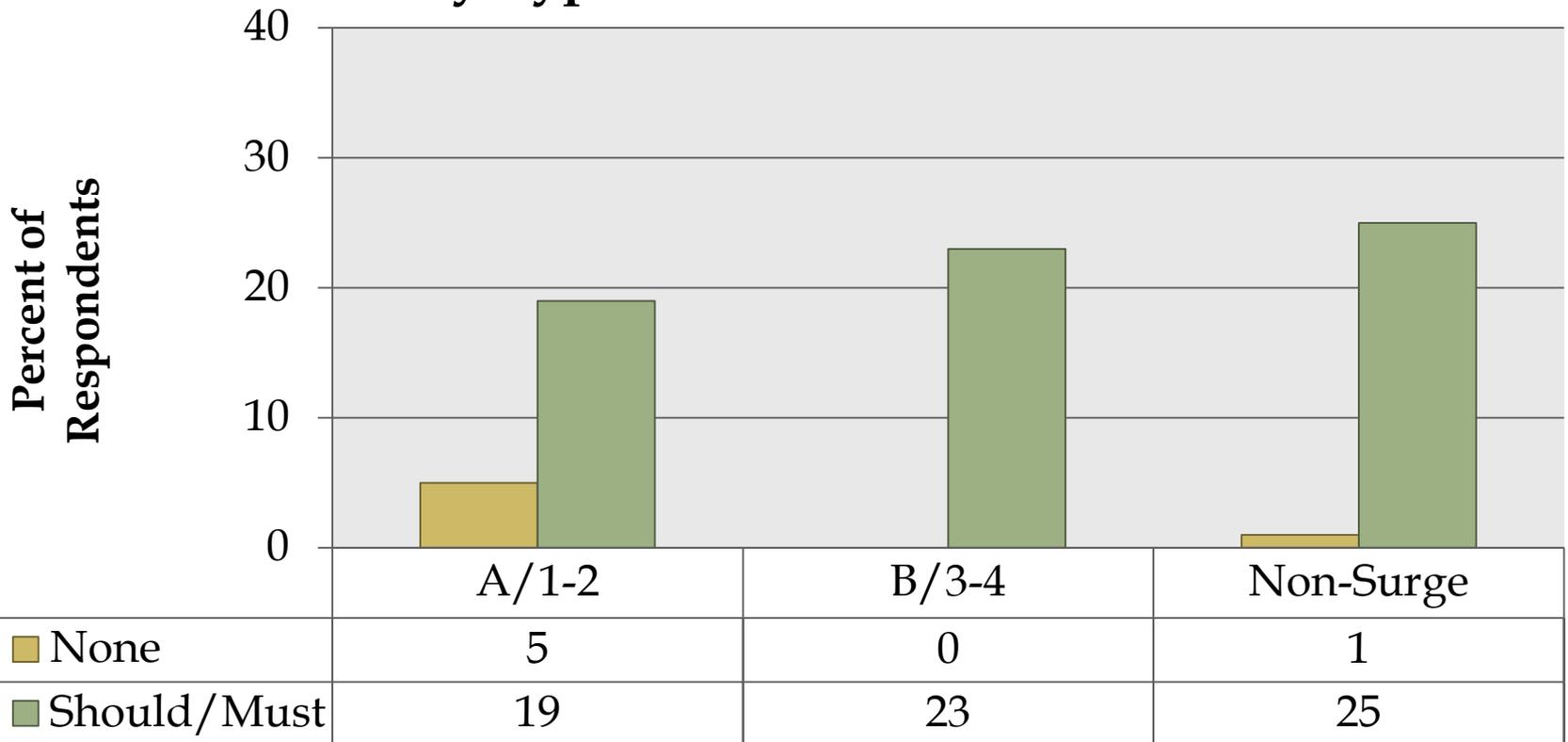
Response in Irene

Type of Evacuation Notice Heard in Irene



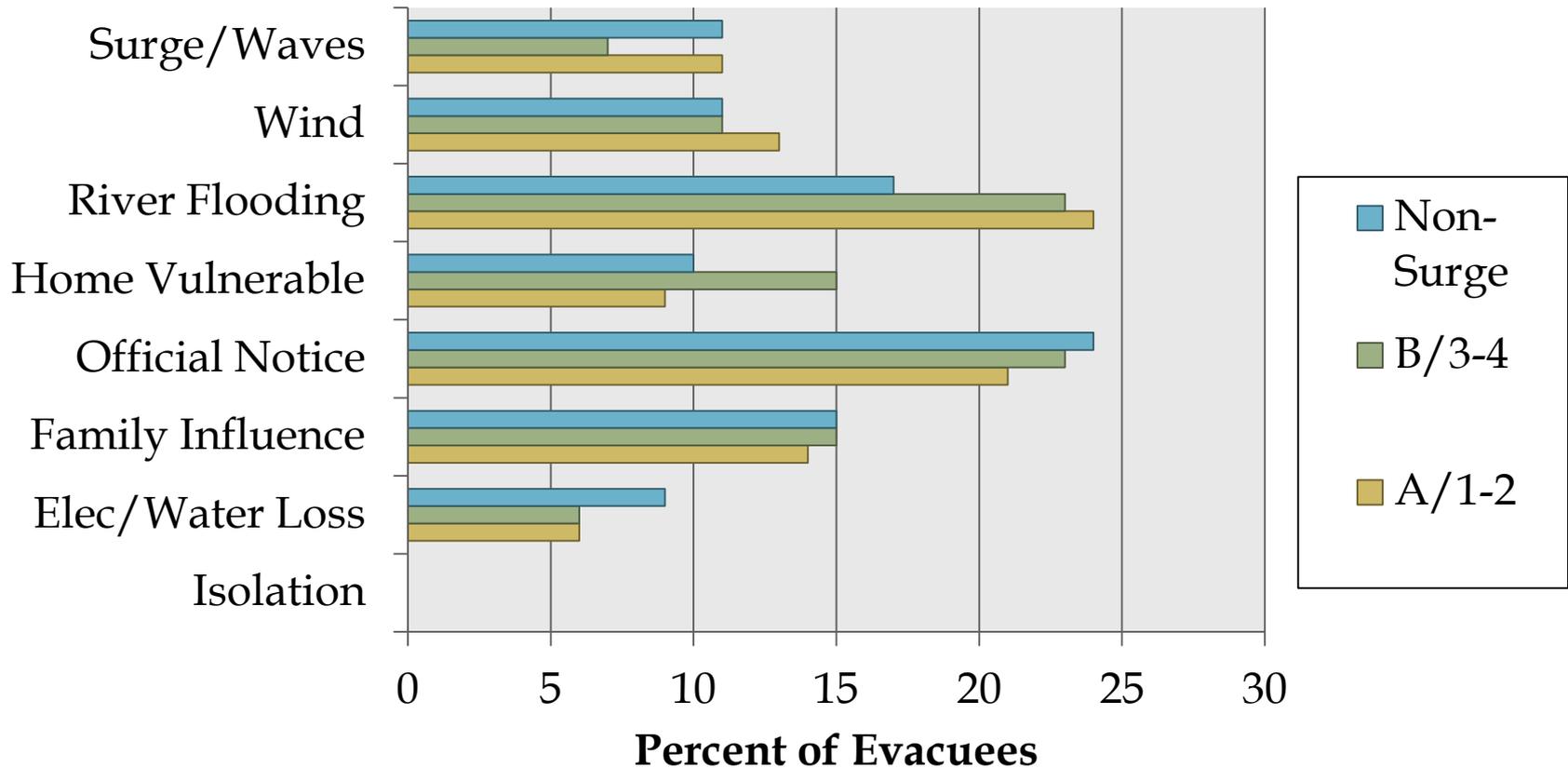
Response in Irene

Evacuation in Irene by Type of Evacuation Notice Heard



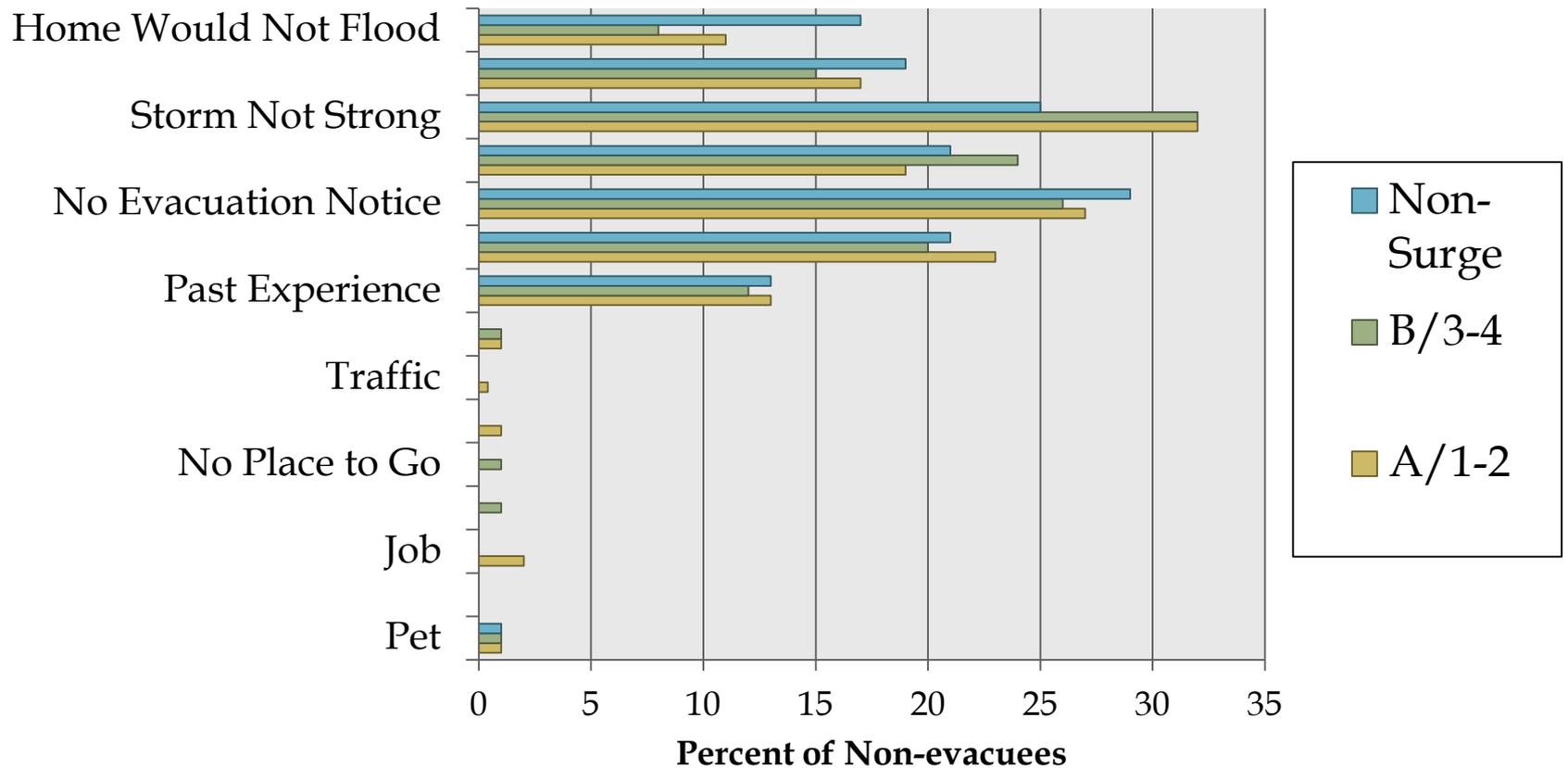
Response in Irene

Reasons for Evacuating in Irene



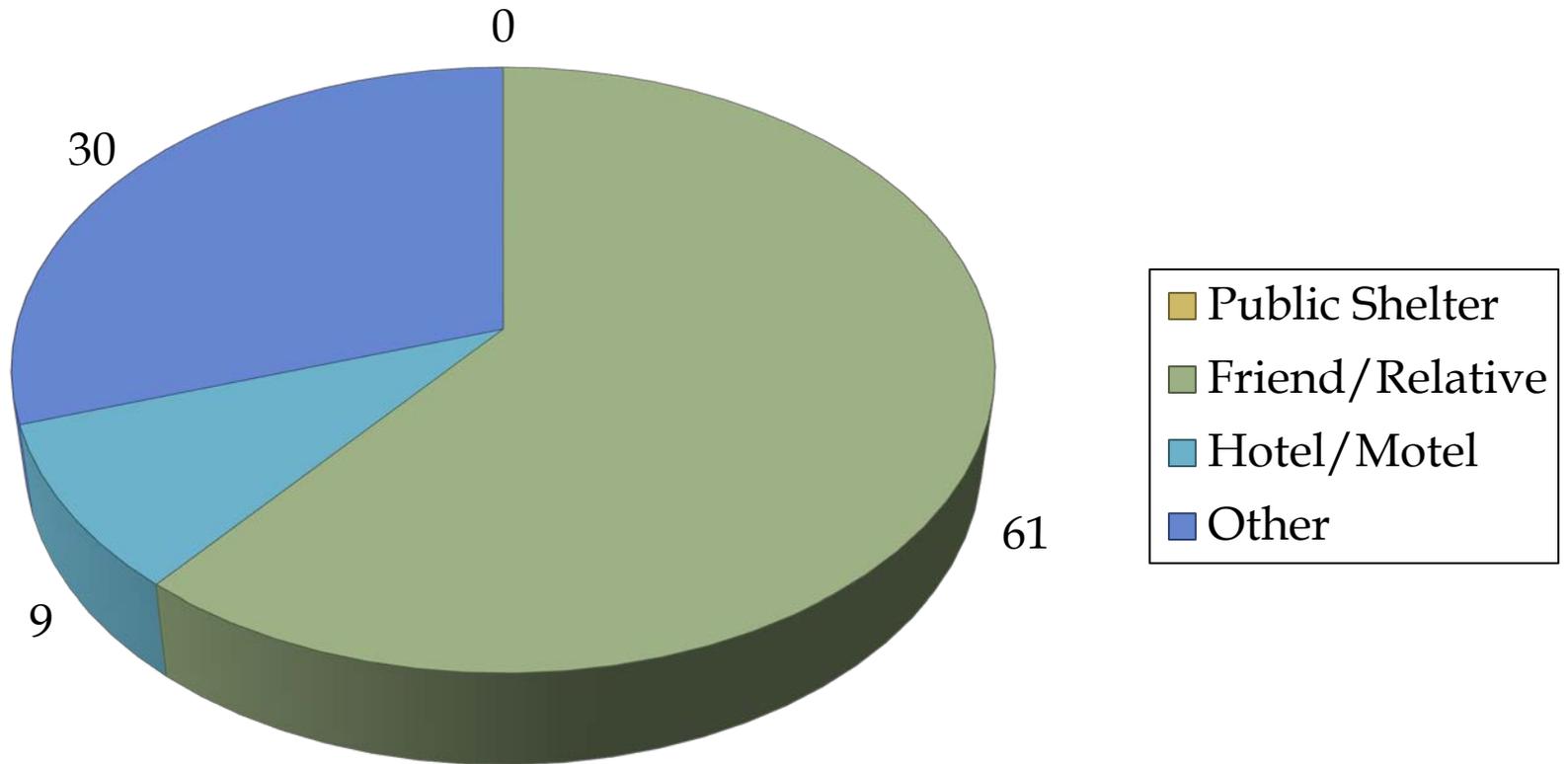
Response in Irene

Reasons for Not Evacuating in Irene



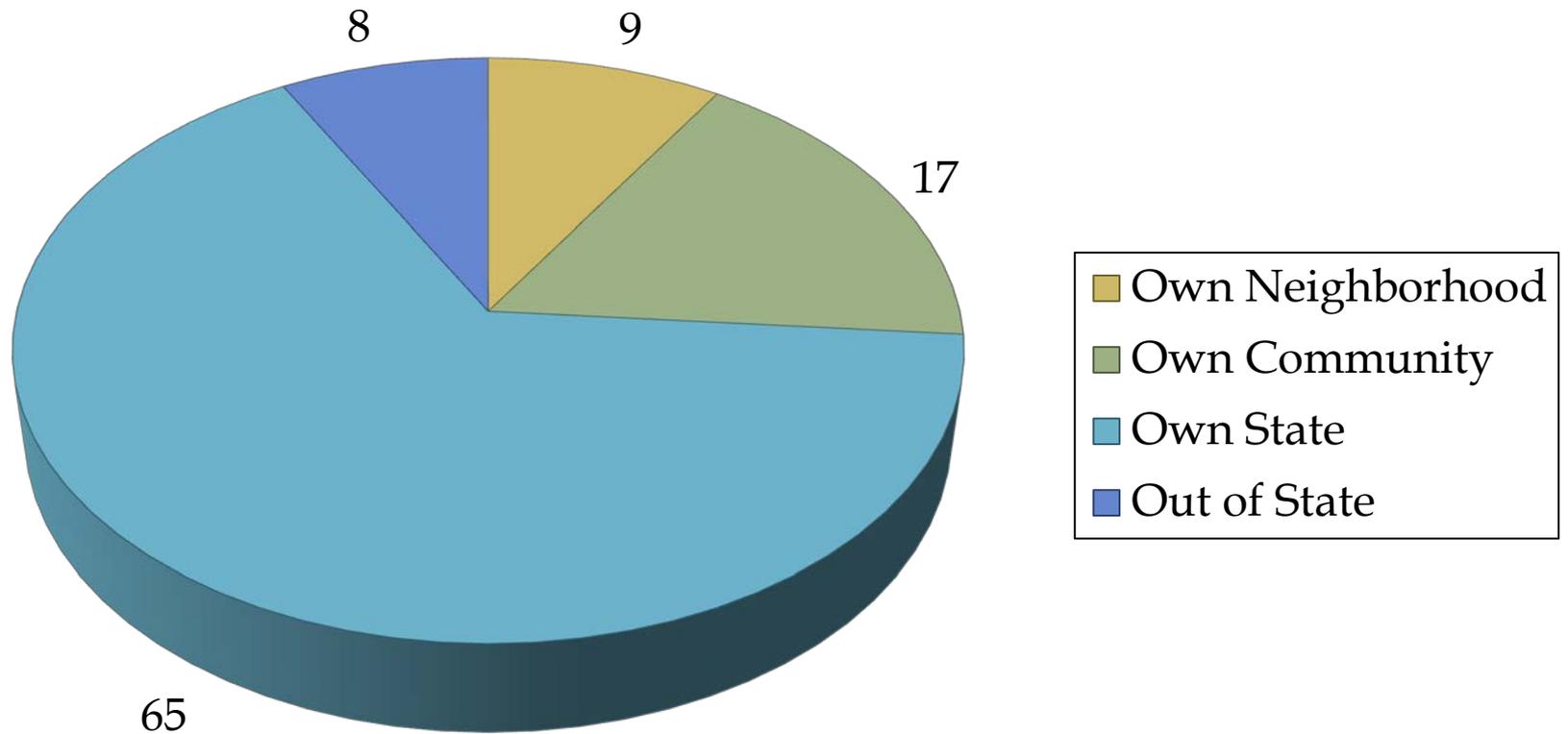
Response in Irene

Type of Refuge in Irene (%)

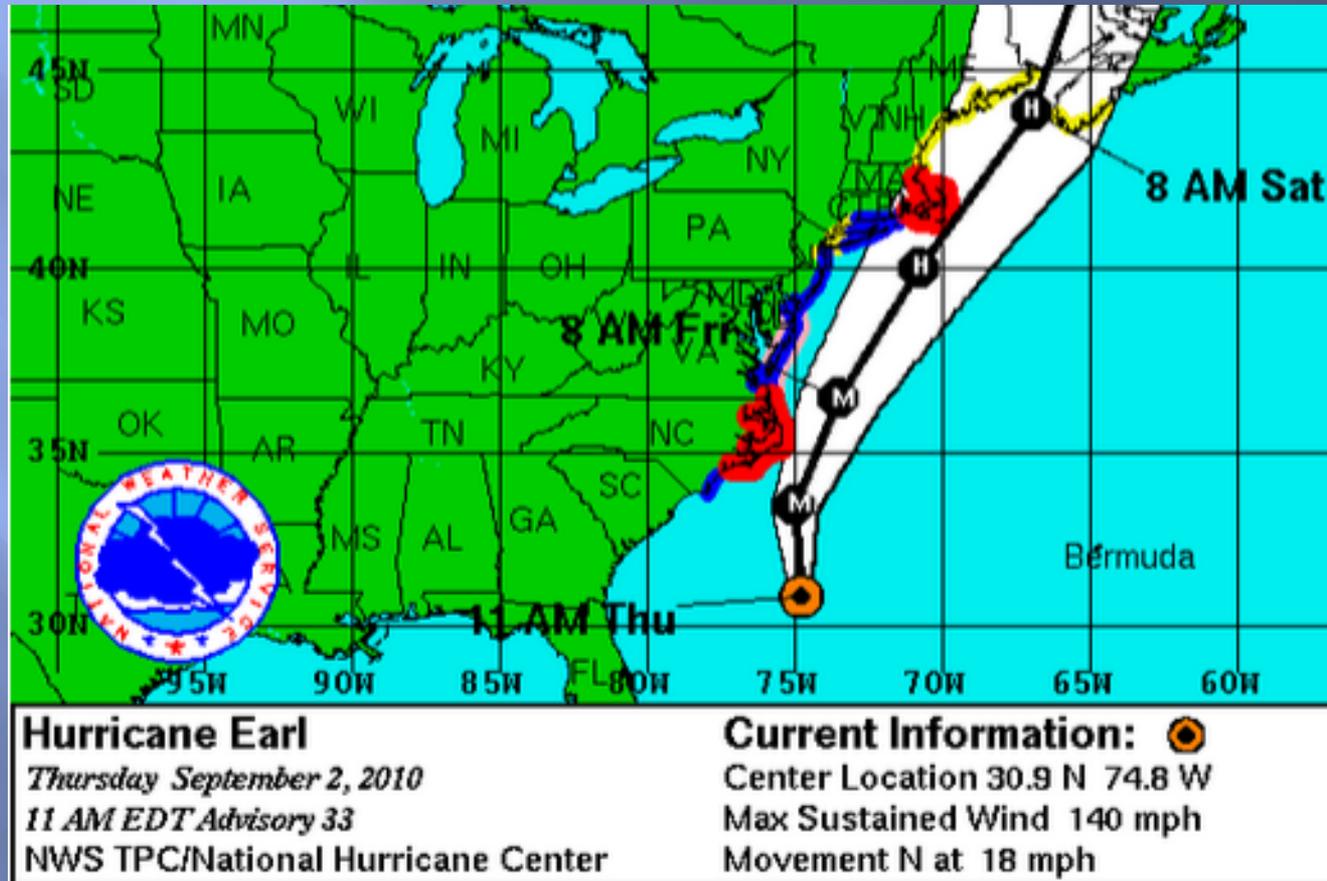


Response in Irene

Location of Refuge in Irene (%)

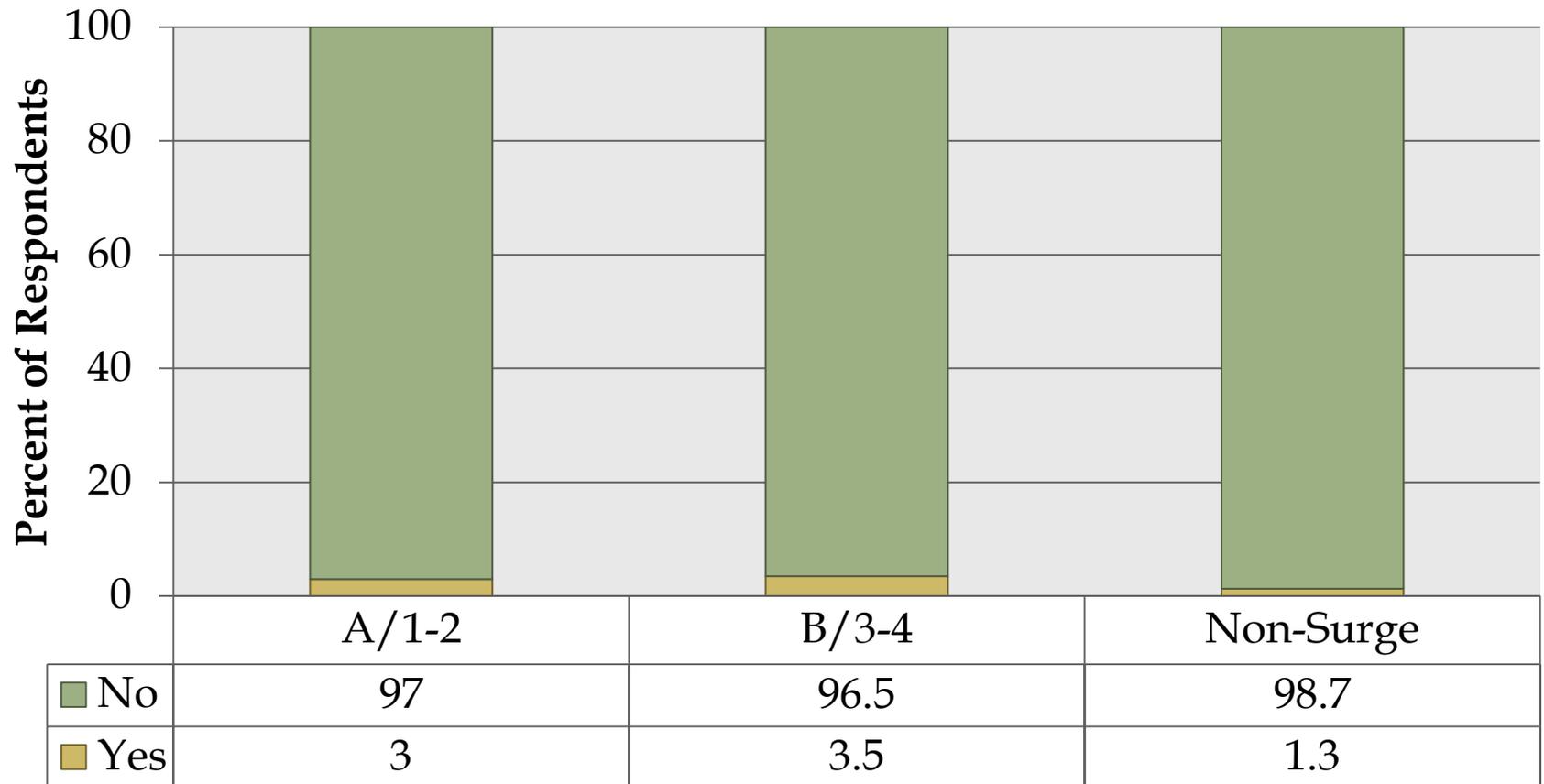


Response in Earl



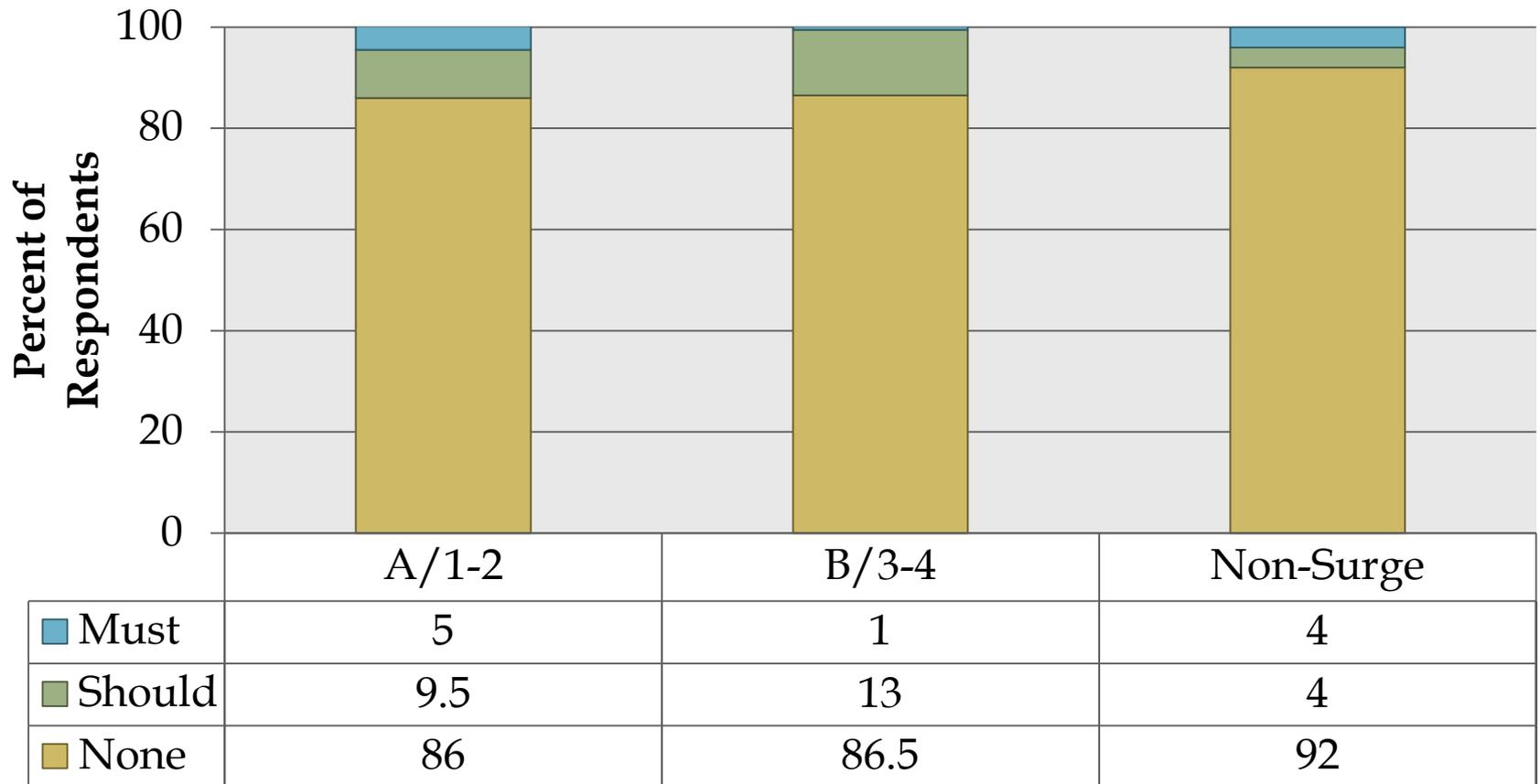
Response in Earl

Evacuation in Earl



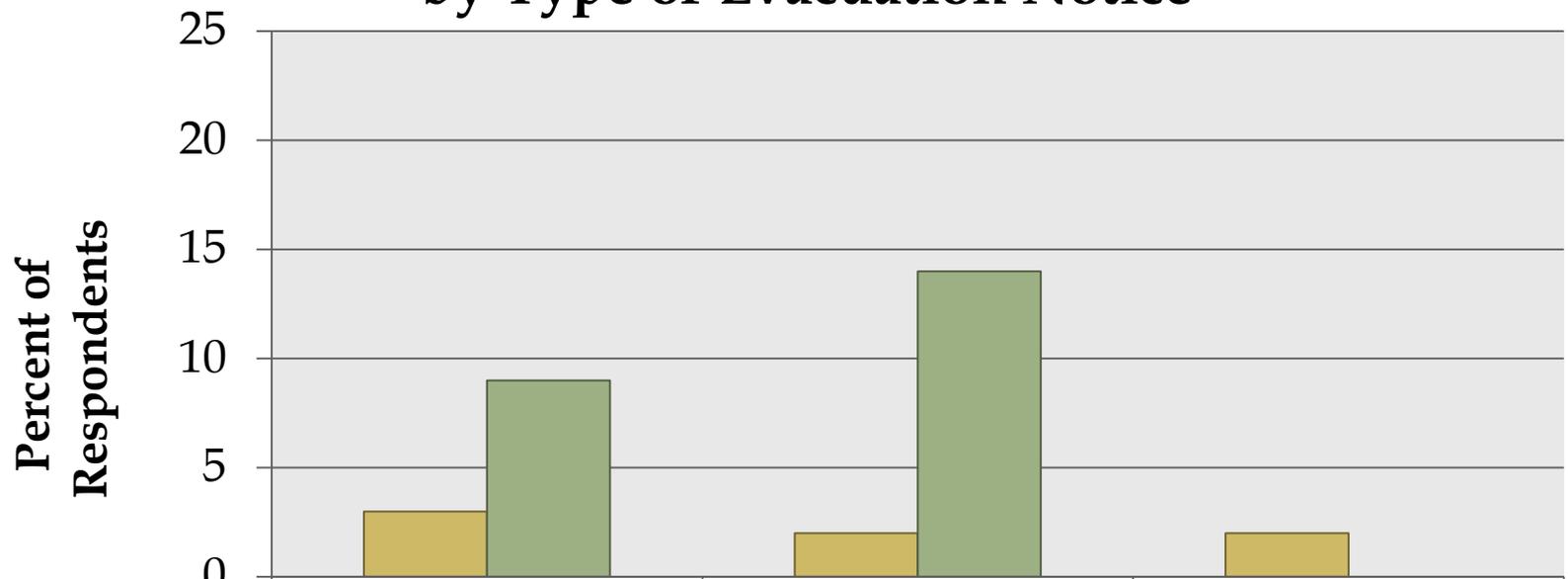
Response in Earl

Type of Evacuation Notice Heard



Response in Earl

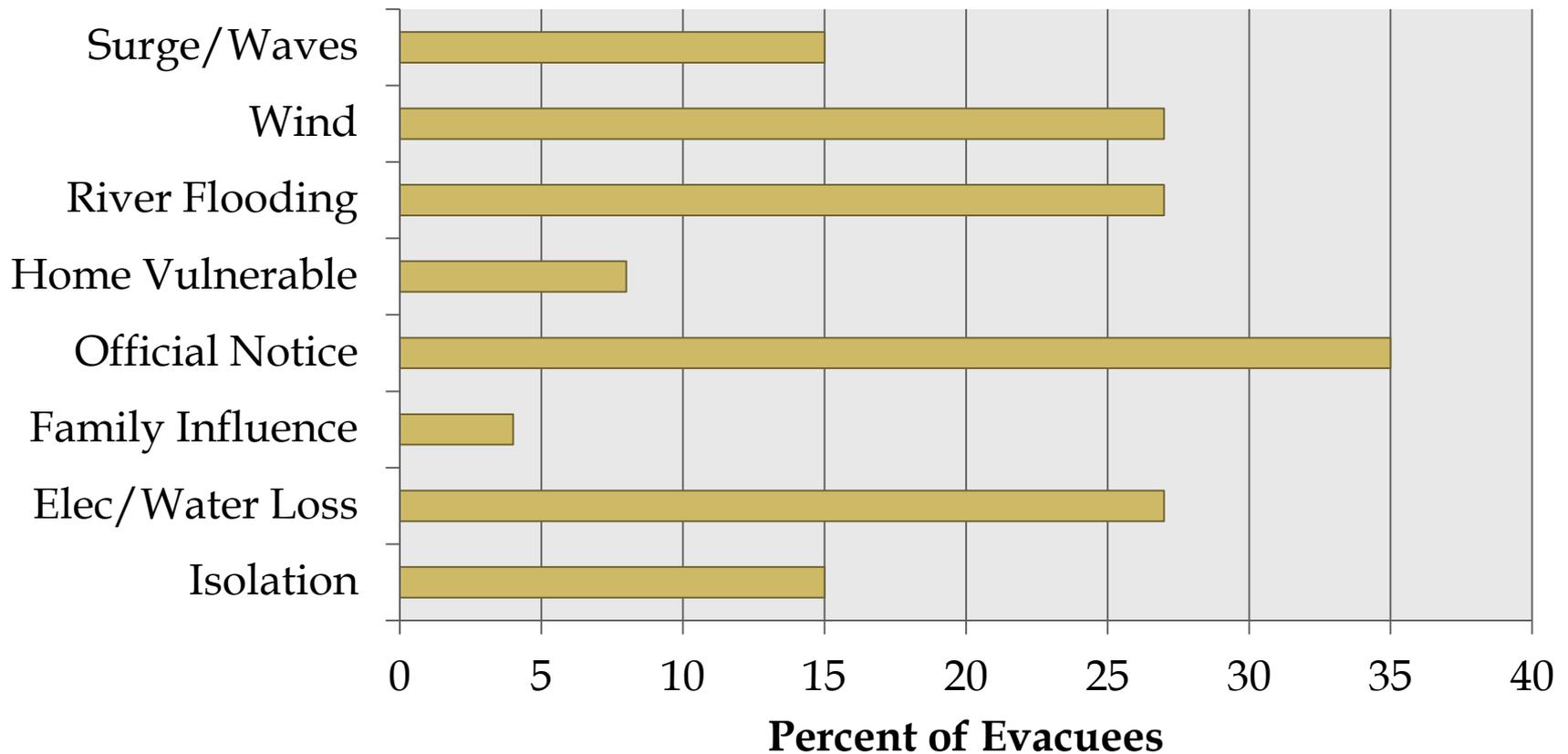
Evacuation in Earl by Type of Evacuation Notice



■ None	3	2	2
■ Should/Must	9	14	0

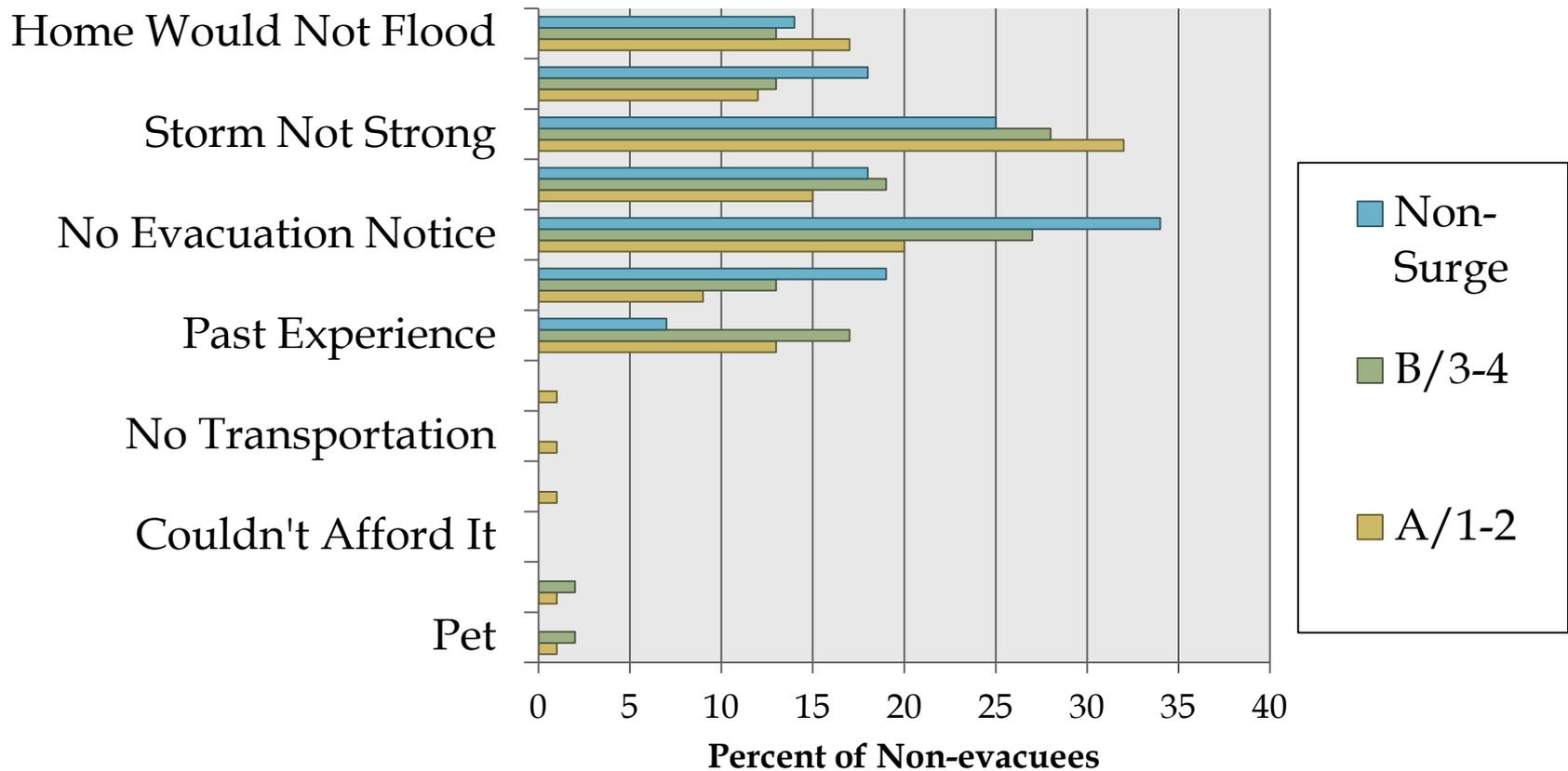
Response in Earl

Reasons for Evacuating in Earl



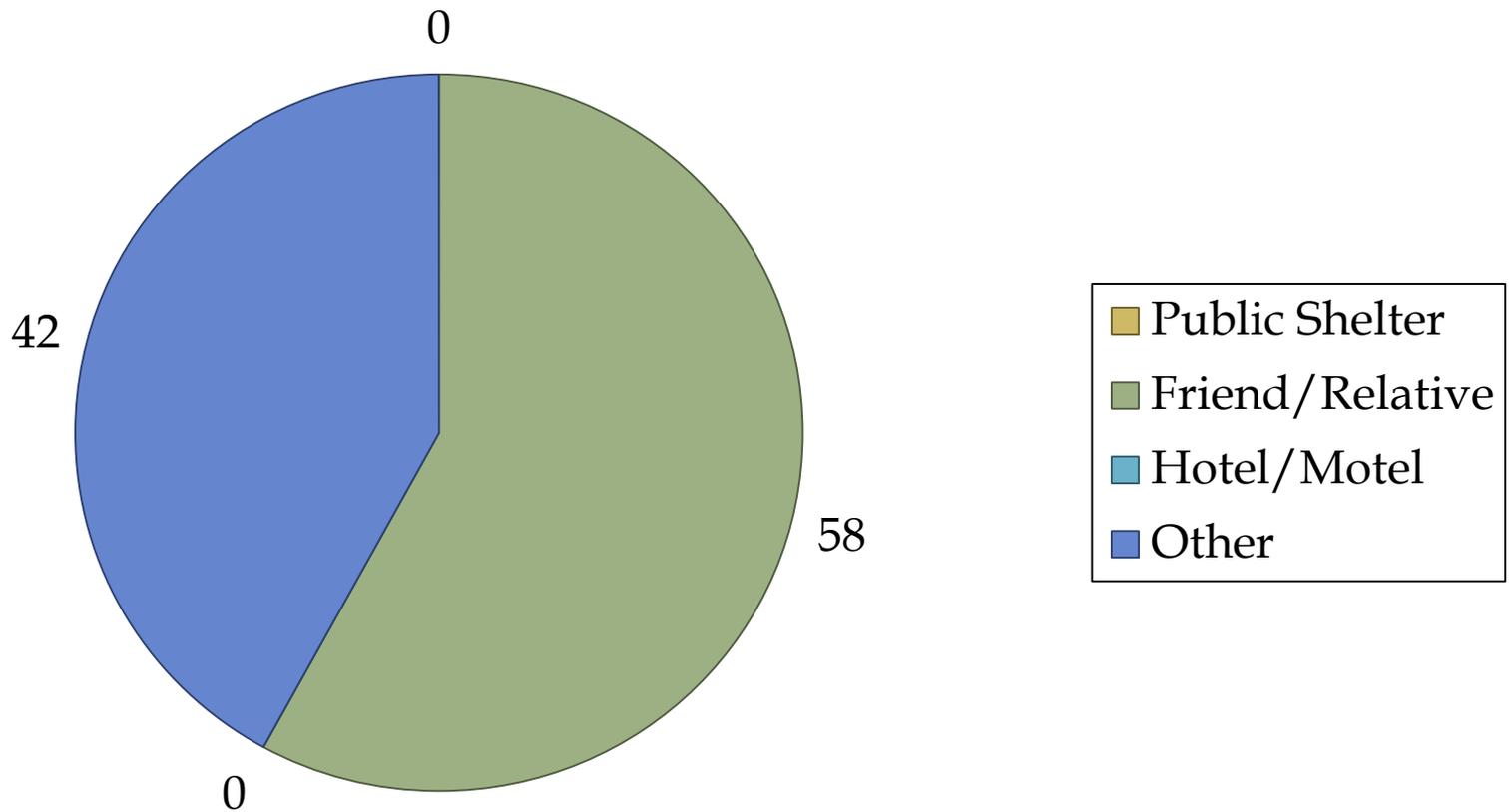
Response in Earl

Reasons for Not Evacuating in Earl



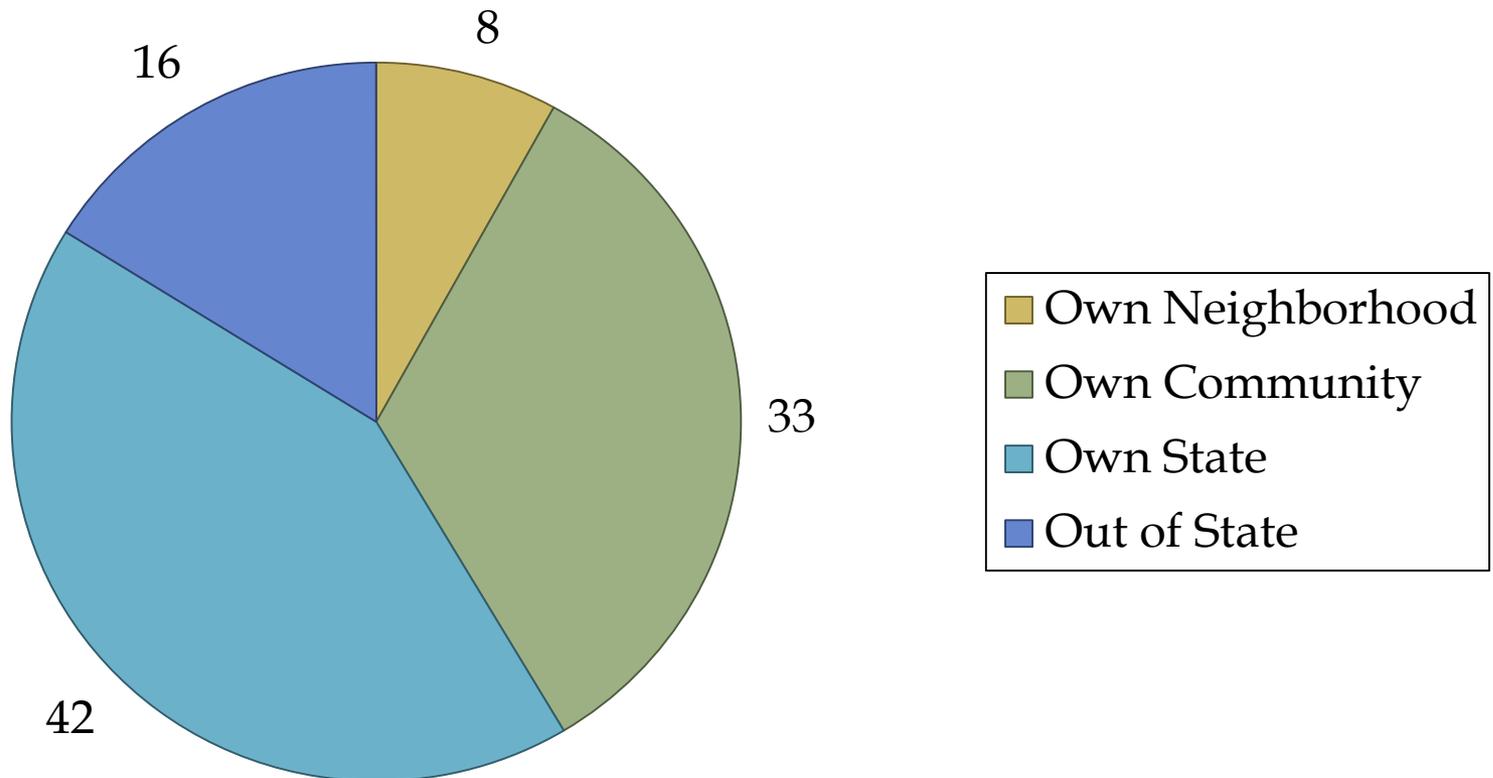
Response in Earl

Type of Refuge in Earl (%)



Response in Earl

Location of Refuge in Earl (%)



Perceived Vulnerability

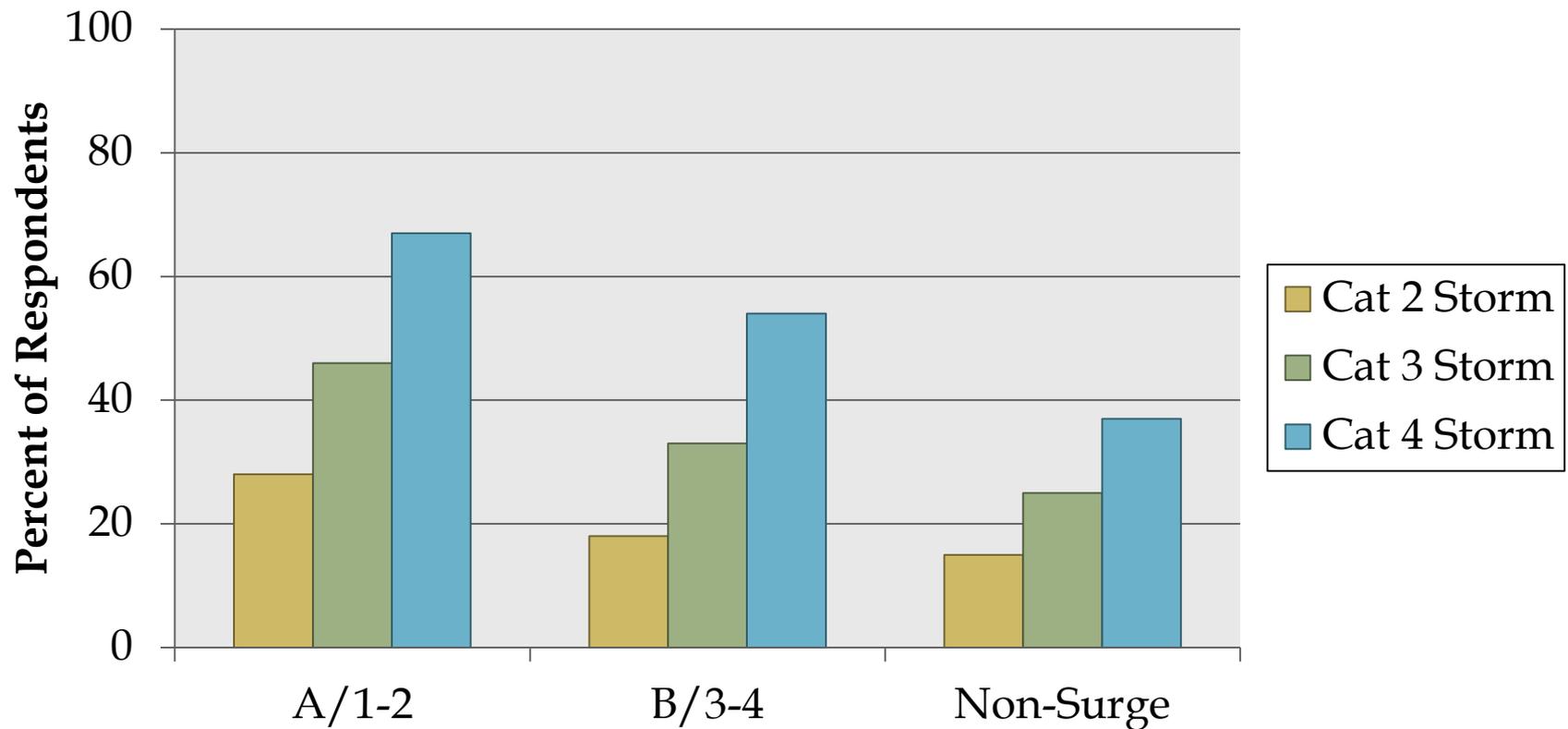
Perceived Vulnerability

- ▣ Interviewees were asked to consider three hypothetical hurricanes:
 - A category 2 storm with winds of 100 MPH and a storm surge 6 to 15 feet high
 - A category 3 storm with winds of 125 MPH and a storm surge 8 to 20 feet high
 - A category 4 storm with winds of 140 MPH and a storm surge 11 to 28 feet high

Perceived Vulnerability

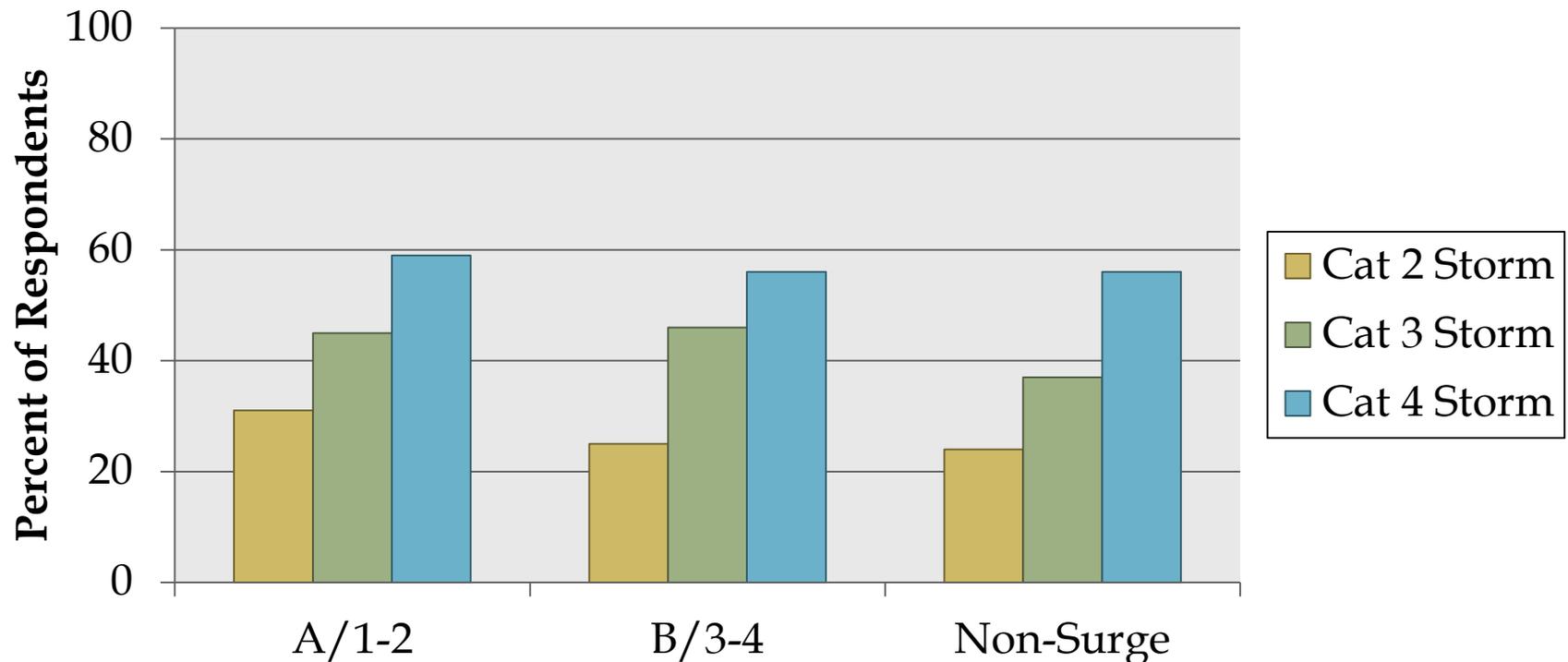
Perceived Vulnerability

**Belief Home would Flood Dangerously
by Storm Category and Risk Area**



Perceived Vulnerability

**Belief Home would be Unsafe,
Considering both Wind and Water,
by Storm Category and Risk Area**

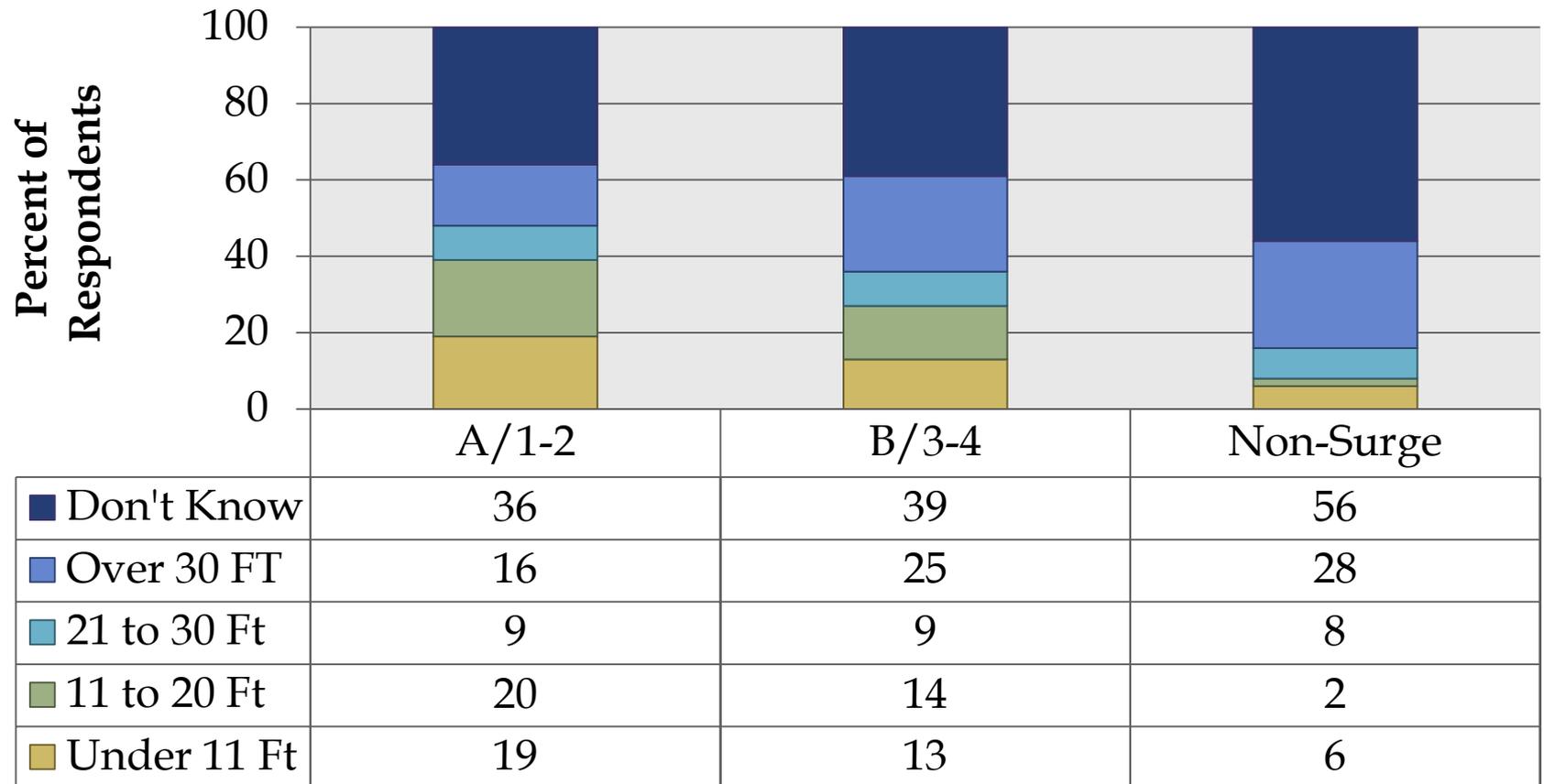


Perceived Vulnerability

- ▣ No significant difference in perceived vulnerability between those who were given
 - only the category and wind speed
 - vs. those who were also given a surge height range.

Perceived Elevation

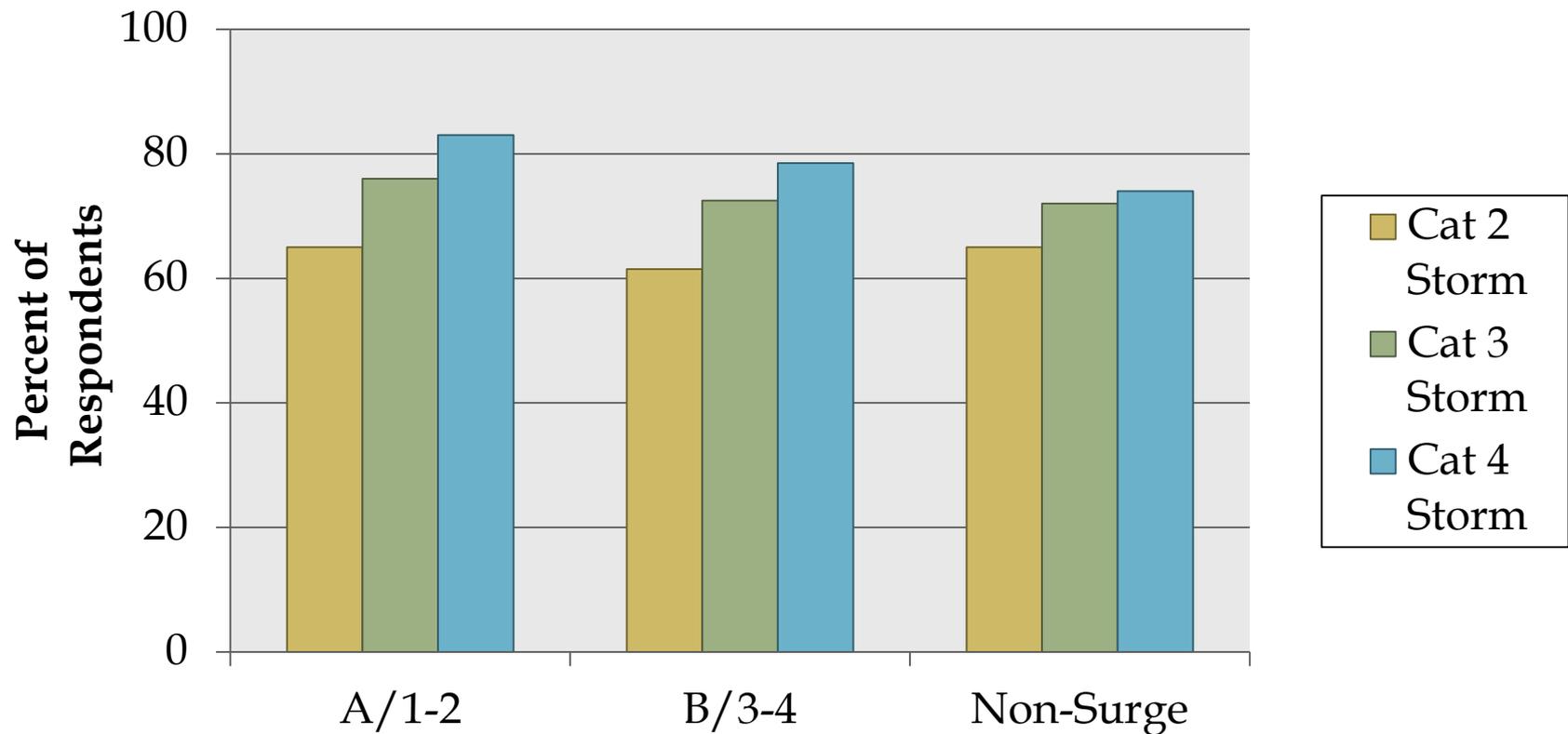
Stated Elevation of Home Site



Evacuation Intentions

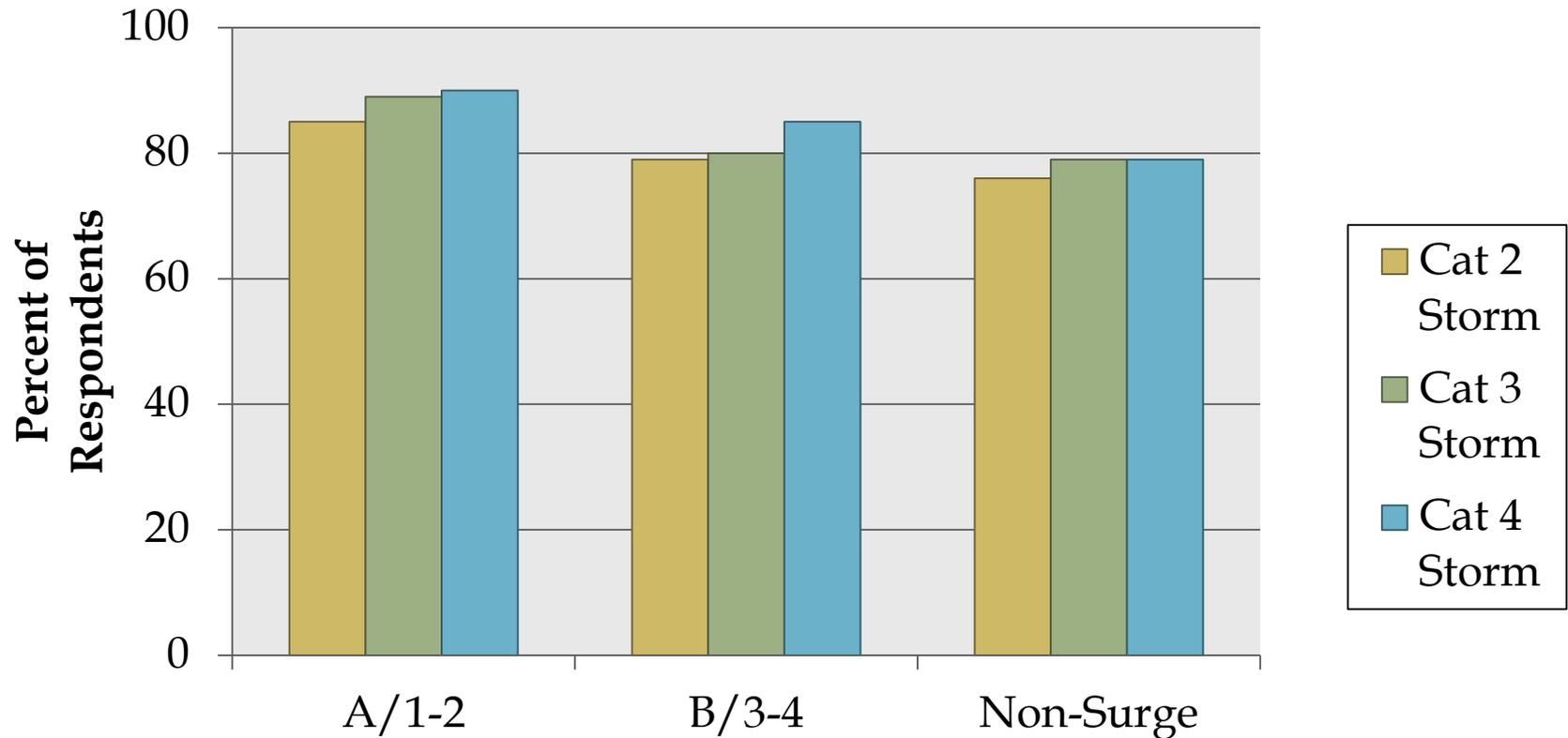
Evacuation Intentions

**Intention to Evacuate if Recommended
by Storm Category and Risk Area**



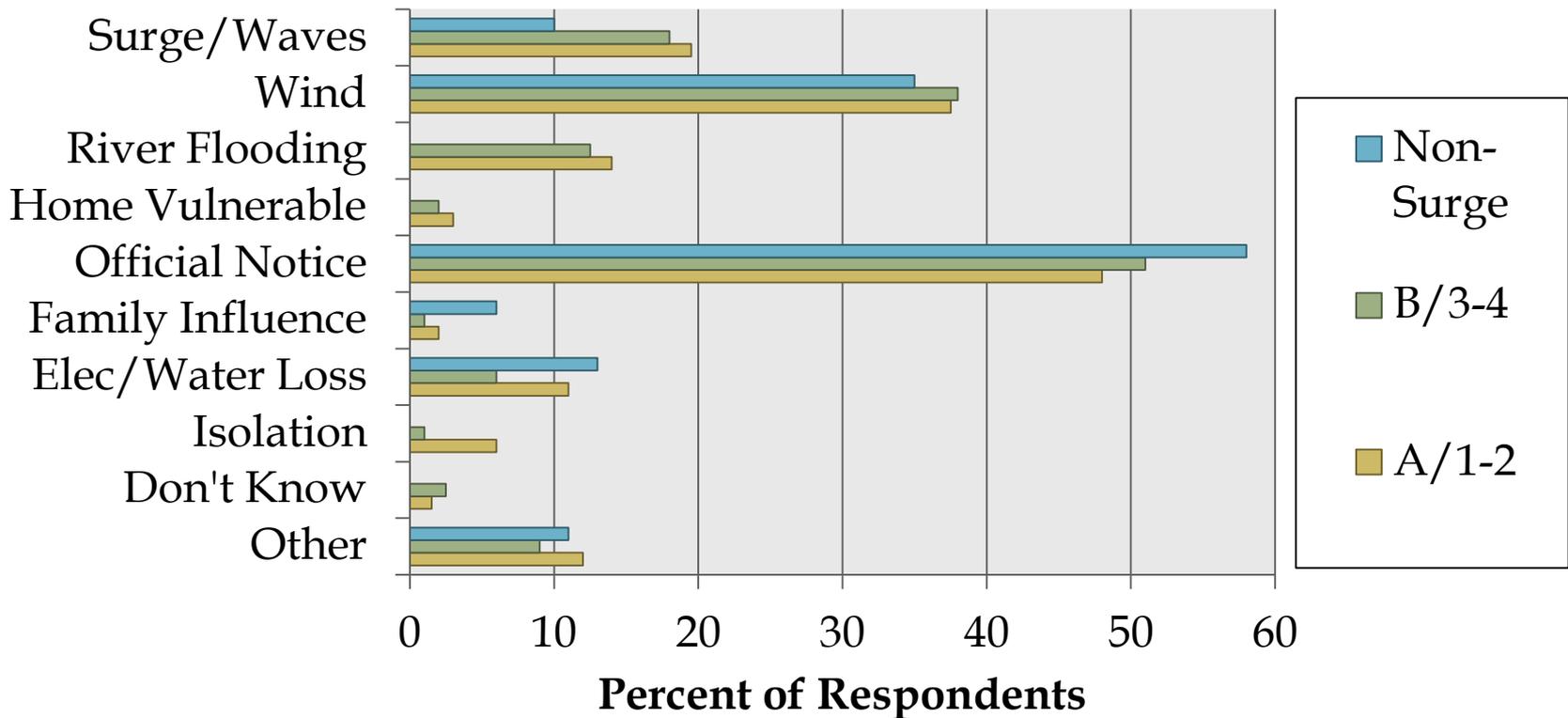
Evacuation Intentions

**Intention to Evacuate if Ordered
by Storm Category and Risk Area**



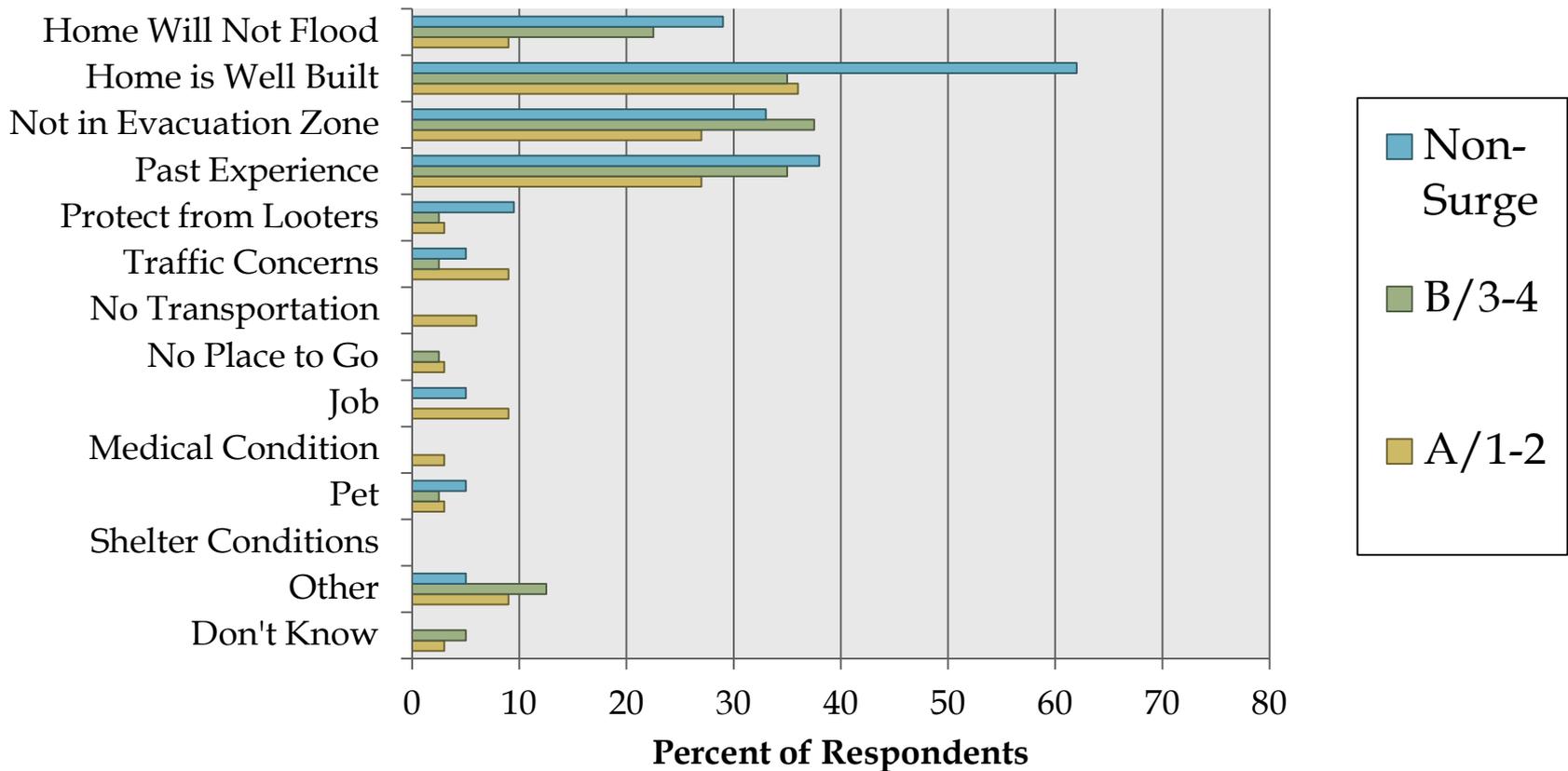
Evacuation Intentions

Reasons to Evacuate in Cat 3 Hurricane



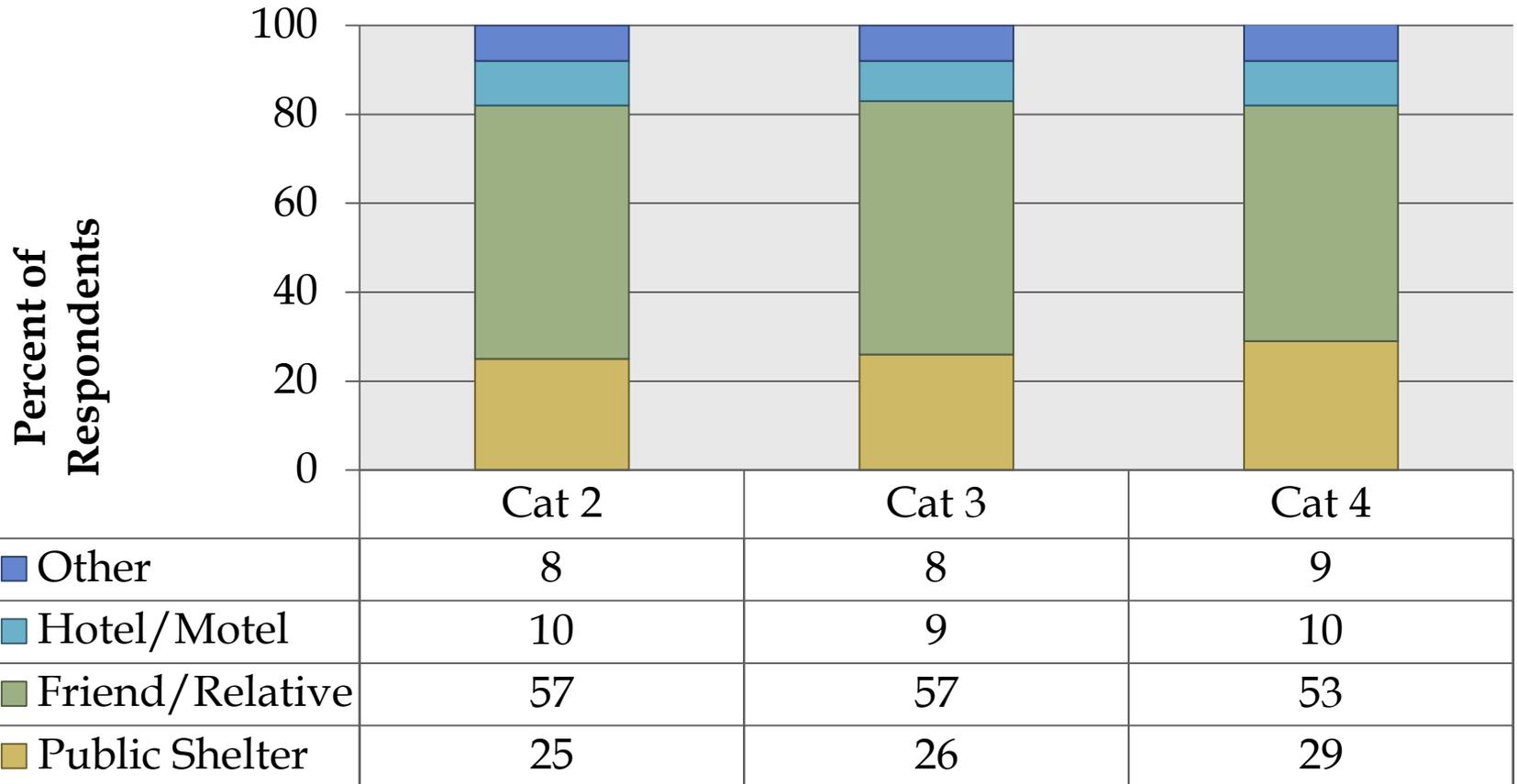
Evacuation Intentions

Reasons for Not Evacuating in Cat 3 Hurricane



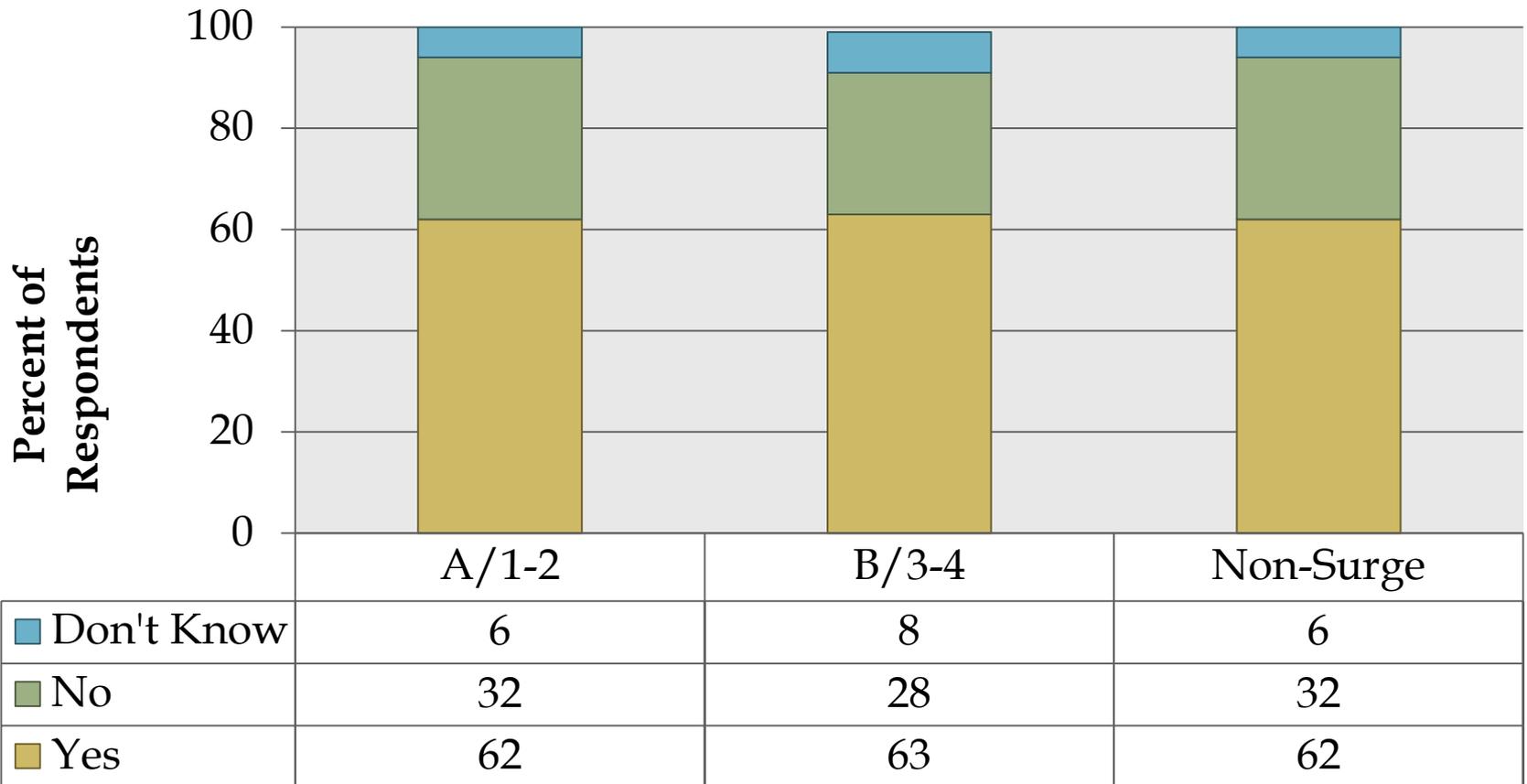
Evacuation Intentions

Intended Refuge by Hurricane Category



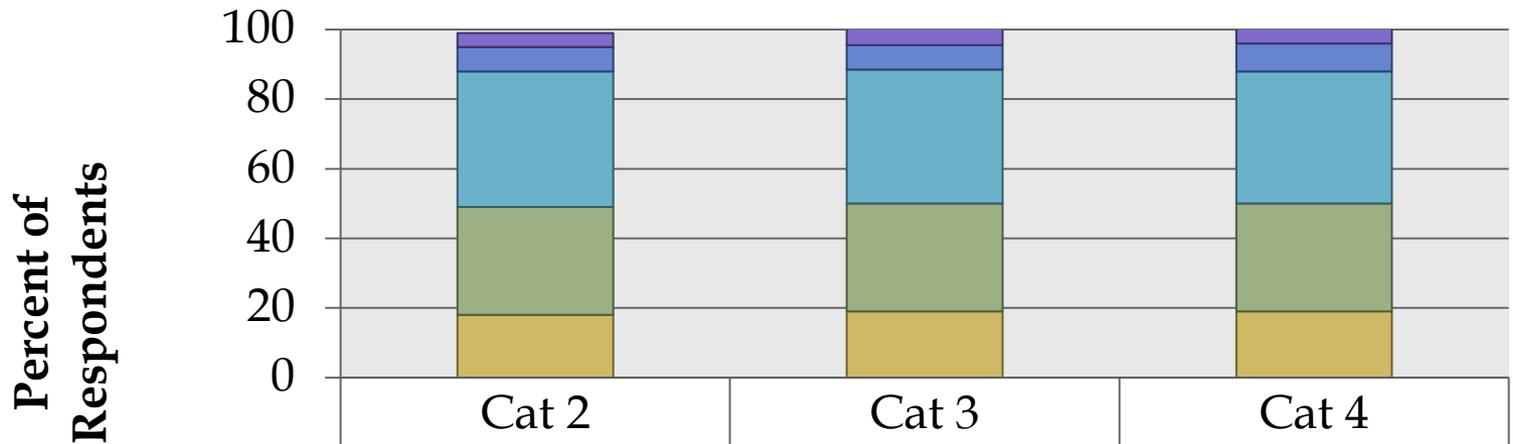
Evacuation Intentions

Could Stay with Friends/Relatives



Evacuation Intentions

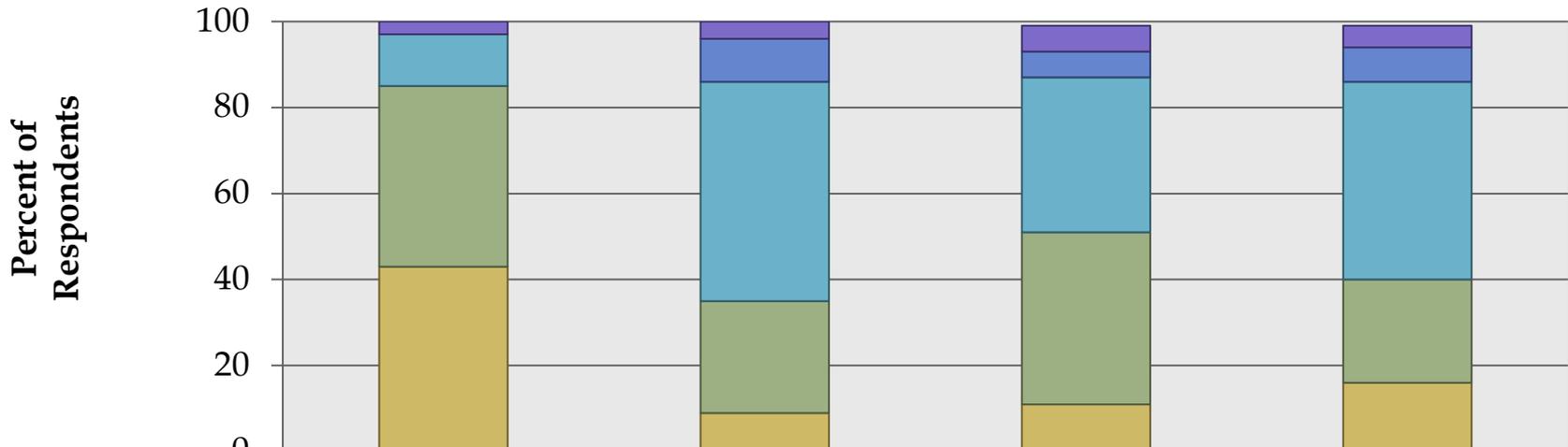
Intended Location of Refuge by Hurricane Category



Don't Know	4	5	5
Out of State	7	7	8
Own State	39	38.5	38
Own Community	31	31	31
Own Neighborhood	18	19	19

Evacuation Intentions

**Intended Location of Refuge
by Type of Refuge**



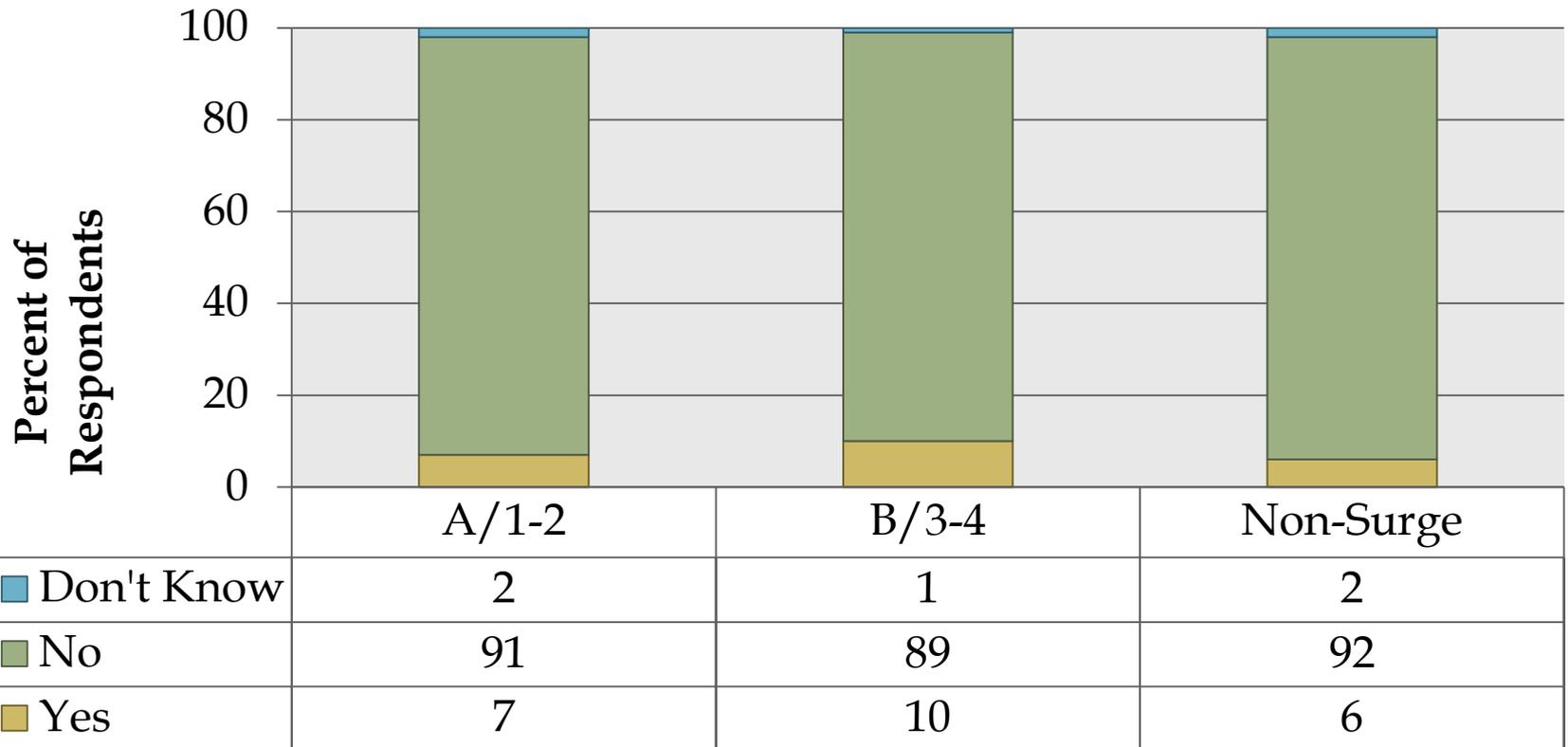
	Public Shelter	Friend/Relative	Hotel/Motel	Other
Don't Know	3	4	6	5
Out of State	0	10	6	8
Own State	12	51	36	46
Own Community	42	26	40	24
Own Neighborhood	43	9	11	16

Evacuation Intentions

	A/1-2	B/3-4	Non-Surge
% W/ No Vehicles	6	6.5	4
Mean Vehicles Available	1.73	1.67	1.98
Mean Vehicles to Take	1.39	1.26	1.34
% Available to Take	80	75	68
% W/ Trailers, MH's	4	2	5

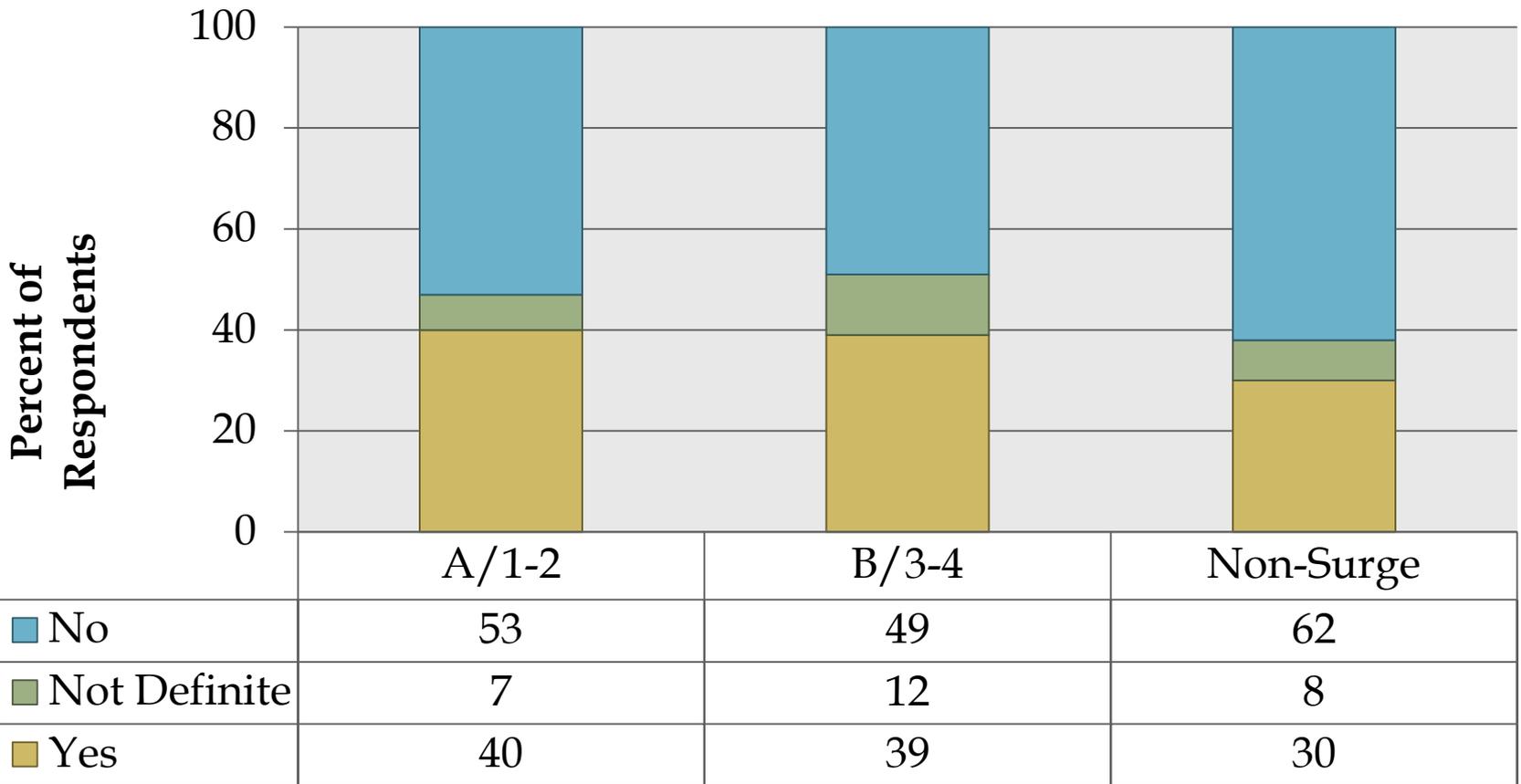
Evacuation Intentions

Someone in Household Would Need Assistance to Evacuate



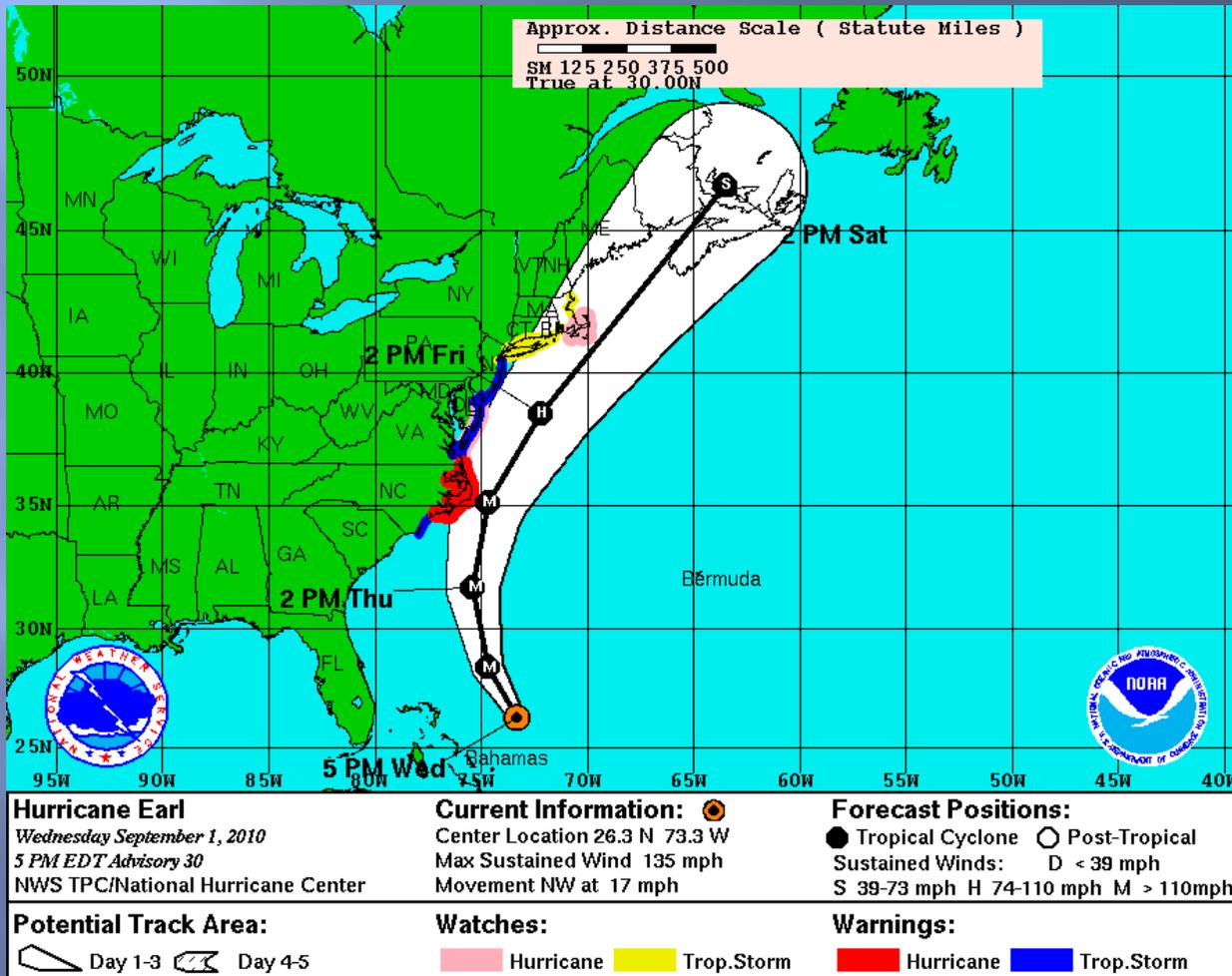
Evacuation Intentions

Family Has Evacuation Plan



Hurricane Earl Real-Time Interviews

Hurricane Earl Real-Time Interviews



Hurricane Earl Real-Time Interviews

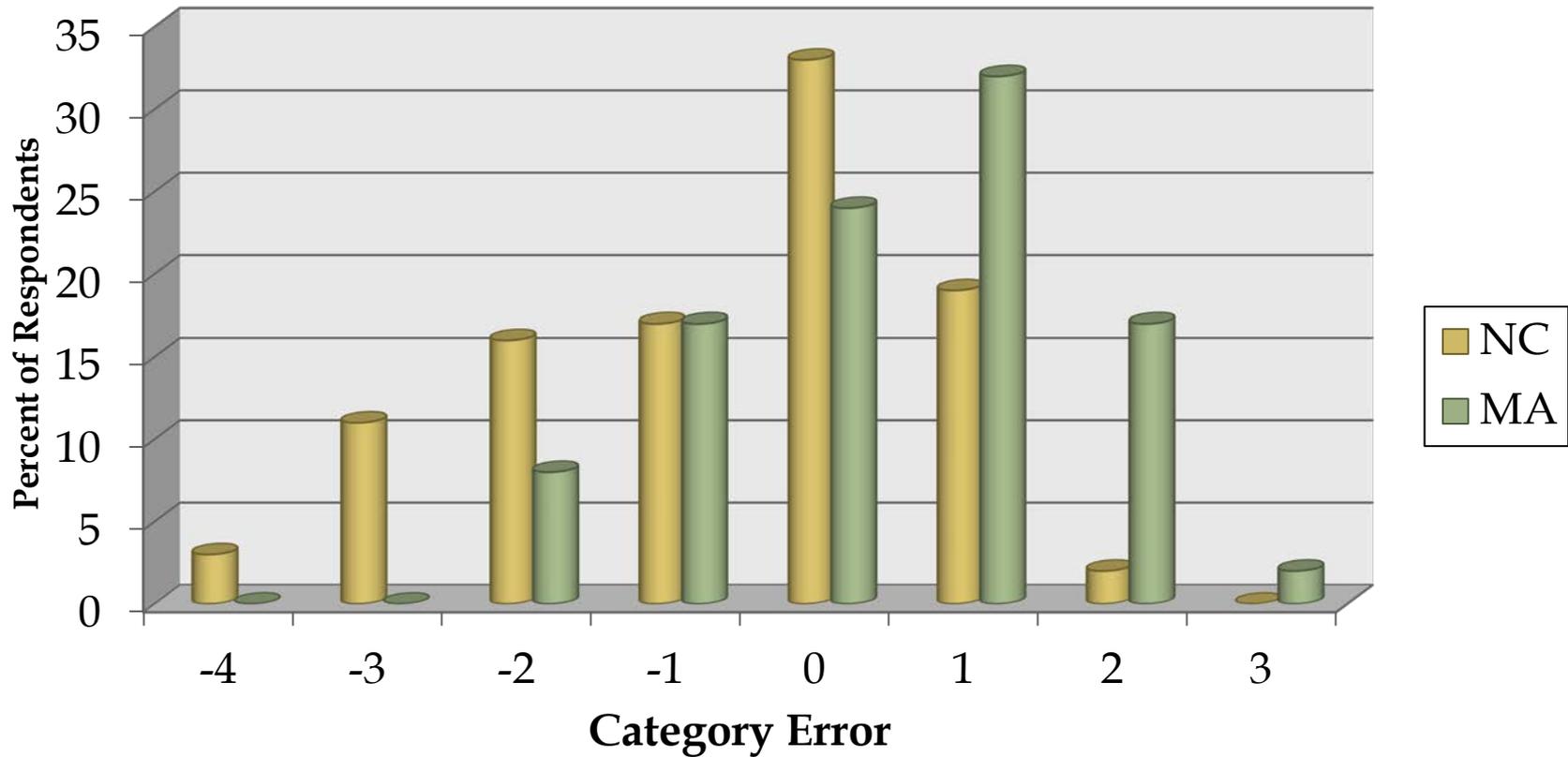
Adv	Day	Date	Time	MPH	NC	MA
26	Tue	8/31	5-9 PM	135	55	0
28	Wed	9/1	8-11 AM	125	37	0
29	Wed	9/1	11AM-5PM	125	53	0
30	Wed	9/1	5-9 PM	135	56	32
32	Thu	9/2	8-11 AM	145	47	31
33	Thu	9/2	11AM-5PM	140	52	34
34	Thu	9/2	5-9 PM	115	52	35
36	Fri	9/3	8-11 AM	105	0	53
37	Fri	9/3	11AM-5PM	85	0	53
38	Fri	9/3	5-9 PM	80	0	52
					352	290

Hurricane Earl Real-Time Interviews

- ▣ Storm Awareness
- ▣ Forecast Awareness
- ▣ Concern about Storm
 - Worry
 - Perceived Safety
- ▣ Preparations
- ▣ Evacuation Plans
- ▣ Information Sources
- ▣ Background Traffic

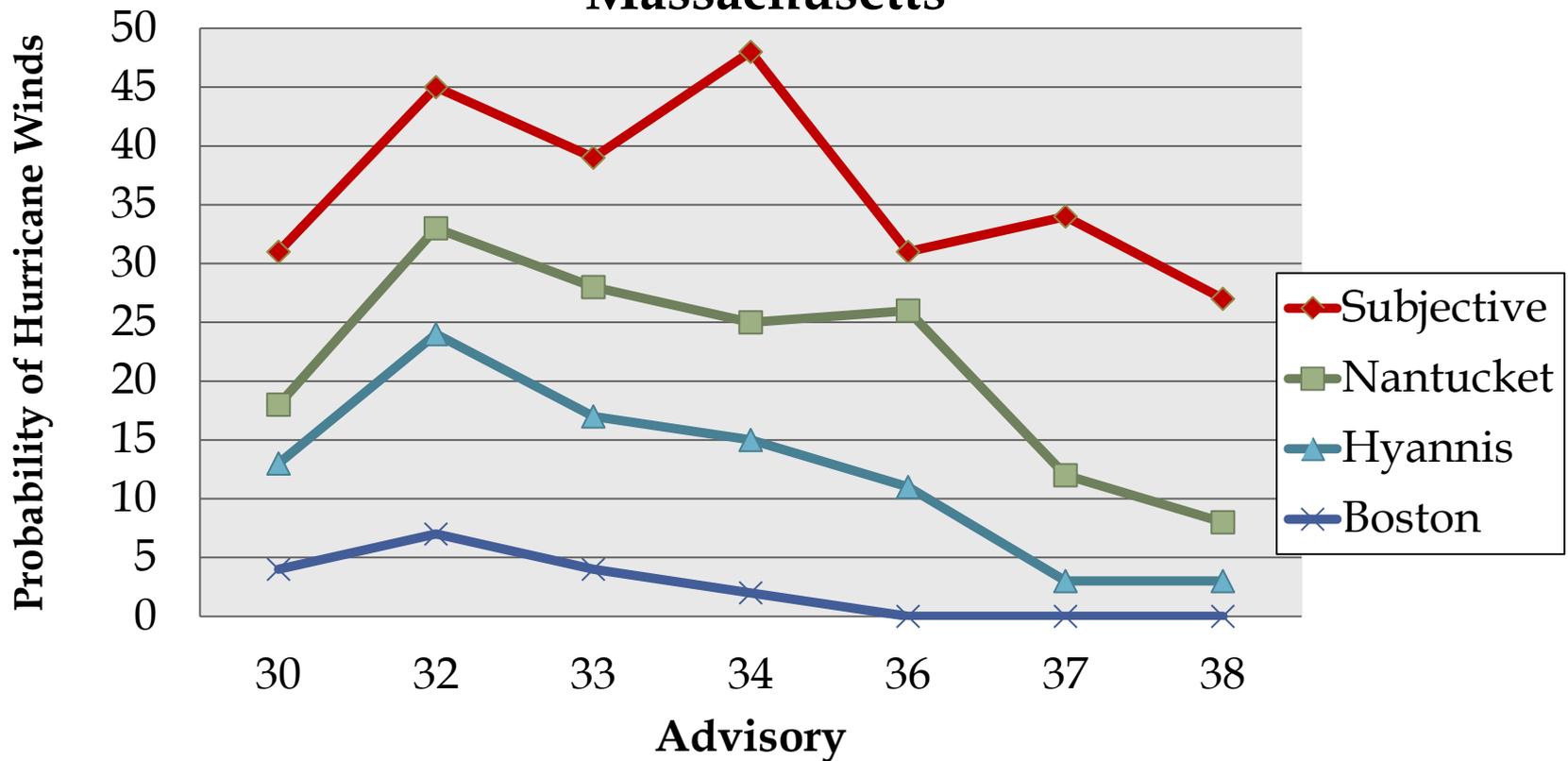
Hurricane Earl Real-Time Interviews

Error in Stated Forecast Category



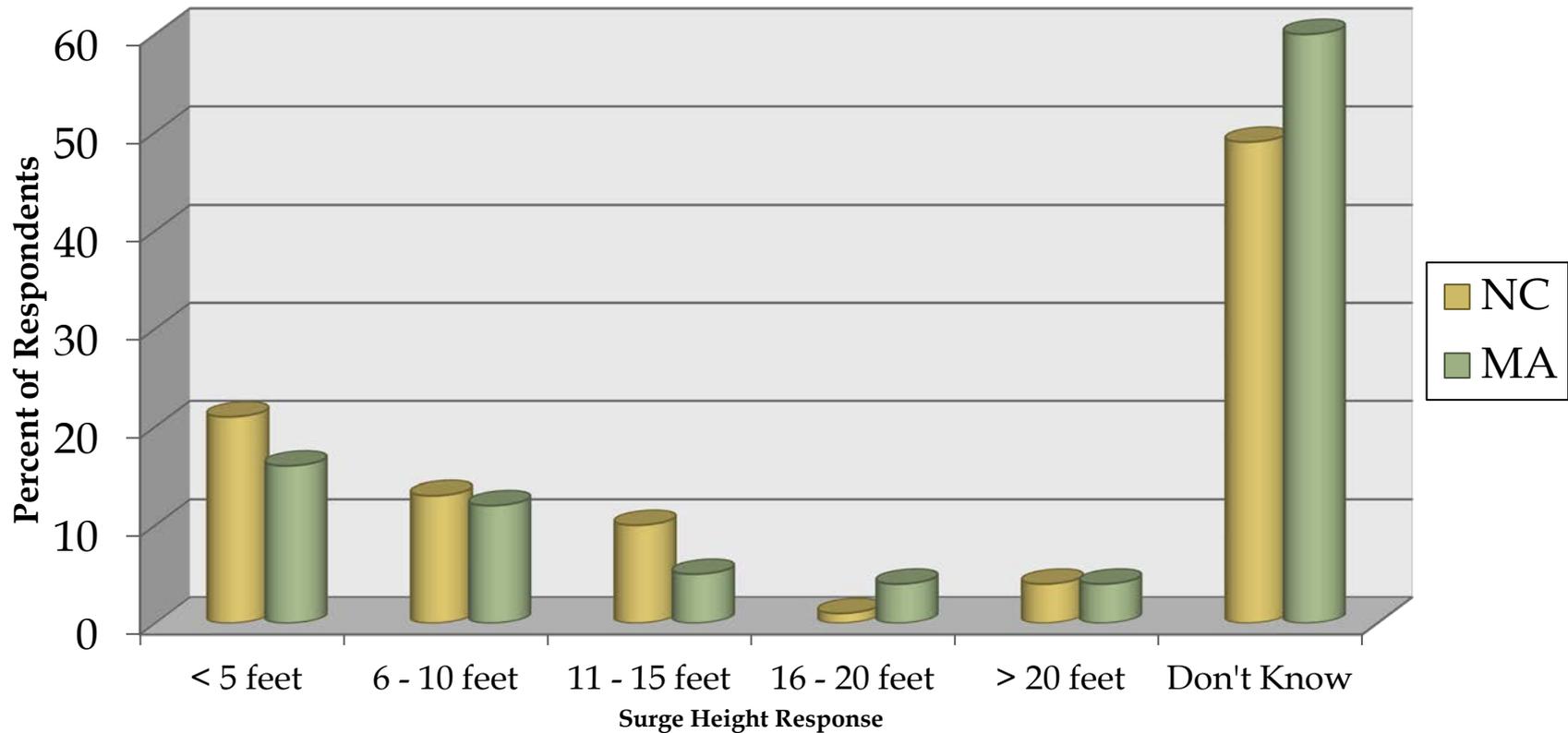
Hurricane Earl Real-Time Interviews

Subjective vs. NHC Hurricane Probabilities in Massachusetts



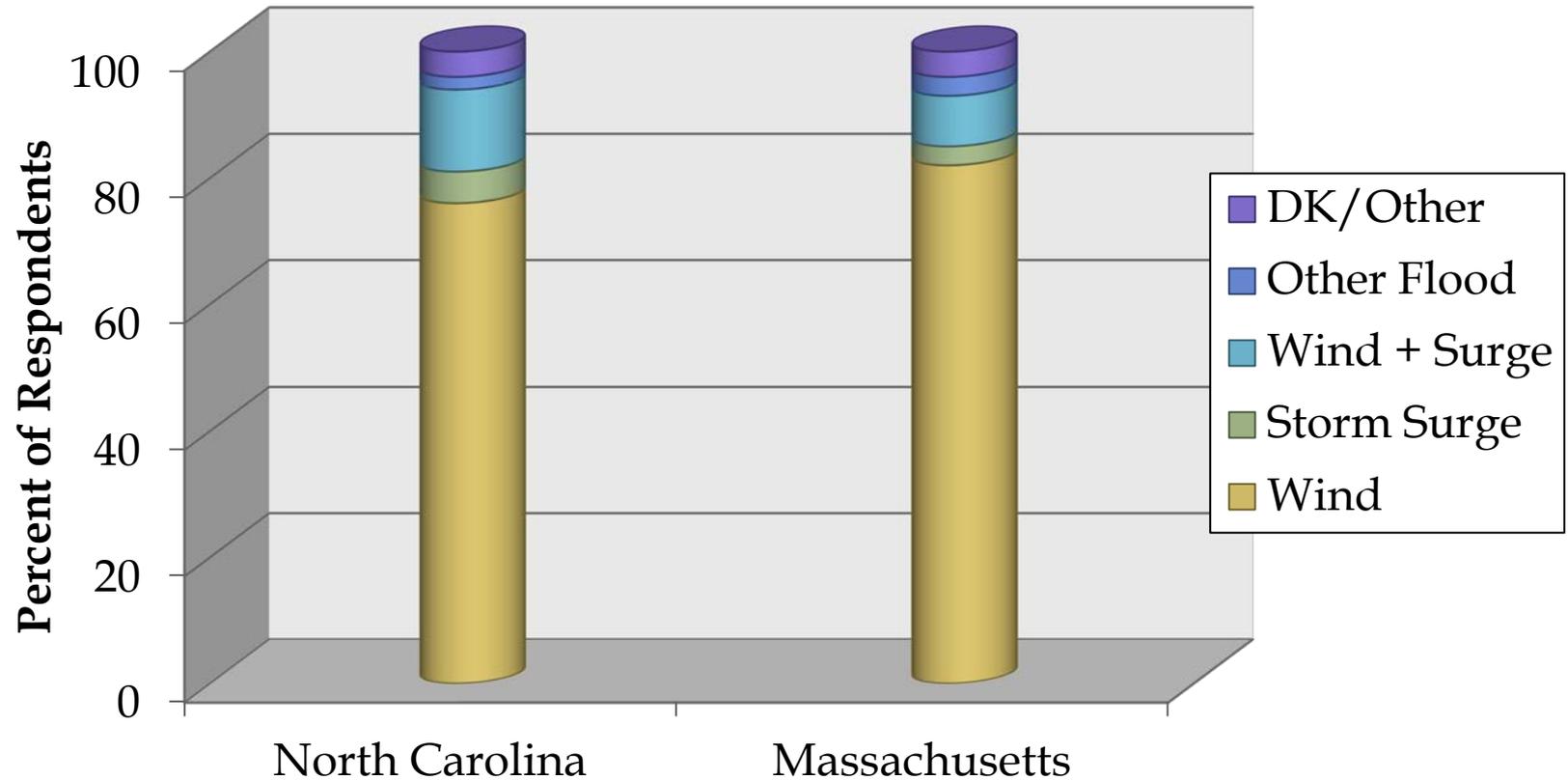
Hurricane Earl Real-Time Interviews

Stated Forecast Surge Height



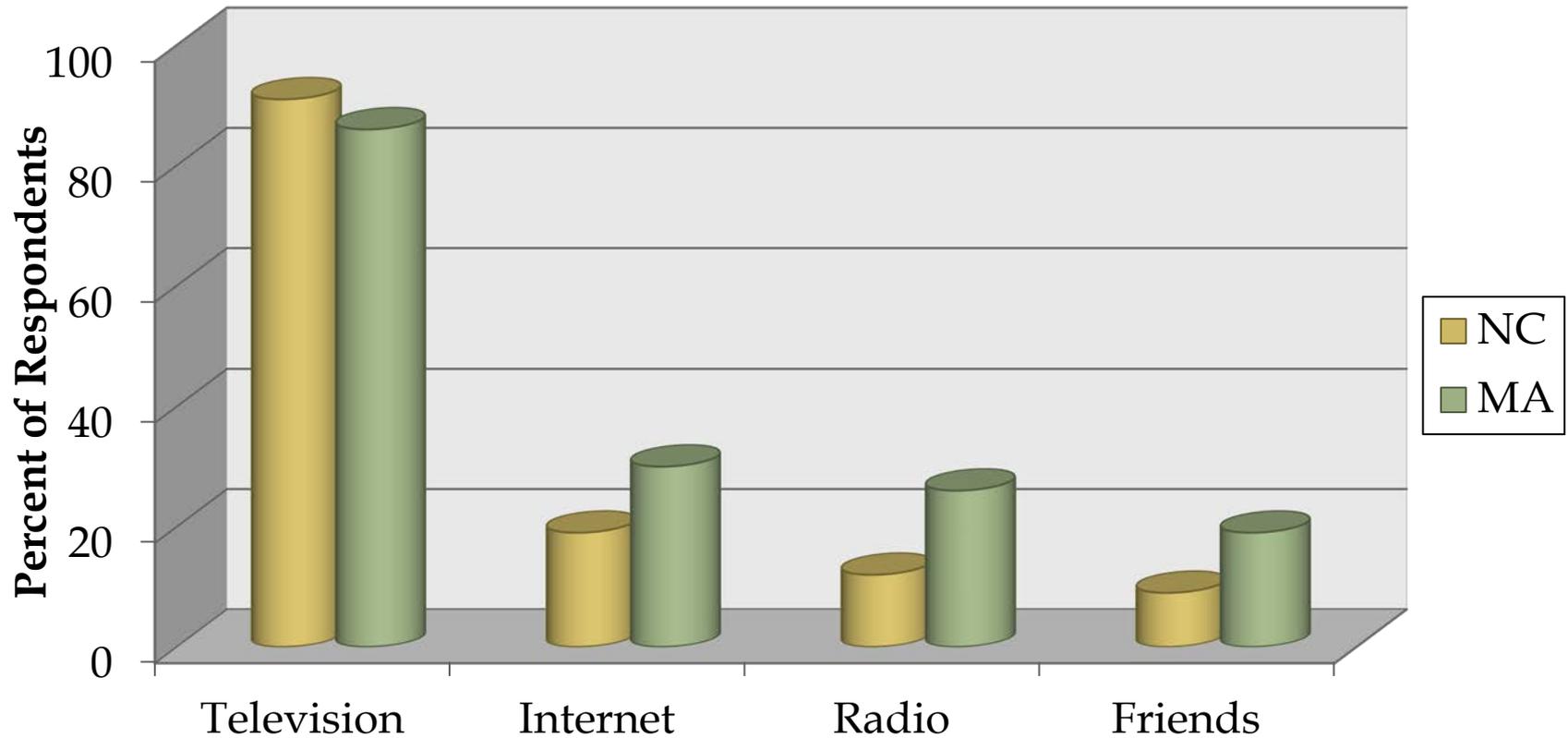
Hurricane Earl Real-Time Interviews

Greatest Perceived Risk to Home in Earl



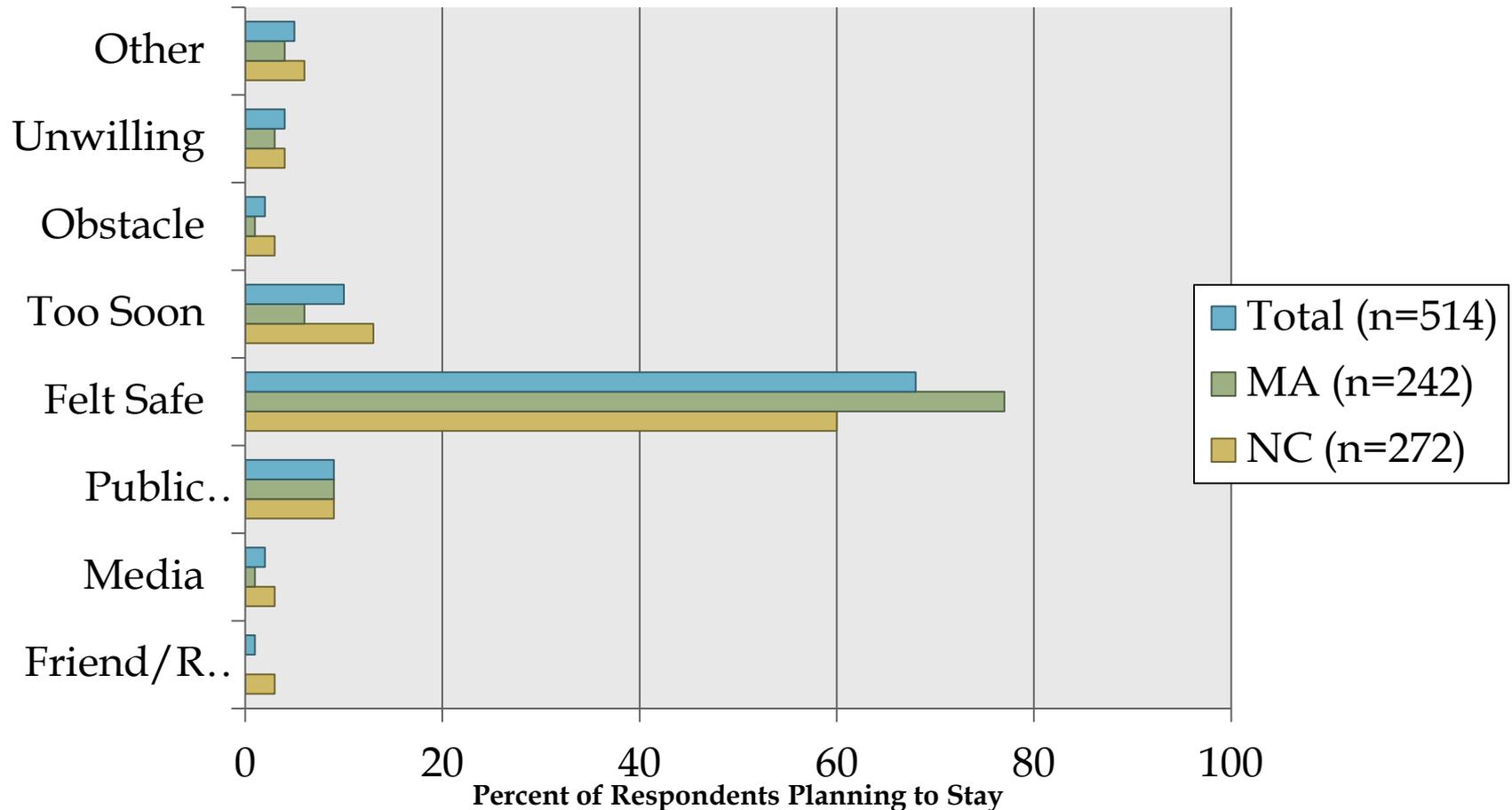
Hurricane Earl Real-Time Interviews

Sources of Most Recent Information



Hurricane Earl Real-Time Interviews

Why Planned to Stay



Thank you.

EARL J. "JAY" BAKER

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