

Weathering the Storm — Understanding the Mental Health Impact of Hurricane Sandy

**Clinician Outreach and
Communication Activity (COCA)
Call
September 17, 2015**

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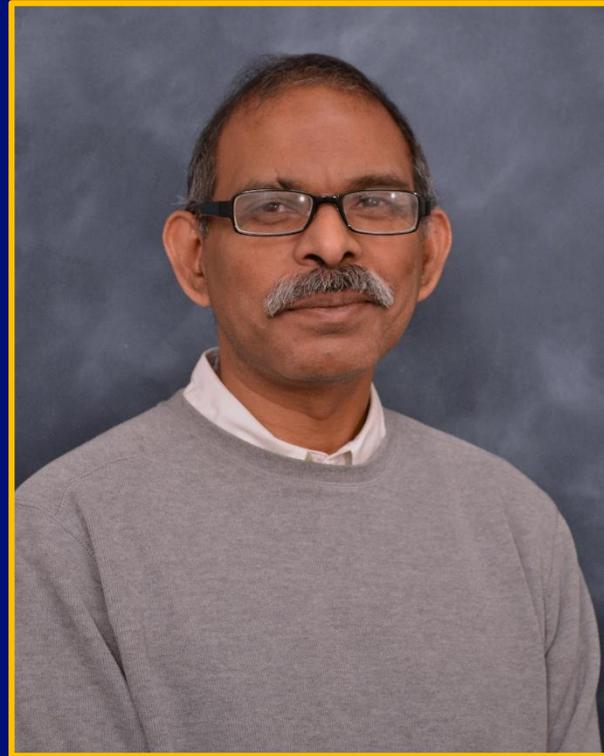
Planners have reviewed content to ensure there is no bias. This presentation will not include any discussion of the unlabeled use of a product or products under investigational use.

Objectives

At the conclusion of this session, the participant will be able to:

- ❑ **Discuss the vulnerability factors to mental health issues after Hurricane Sandy**
- ❑ **Describe how administrative data from Emergency Department can be utilized for public health purposes**
- ❑ **Describe the groups who were most at risk for mental health issues after the storm**
- ❑ **Describe how local disaster preparedness and response activities can address the mental health needs of residents who are impacted by disasters**

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UNDERSTANDING MENTAL HEALTH NEEDS POST HURRICANE SANDY:

Project light

**Emanuela Taioli MD PhD
Icahn School of Medicine at Mount Sinai**

The findings and conclusions in this presentation are those of the author(s) and do not necessarily represent the views of the Centers for Disease Control and Prevention/the Agency for Toxic Substances and Disease Registry

Project LIGHT: Leaders in Gathering Hope Together



- PI: Dr. Emanuela Taioli (Icahn School of Medicine at Mount Sinai)
- Co-PI: Dr. Rebecca Schwartz (Hofstra NSLIJ School of Medicine)
- Co-PI: Commissioner Lisa Murphy (Nassau County Dept of Human Services)

- <http://www.feinsteininstitute.org/project-light/>

- Research reported in this presentation was supported by *The Centers for Disease Control and Prevention* under award number U01-TP000573-01.

Research Questions, Aims, and Objectives

- **Objective:** To understand the psychological impact of Hurricane Sandy in an effort to inform current intervention and future prevention efforts. This is a partnership between the North Shore-LIJ Health System (NSLIJHS), and the Nassau County Department of Human Services.

- **Aim 1:** Assess the psychological and behavioral effects of Hurricane Sandy on the residents of Nassau, Suffolk, Queens and Richmond (Staten Island) counties.
- **Aim 2:** Examine the prevalence of specific mental health diagnoses presenting to local Emergency Departments in the affected counties
- **Aim 3:** Develop a vulnerability profile based on the results of Aims 1 and 2, and a Hurricane Sandy Cohort database that will be disseminated to local and national public health stakeholders.

Sampling Goals

- Recruitment of 669 study participants.
- Sampling areas: Nassau County, Suffolk County, Queens County, and Richmond County (Staten Island).
- Sampling was conducted from both heavily and mildly affected areas to ensure variability in exposure.
- Recruitment strategy is one of convenience sampling at various community sites and events
 - ▣ Contacts established through key stakeholders have been crucial to success.

Questionnaire Sections

General Information:

- Section A: Basic Information
- Section B: Demographic Information
- Section C: Occupation and Environment
- Section D: Medical History
- Section E: Lifestyle Factors

Mental Health Measures

- Section F: Perceived Stress Scale
- Section G: PHQ-4
- Section H: PCL-S
- Section I: Mental Health Status
- Section J: PTGI (Short Version)
- Section K: Hurricane Sandy Exposure Assessment

Demographics

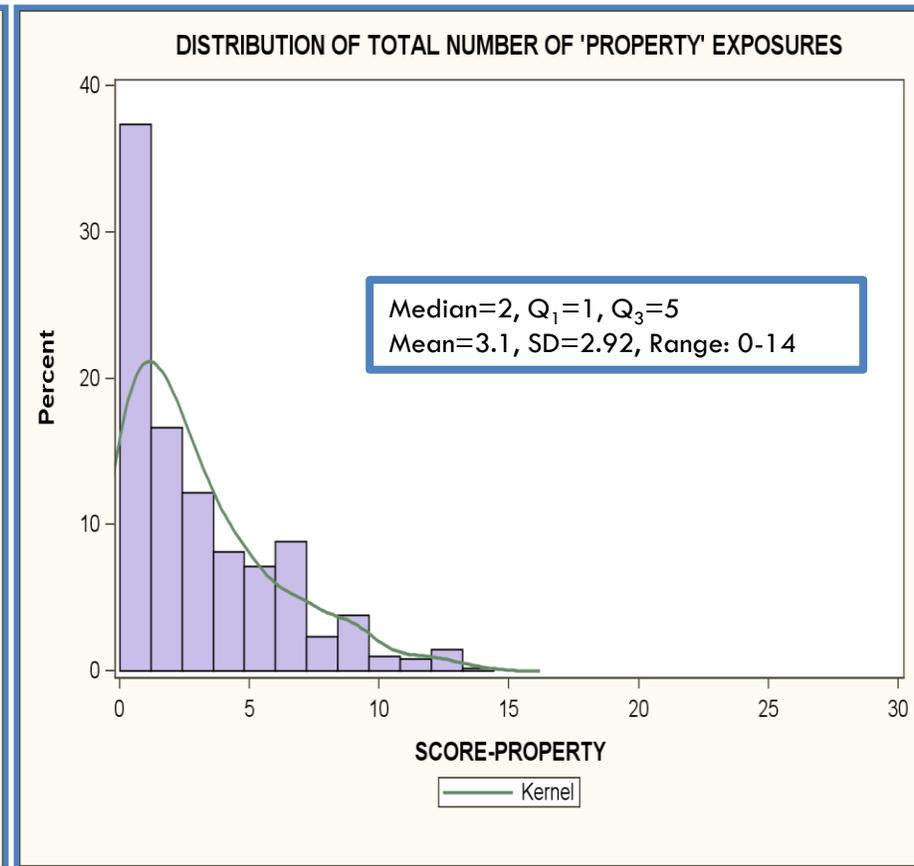
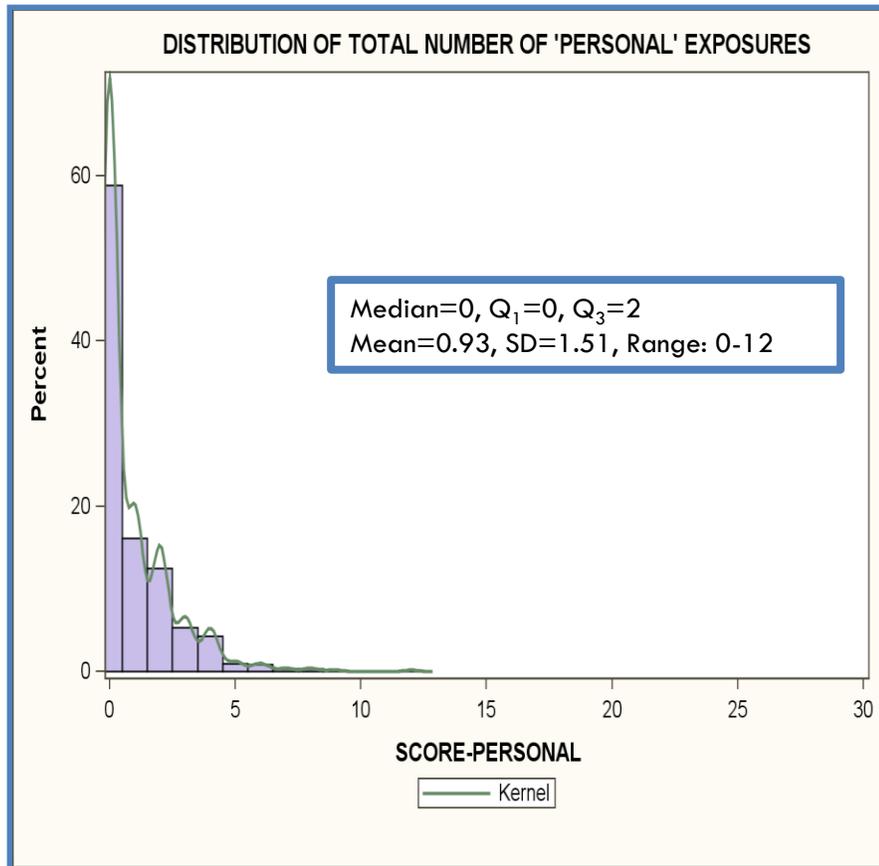
- Total sample size through 2/25/15 - 669
- Gender: 36.0% male; 63.7% female
- Race:
 - ▣ 65% White
 - ▣ 20% Black/African American
 - ▣ 3% Native American/Pacific Islander
 - ▣ 3% Asian
 - ▣ 2% Other
- Ethnicity:
 - ▣ 20% Hispanic
- Mean age= 47.6 Years; Range = 18-104 Years

Sample Hurricane Exposure Items

- ❑ Family member missing: 1.79%
- ❑ Physical harm to family member: 4.48%
- ❑ Felt life was in danger: 7.47%
- ❑ Evacuated emergently: 10.46%
- ❑ Loss of electricity: 71.30%
- ❑ Displaced from home: 30.49%
- ❑ Home damaged: 30.49%
- ❑ Vehicle loss: 13.60%
- ❑ Became unemployed: 5.08%
- ❑ No access to gasoline: 32.88%
- ❑ Difficulty accessing food: 15.40%
- ❑ Flooding in the home: 25.56%

- ❑ Overall mean (out of 20 items): 3.83 items endorsed (SD=3.86)

Personal and Property Exposures Based on Principal Components Analysis



Mental Health Outcomes

- Perceived Stress: Mean= 15.6, SD= 7.3; Range= 0-37
 - ▣ General population mean = 13

- Anxiety: Mean=1.6, SD=1.7; Range: 0-6
 - ▣ Mean \geq 2 = Probable anxiety; 47.5% of sample

- Depression: Mean=1.2, SD=1.7; Range: 0-6
 - ▣ Mean \geq 2 = Probable depression; 34.3% of sample

- PTSD: Mean=25.0, SD=11.1; Range: 16-85
 - ▣ Mean \geq 30 = Probable PTSD; 20.5% of sample

Overall Mental Health Findings

Hurricane exposure was significantly associated with all mental health outcomes even after controlling for demographics and time since hurricane.

DEMOGRAPHICS	DEPRESSION			ANXIETY			PTSD		
	OR	95% CI		OR	95% CI		OR	95% CI	
AGE	0.99	0.98	1.00	0.98*	0.97	0.99	1.00	0.99	1.01
FEMALE GENDER	0.93	0.63	1.36	1.81*	1.25	2.63	1.17	0.7	1.96
EDUCATION (HS OR LESS)	1.69*	1.15	2.48	1.28	0.88	1.85	2.05*	1.22	3.45
RACE (NON-WHITE)	1.09	0.73	1.63	0.87	0.59	1.29	2.3*	1.33	3.95
HISPANIC ETHNICITY	1.41	0.9	2.22	1.12	0.72	1.75	2.86*	1.6	5.11
PREVIOUS MENTAL HEALTH HISTORY	2.41*	1.61	3.6	3.3*	2.17	5.03	3.14*	1.87	5.26
TOTAL HURRICANE EXPOSURES	1.1*	1.05	1.15	1.08*	1.03	1.13	1.32*	1.24	1.41

Mental Health Findings by Sex

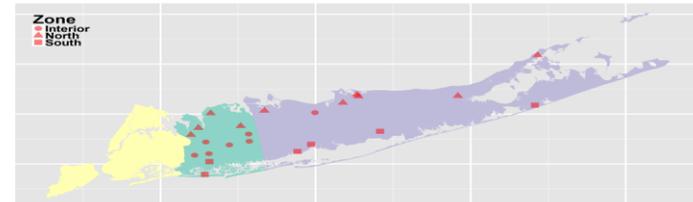
	DEPRESSION						ANXIETY						PTSD					
	MALES			FEMALES			MALES			FEMALES			MALES			FEMALES		
	OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI	
AGE	0.98	0.96	1.00	1.00	0.98	1.01	0.97	0.96	0.99	0.99	0.98	0.99	0.98	0.96	1.01	1.01	0.99	1.02
EDUCATION (HS OR LESS)	2.88*	1.48	5.6	1.18	0.72	1.93	2.19*	1.13	4.25	0.93	0.58	1.48	5.02*	2.01	12.55	1.14	0.59	2.19
RACE (NON-WHITE)	0.78	0.37	1.62	1.23	0.74	2.03	0.9	0.44	1.82	0.82	0.51	1.32	1.46	0.53	4.04	2.99*	1.51	5.92
HISPANIC ETHNICITY	1.05	0.47	2.31	1.75	1.00	3.08	0.74	0.34	1.64	1.38	0.79	2.42	1.84	0.65	5.2	4.15*	1.98	8.7
PREVIOUS MENTAL HEALTH HISTORY	3.08*	1.49	6.38	2.01*	1.23	3.31	3.15*	1.51	6.58	3.2*	1.89	5.41	4.05*	1.6	10.28	2.73*	1.44	5.2
TOTAL HURRICANE EXPOSURES	1.08	0.98	1.18	1.09*	1.03	1.16	1.13*	1.02	1.24	1.06*	1.00	1.12	1.33*	1.16	1.51	1.32*	1.22	1.42

Mental Health Findings by Sex

- Total hurricane exposure was associated with all outcomes for both males and females
- With one exception: hurricane exposure was not associated with depression among males

ED Data Findings

- Expanded data collection to all Long Island residents who were seen by any ED in NY state.
- Information on 23 EDs in entire NY state between 2009-2013
- Patient demographics and residential zip code, principal diagnosis, admission and discharge date were extracted



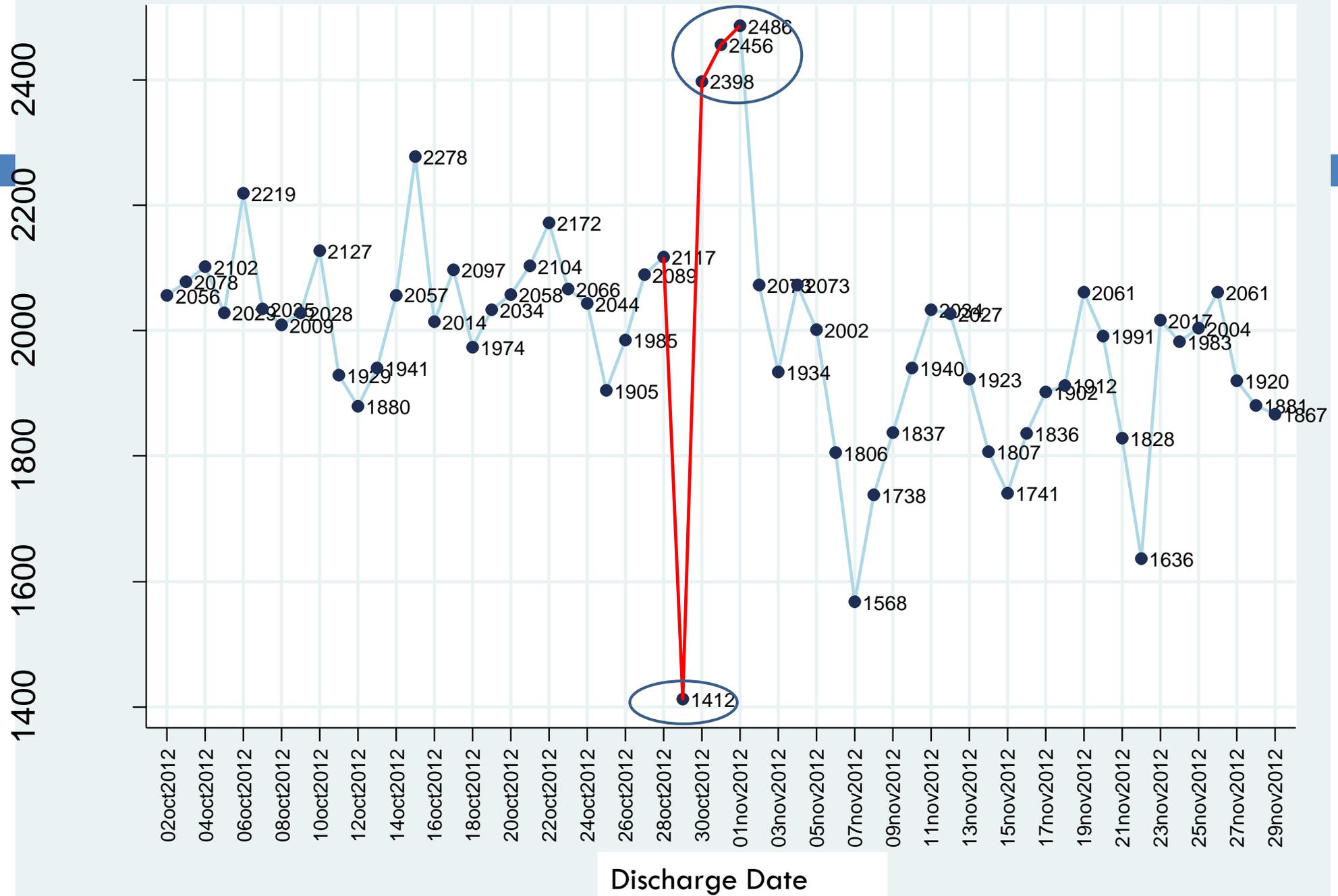
Magnitude of Sandy's Direct Health Effects

Time Period	ED Visits
October 1-October 28	Mean= 1,995
November 2-November 30	Mean= 1,907
October 29	n= 1,412
October 30-November 1	Mean= 2,447 (Total= 7,340)

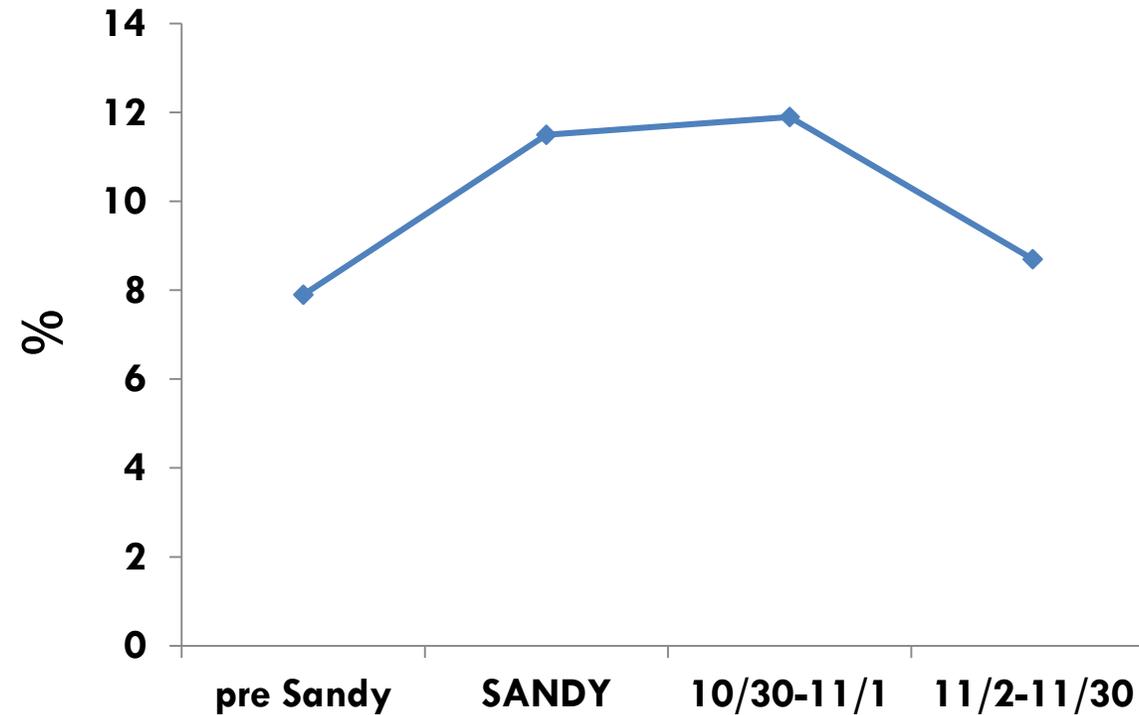
$$D1 = \text{Before-Oct 29} = 1995 - 1412 = \mathbf{583}$$

$$D2 = \text{Before-(Oct 30-Nov 1)} = 1995 * 3 - 7340 = \mathbf{-1355}$$

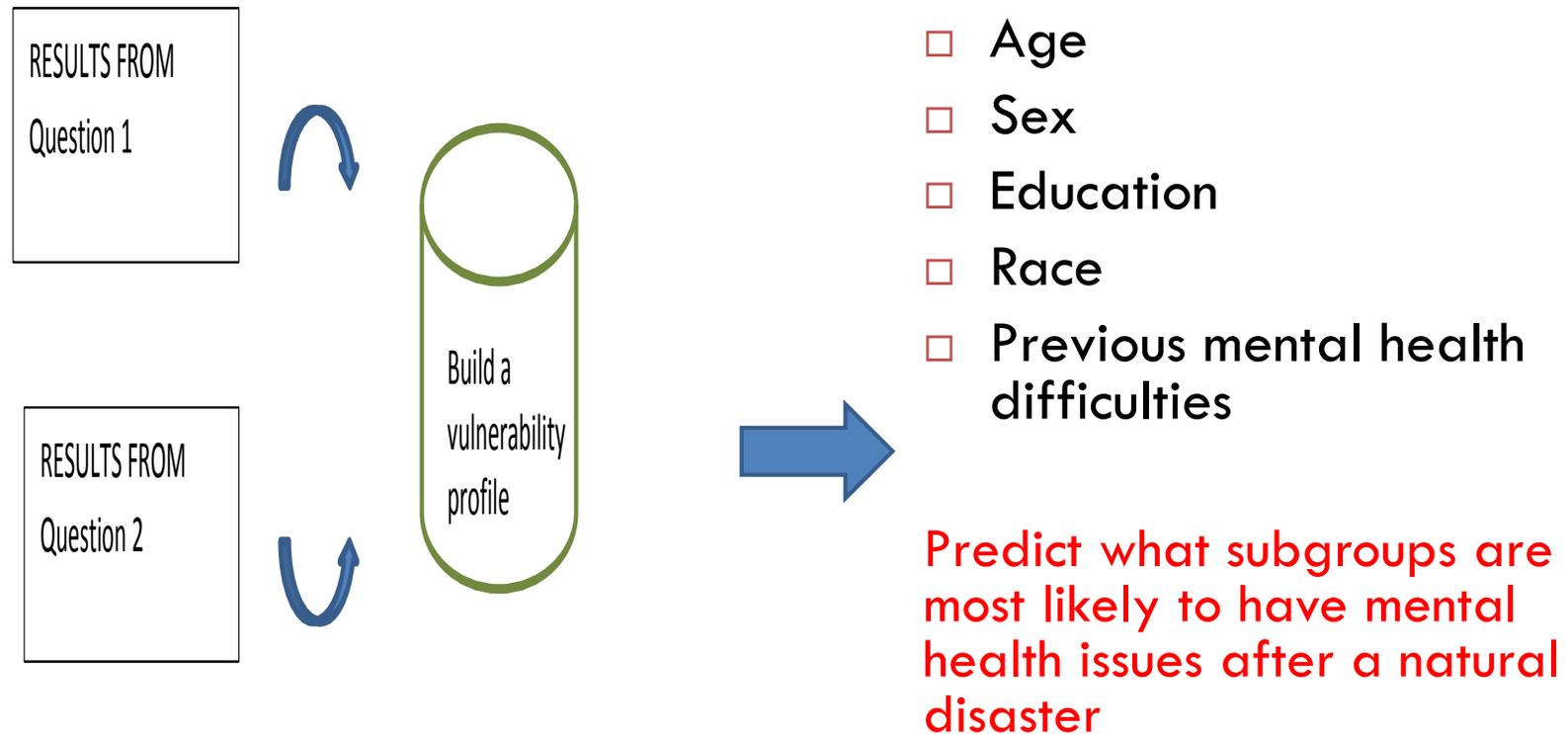
$$D2 - D1 = 1355 - 583 = \mathbf{773}$$



Trends in ED visits for disease of the respiratory system



VULNERABILITY FACTORS



Example of vulnerable population analysis: Seniors and Hurricane Sandy

- Mortality
 - 31 of the 44 people (>70%) who died during Hurricane Sandy in NYC, were 55 or older
- Overall Health
 - Seniors reported the worsening of a health condition due to Hurricane Sandy at three times the rate of those under 65
 - Interruptions in access to prescription medications had serious consequences for seniors
- Transportation
 - During Hurricane Sandy, there were inadequate contingency plans which exacerbated chronic conditions for seniors (e.g. no alternative plan for transportation to dialysis centers).
 - Many home care workers and caregivers were unable to reach seniors because they were not granted the requisite priority access to roads or gas during the fuel shortage

Seniors and Hurricane Sandy

- Public Assistance

- Under-enrollment among the elderly to benefit programs such as SNAP, SCRIE (Senior Citizens Rent Increase Exemption Program), VITA (Voluntary Income Tax Assistance)
- Elderly are at a greater disadvantage when dealing with property damage and problems accessing resources following the storm

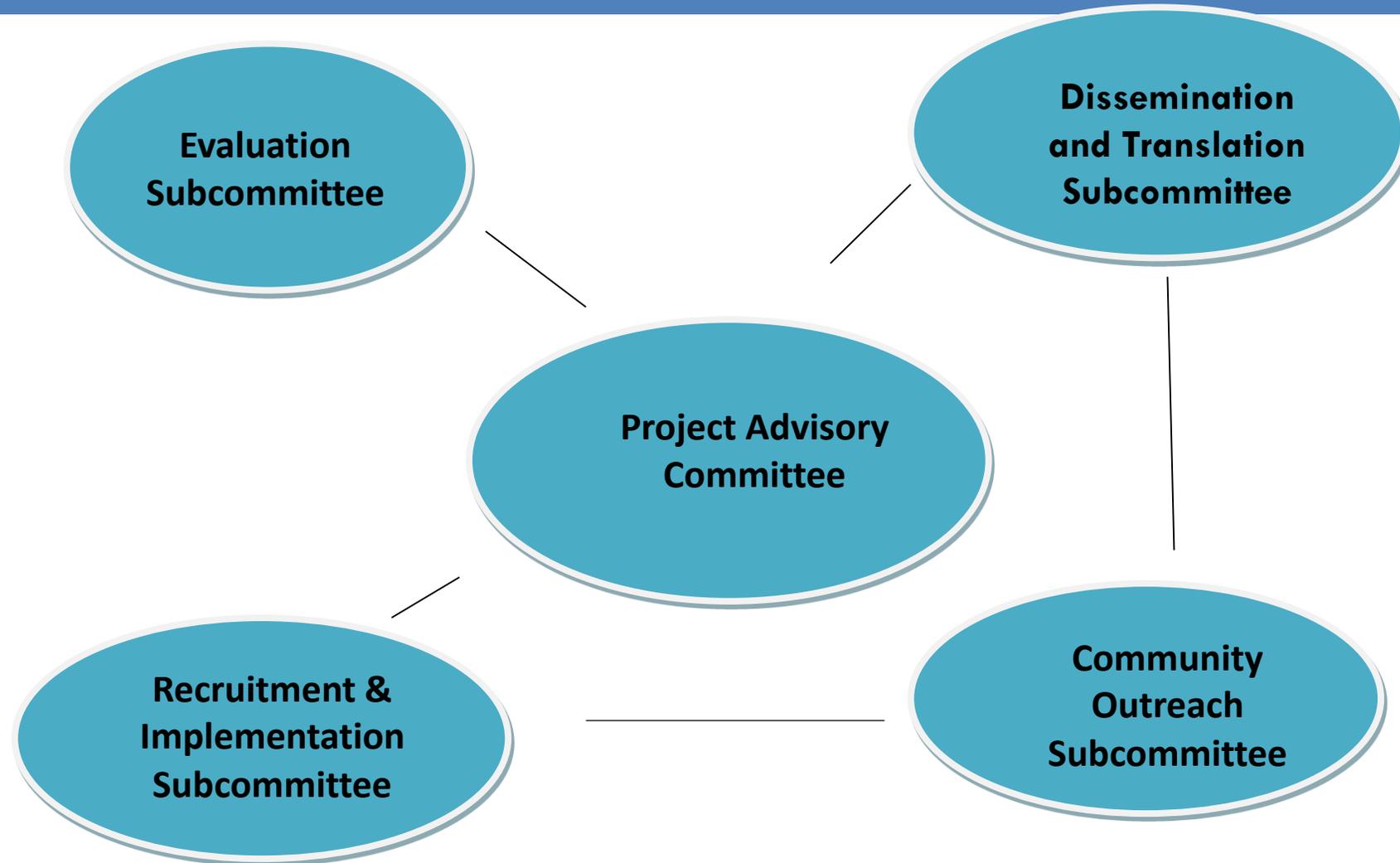
- Reluctance to Evacuate

- Seniors were reluctant to evacuate, perceiving that shelters were unsafe or could not meet their needs (medically or otherwise)

Project LIGHT Summary

- ❖ Increased Hurricane Sandy exposure was significantly associated with increased mental health difficulties across all outcomes (i.e., stress, anxiety, depression and PTSD symptoms) even after adjusting for factors known to be associated with mental health.
- ❖ A history of mental health difficulties, lower education, and younger age were consistently associated with poorer mental health across most outcomes.
- ❖ ED data show an increase in utilization right after Hurricane Sandy

Project Committees





MEET THE TEAM

Impact of Hurricane Sandy on Mental Health in New York City

Charon Gwynn, PhD

Division of Epidemiology

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Acknowledgements

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- Megan Affrunti, MPH, LMSW

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Unprecedented Natural Disaster in NYC

- 10/28/12 - Mandatory evacuation in Zone A
- 10/29/12 - Landfall
- Impacts on built environment
- Flooding inundation exceeded mapped evacuation zones
- Deaths, injuries and mental health impacts



Background

- Mental health post-disaster
 - Symptoms commonly short in duration and improve over time
 - Some may have delayed symptom onset
- Common mental health symptoms after a disaster
 - Post-traumatic stress disorder (PTSD)
 - Depression
 - Psychological distress or serious psychological distress (SPD)
- Some at higher risk for developing symptoms
 - Gender (being female)
 - Prior mental health or physical health impairment
 - Low SES Status
 - Direct exposure to the event (injury, witnessing trauma)

Research Aims

1. Characterize mental health outcomes among NYC residents and identify those most impacted by Hurricane Sandy.
2. Describe evacuation strategies and assess their impact on mental health outcomes among NYC residents.
3. Describe calls made to crisis hotline (LifeNet) among NYC residents following Sandy

Affected Areas

- Inundation Zone - defined by FEMA after Sandy
- Evacuation Zone - defined by NYC in coastal storm plan before Sandy
 - 3 evacuation zones (A, B, C) delineated according to risk of impact
 - During Sandy, NYC officials focused on alerting Zone A residents
 - 165,000 emergency alerts sent
 - 375,000 residents ordered to evacuate

Methods

- NYC DOHMH Community Health Survey CHS (2012 & 2013)
 - Annual random digit dial survey
 - Assesses a broad range of chronic illnesses, behavioral risk factors and mental health outcomes
 - Collected information on Zone A residents during Irene and Sandy

Analyses – Irene vs. Sandy

- Among those in Zone A
- Prevalence of SPD overall and by sociodemographic factors and evacuation status

Methods

- Community Assessment for Public Health Emergency Response Survey (CASPER)
 - Mental health needs assessment survey
 - 420 adults from 1,000 households in South Brooklyn/Rockaways and Staten Island after Sandy
 - Question on trauma during the storm, storm related stressors, PTSD, SPD, general anxiety disorder, depression, etc.

Analyses:

- Among those in FEMA-defined inundation zone
- Prevalence of PTSD, SPD, probable depression, Sandy stressors and exposures, prior trauma, evacuation behaviors, etc.

Methods

- LifeNet
 - Free, confidential 24 hour crisis hotline provided by the Mental Health Association and DOHMH
 - Referrals for mental health and substance use

Analyses:

- Phone numbers with area code from NYC counties
- Key words: hurricane, storm, flood, damages
- Calculated total call volume and proportion of callers with mental health and substance use issues

Mental Health Measures

Mental Health Measures

	Community Health Survey			CASPER
	NYC Overall	NYC Zone A ¹		Inundation Zone [†]
		Irene (2012)	Sandy (2013)	
Serious Psych. Distress	5%	7%	7%	16%
Depression	5%	-	4%	22%
Post Traumatic Stress Disorder	-	-	-	26%

¹Zip codes prone to flooding in Aug 2011: 10004, 10005, 10006, 10009, 10038, 10280, 10282, 10303, 10305, 10306, 10307, 10309, 10314, 11096, 11109, 11224, 11231, 11235, 11691, 11692, 11693, 11694, 11697

[†]Operational Inundation Area determined by Office of Emergency Management using data provided by FEMA

Mental Health Risk Factors

- For both Irene and Sandy, Serious Psychological Distress in Zone A residents was similar to those outside of Zone A (CHS)
- Post Traumatic Stress Disorder and Depression were higher in the inundation zone compared to national levels (CASPER)
 - both higher among those with storm-related traumatic events and stressors (CASPER)

Evacuation & Mental Health

Evacuation Behaviors (CHS 2012 & 2013)

- 31% Zone A residents evacuated during Irene
- 37% Zone A residents evacuated during Sandy
 - 53% left before Sandy reached NYC
 - 61% were displaced for more than one week
 - Persons >65 years old were less likely to evacuate than persons 18-24 years (25% vs. 45%)

Evacuation Behaviors (CHS 2012 & 2013)

Characteristics of evacuees from Zone A in 2011 and 2012, New York City

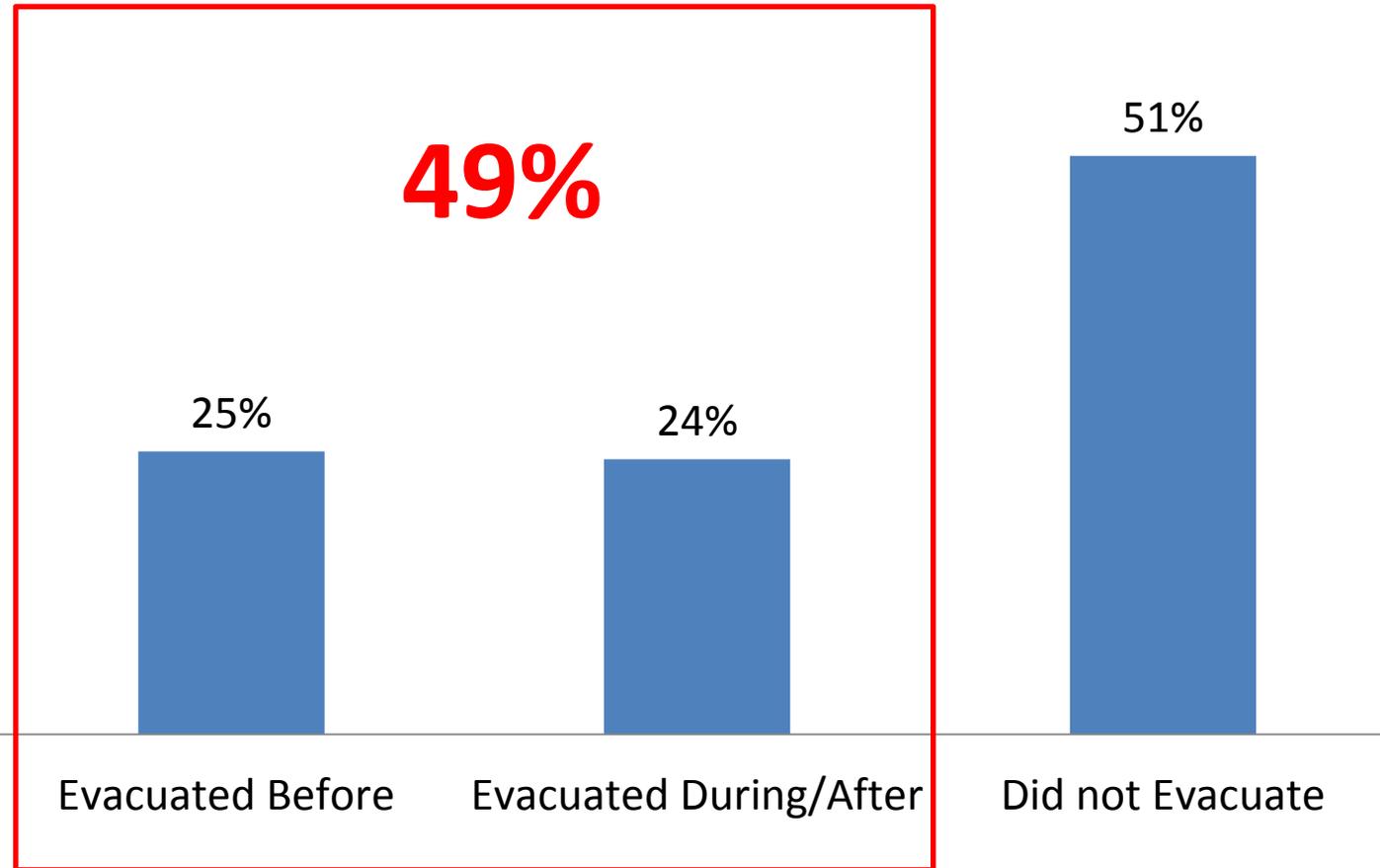
Characteristic	Irene (2011)	Sandy (2012)
Evacuation Rate	31%	37%
Age		
18-24	46%*	45%*
25-44	32%	45%
45-64	26%	31%
65+	23%	25%
Gender		
Male	22%	35%
Female	39%	38%
Race/ethnicity		
White, non-Hispanic	24%	35%
Black, non-Hispanic	49%*	52%*
Hispanic	42%*	45%*
Asian/Pacific Islander	29%*	17%*

*Estimate should be interpreted with caution due to small sample.

Source: NYC Community Health Survey 2012 and 2013

CASPER

Almost half of residents evacuated

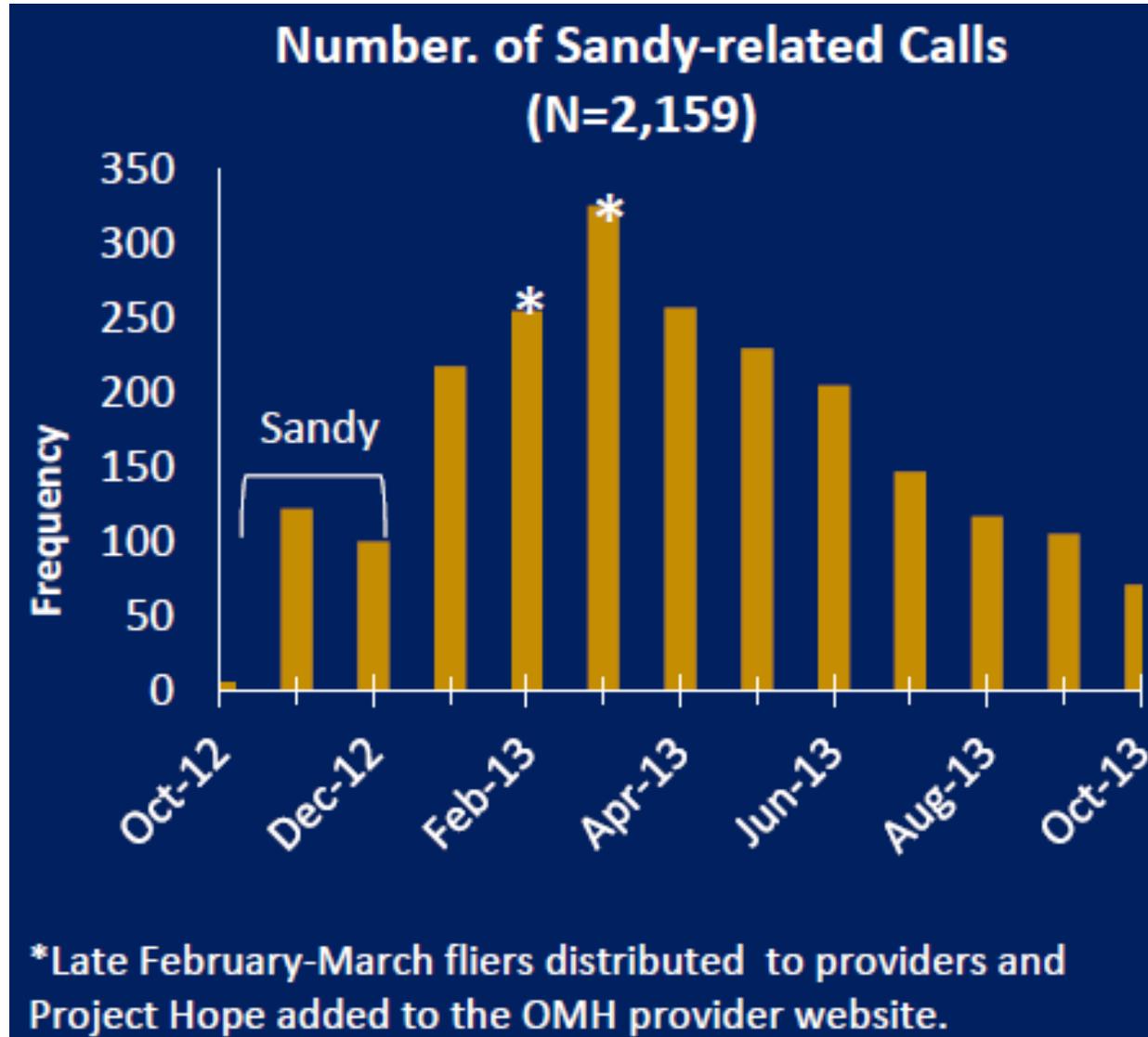


Evacuation and Mental Health

- People who did and did not evacuate:
 - from *Zone A* during Sandy and Irene had similar levels of Serious Psychological Distress (CHS)
 - from the *inundation zone* had similar levels of Serious Psychological Distress, Depression, and Post Traumatic Stress Disorder (CASPER)

LifeNet Calls

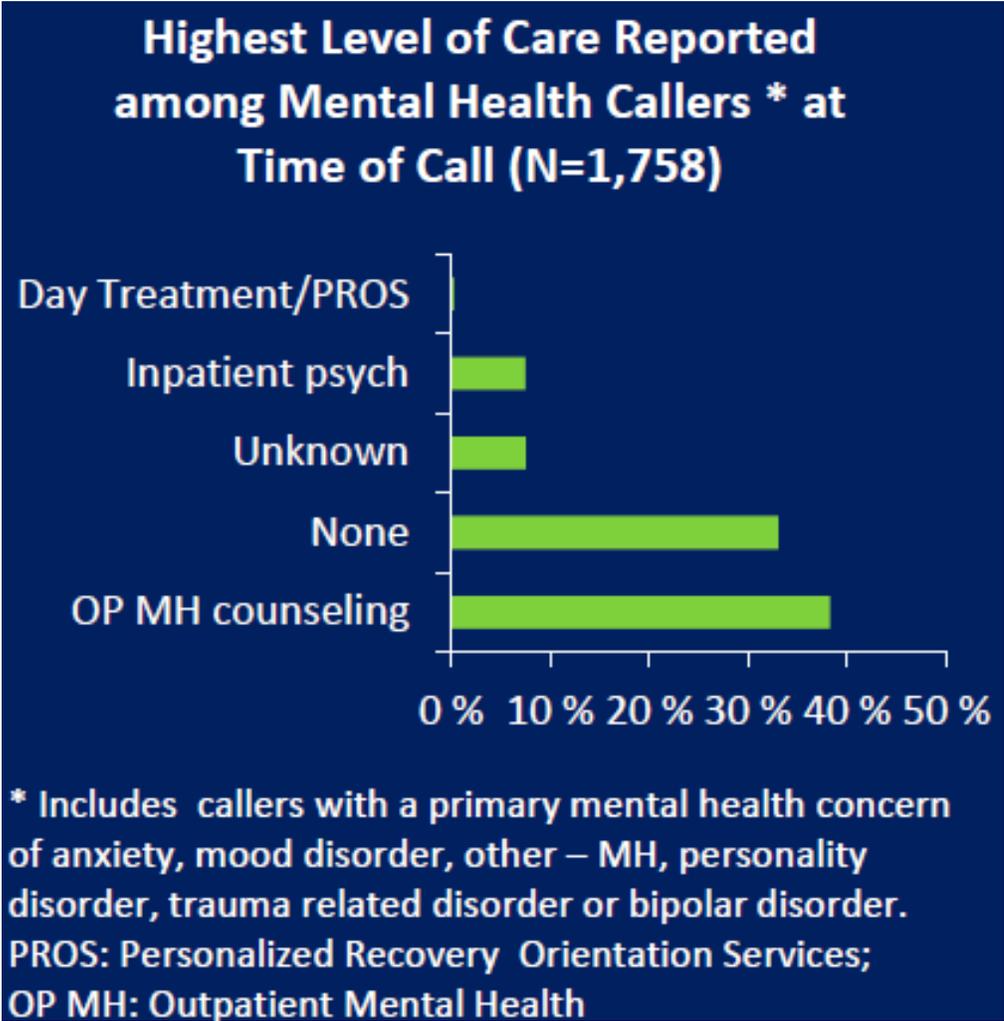
LifeNet Calls after Sandy



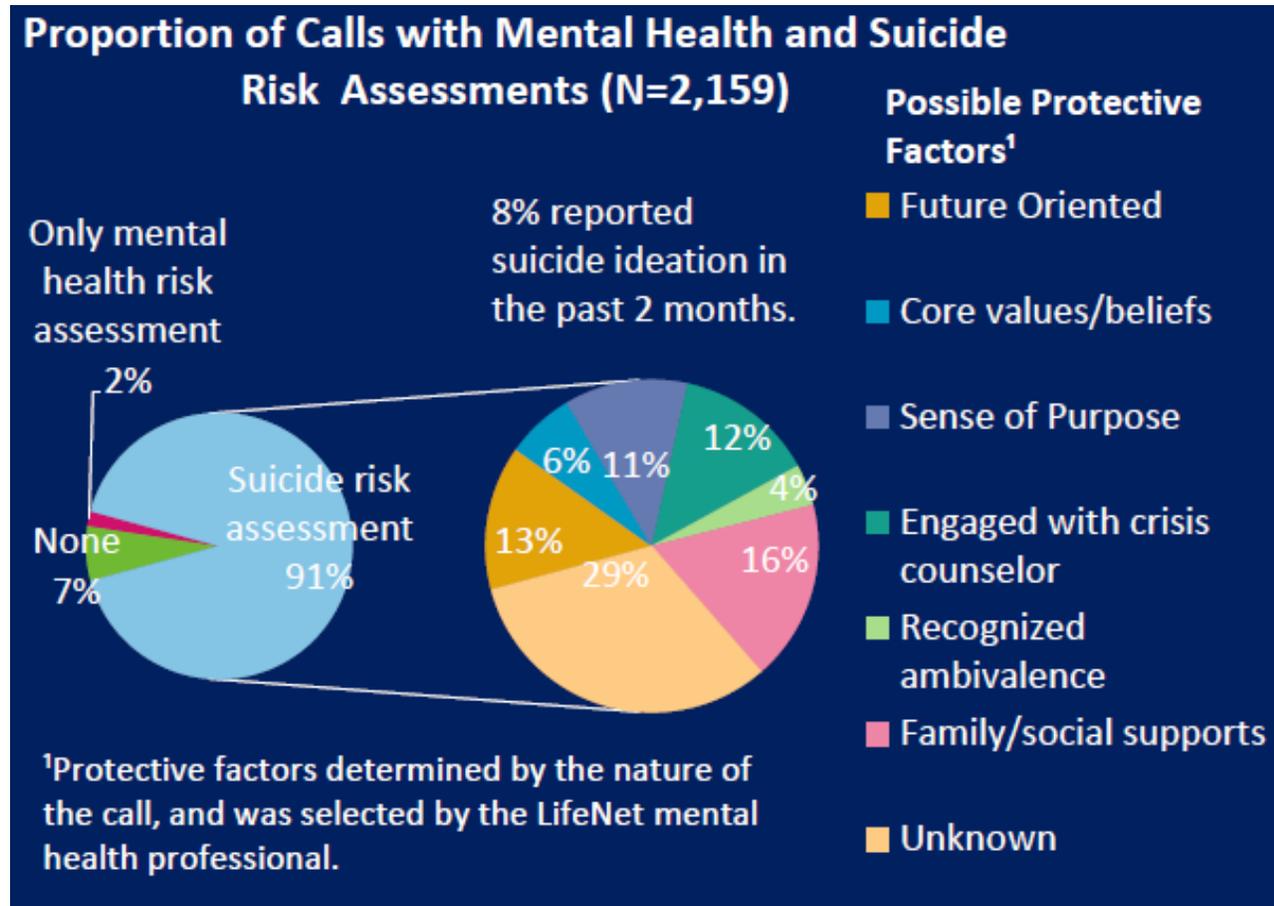
LifeNet Caller Mental Health Concerns

Commonly Reported Primary Mental Health /Substance Use Concern among Sandy-related Callers (N =2,159)		
	N	%
Bipolar and Related Disorder	602	27.9
Anxiety Disorder	511	23.7
Other – Mental Health	437	20.2
Unknown/Missing	177	8.2
Neurocognitive/Neurodevelopmental Disorder	130	6.0
Substance Use	109	5.0
Trauma Related Disorder	59	2.7
All Others	134	6.2

Level of Care Among LifeNet Callers



Risk Assessment Among LifeNet Callers



Limitations

- CHS, CASPER
 - Data sources had different methods
 - Differing areas, sampling
 - Findings may not be representative or directly comparable
 - Small cell sizes
 - Difficult to describe certain outcomes, particularly when stratifying
 - Different outcomes of interest were assessed by each source

Limitations

- LifeNet
 - Classifying calls as Sandy-related was difficult:
 - Not designed to be disaster specific, fields subjectively determined by the mental health professional.
 - Text field/narrative searches may not have fully captured the true nature of calls.
 - The validity of reported primary mental health concerns was unclear since call reasons were rarely mutually exclusive.
 - Callers from cell phones were indistinguishable from those calling from landlines, thus, leading to potential misclassification of NYC resident callers based on area code.

Summary

- Mental Health
 - The prevalence of mental health outcomes for respondents in the inundation zone was higher than the national levels
 - The prevalence of SPD and PTSD was higher among those with storm-related traumatic events and stressors
- Evacuation
 - Among CHS respondents who reported being residents of zone A 31% evacuated during Irene and 37% evacuated during Sandy
 - From CASPER, 49% of inundation-zone residents reported evacuating

Summary (con't)

- Mental health outcomes by evacuation status
 - Among those in Zone A and the inundation zone during Sandy, there was no significant difference in prevalence of SPD, depression, or PTSD by evacuation status
- LifeNet
 - One third of callers with mental health concerns reported receiving no care
 - Social support, counseling, and having goals for the future were the most commonly reported protective factors for suicide (about 52%).

Implications

- Understand vulnerable populations for future storm events
- Need clear and specific communication about evacuation and protective actions
- Citywide action to aid at-risk populations, including linking to mental health services



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- “Click” ask

□ On the Phone

- Press Star (*) 1 to enter the queue
- State your name
- Listen for the operator to call your name
- State your organization and then ask your question

Thank you for joining!
Please email us questions at coca@cdc.gov



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The Role of Clinicians in Addressing the Opioid Overdose Epidemic

- ❑ Date: Thursday, Sep 24, 2015
- ❑ Time: 2:00 – 3:00 pm (Eastern)
- ❑ Presenters
 - Dr. Chris Jones – HHS
 - Dr. Gary Franklin – University of Washington
 - Dr. Melinda Campopiano von Klimo – HHS

How To Prevent and Control Pediatric Influenza

- ❑ Date: Thursday, Oct 1, 2015
- ❑ Time: 2:00 – 3:00 pm (Eastern)
- ❑ Presenters
 - Dr. Hank Bernstein – American Academy Pediatric

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