Engagement in linkage to mental health care program in the Rockaways after Hurricane Sandy

Kristin Bevilacqua1,2 | Samantha Schneider1,2 | Rehana Rasul1,2,3 | Emanuela Taioli2,4 | Rebecca M. Schwartz1,2,4,5

1Department of Occupational Medicine, Epidemiology and Prevention, Northwell Health
2Joint Center for Disaster Health, Trauma and Resilience
3Department of Biostatistics, Northwell Health
4Institute of Translational Epidemiology, Department of Population Health Science and Policy, The Icahn School of Medicine at Mount Sinai
5Donald and Barbara Zucker School of Medicine at Hofstra/Northwell

Correspondence
Email: kbevilacqu@northwell.edu

We acknowledge and thank our funding sources: Project Restoration funded by a research gift to Northwell Health (PI: Dr. Rebecca Schwartz).

Abstract
The Rockaways area of New York City was especially devastated by Hurricane Sandy. This study examined participant characteristics associated with acceptance of a linkage to and attendance at appointments for mental health difficulties (MHD). Participants (N = 1,011) completed questionnaires to assess mental health symptoms. Participants who met screening criteria (n = 442) were offered linkage to care. Individuals who had a higher mental health symptom burden (MHSB; i.e., those who screened in on more than one criteria vs. only one criterion) had 2.68 greater odds of accepting services (95% confidence interval [1.68, 4.26]). MHSB was not associated with attending a first appointment (p = 0.80). Female gender and Hispanic ethnicity were also associated with acceptance of linkage to care, though not attendance. Reducing stigma around MHD associated with natural disasters and increasing knowledge about the mental health care system could promote help-seeking behavior among survivors.

1 | BACKGROUND

1.1 | Sandy and the rockaways

Hurricane Sandy made landfall in New York on October 29, 2012 as the largest Atlantic storm in recorded history (Shukman, 2012). As a result of widespread flooding and power outages, an estimated 370,000 people were evacuated and over 300,000 homes were damaged in New York State (Blake, Kimberlain, Berg, Cangialosi, & Beven, 2013). In New York, 53 individuals died as a result of hurricane-related causes (Centers for Disease Control, 2013). The Rockaways area of New York City, a low-lying peninsula less than a mile wide off the southern shore of Queens, experienced widespread displacement and property damage in the wake of the storm (Subaiya, Moussavi, Velasquez, & Stillman, 2014).
Colloquially divided into the beachside and bayside, the Rockaways is a uniquely diverse area comprised of 10 distinct neighborhoods all encompassed within the Queens Community Board 14 (U.S. Census Bureau, 2016). An estimated 128,000 residents live across the peninsula in housing ranging from extravagant beach homes to New York City Housing Authority public housing developments (Kaplan & Kaplan, 2003). The median age in the Rockaways is 34.1 years and 52% of the population is female. The median household income is just over $44,000 with 22.8% of the population living below the poverty line (U.S. Census Bureau, 2016), 26% of the population was born outside of the United States and over 30% speak another language at home other than English.

In addition to the Rockaways’ unique demographics, compared to the rest of New York City, the area is largely geographically isolated, and in the aftermath of Sandy, many residents reported feeling abandoned by recovery efforts that focused on lower Manhattan and Long Island (Maslin Nir, 2012). These sentiments are still felt today, as recovery efforts continue nearly 6 years after Sandy made landfall in the Rockaways (Durkin, 2017; Honan, 2017; Nonko, 2017).

It is within this context that the present study was conducted to better understand the mental health impacts of Hurricane Sandy and its aftermath on the Rockaways community and to examine the potential for linkages to mental health care in the context of a natural disaster.

1.2 Hurricanes and mental health

Exposure to natural disasters is associated with increased risk of developing mental health difficulties including anxiety, depression, and/or posttraumatic stress disorder (PTSD) (Fergusson, Horwood, Boden, & Mulder, 2014; Kim et al., 2016; Lieberman-Cribbin, Liu, Schneider, Schwartz, & Taioli, 2017; Liu, Wang, Li, Gong, & Liu, 2017; Lowe, Manove, & Rhodes, 2013; Maclean, Popovici, & French, 2016; Ruskin et al., 2018; Schwartz et al., 2016a; Schwartz et al., 2015, 2018; Schwartz, Gillezeau, Liu, Lieberman-Cribbin, & Taioli, 2017; Schwartz, Rothenberg, Kerath, Liu, & Taioli, 2016b; Thienkrua et al., 2006). Exposure to a natural disaster has also been found to be correlated with increased suicidal ideation and attempts as well as substance use (Fergusson et al., 2014; Stein et al., 2010).

The mental health impacts of natural disasters have been found to be directly related to the intensity of individual exposure and types of exposure experienced by an individual (Fergusson et al., 2014; Neria & Shultz, 2012; Norris, 1992; van Griensven et al., 2006). In New York, individuals exposed to Hurricane Sandy were found to be at greater risk of developing symptoms of PTSD and depression (Boscaino, Hoffman, Adams, Figley, & Solikhah, 2014; Gruebner, Lowe, Sampson, & Galea, 2015; Lieberman-Cribbin et al., 2017; Schwartz et al., 2015), and elevated symptoms of mental health difficulties among individuals exposed to Hurricane Sandy remained years after the storm (Schwartz et al., 2015; Schwartz et al., 2016b).

Intervention in the wake of natural disasters often focuses on ensuring the physical safety and well-being among survivors (Katz, Pellegrino, Pandya, Ng, & DeLisi, 2002; North & Pfefferbaum, 2013). When mental health in a postdisaster context is addressed, interventions tend to be short term and use psychological first aid, psychological debriefing, or crisis counseling to address acute mental health concerns and such interventions often lack empirical evaluation (North & Pfefferbaum, 2013). Few existing interventions focus on long-term mental health care, and of those interventions that do (Contreras et al., 2018; Hamblen et al., 2009), engagement in those programs has not been evaluated. As such, this present study aimed to evaluate Project Restoration’s Linkage to Care (L2C) program’s success in linking individuals with mental health care and to better understand the participant characteristics associated with acceptance of and attendance at mental health treatment in the wake of Hurricane Sandy.

2 METHODS

2.1 Participants and procedure

Project Restoration (PR) participants are 1,011 adult residents of the Rockaways area of Queens County, New York. Recruitment for PR took place from June 5, 2014 to August 9, 2016. Approval for PR was given by the Institutional Review Board of Northwell Health (no. 13–499B). Using convenience sampling, study team members recruited
participants at local community events such as church events, health fairs, job fairs, and craft shows as well as community-specific locations such as pharmacies, libraries, and grocery stores. Recruitment efforts were monitored to ensure representation of the demographics of the region as reported by the census (Rasul et al., 2017).

After recruitment, participants were asked to complete a 30-minute baseline questionnaire to assess demographics, behavioral health and mental health status (including PTSD), anxiety, perceived stress, and depression. Participants were compensated for completion of the baseline survey. Participants who met screening criteria on mental health burden (alcohol abuse, recreational drug abuse, family substance abuse, anxiety symptoms, depression symptoms, or PTSD symptoms) were offered a linkage to mental health care. Study staff outlined the L2C process, which included a referral to a local mental health care provider, assistance in reducing barriers to attending mental health treatment appointments, and follow-up contact with study staff. If a participant indicated interest, the study coordinator collected his/her contact information, insurance provider information, and current mental health provider status when applicable and arranged a time and date to discuss the L2C process in detail over the telephone.

The study project coordinator communicated with eligible participants in two stages to provide linkage to mental health care. In the initial stage, participants were briefed on the services PR had to offer. The coordinator called each participant individually and gave detailed information regarding PR’s linkage to mental health care component as it applied to each specific participant’s situation. The coordinator obtained all necessary medical release forms and made phone contact up to five times, unless a participant requested additional follow-ups, for each participant after the initial phone conversation.

In the second stage, research staff assessed each participant’s barriers to care to facilitate their attendance at treatment appointments. For example, if transportation was a barrier, then public transportation cards were provided to the participant, and participants who required childcare to attend appointments were reimbursed for childcare expenses incurred. This assistance was also provided to participants who screened into care but were already receiving treatment. Finally, participants were linked to appropriate mental health providers in the community. After completing the L2C referral process, the coordinator reached out a maximum of 10 additional attempts, unless a participant requested additional follow up, to assist the participant in attending at least one appointment for treatment or to confirm continued attendance among those participants who were already receiving treatment. Participants who attended at least one appointment were considered linked into care.

In addition to linkage to care and addressing barriers that PR provided, the study partnered with Northwell Health’s Far Rockaway Treatment Center (FRTC), a substance use and mental health clinic in the Rockaways, to assist participants who had substance use difficulties or family members with such difficulties. PR increased provider capacity at FRTC by hiring an additional social worker specialized in trauma therapy, to provide individual and group therapy services to reduce trauma symptoms. The study project coordinator routinely followed up with participants linked into care to ensure that barriers to care were addressed throughout the 6-month study period.

2.2 Measures

2.2.1 Questionnaire

The self-report survey was completed by the participant. If a participant had literacy or visual concerns, the questionnaire was read aloud to the participant by a study staff member in a confidential setting. The survey included questions regarding demographics (age, gender, race, ethnicity, and education) and behavioral health (alcohol abuse, recreational drug abuse, current smoking, history of mental illness, mental health treatment status, anxiety symptoms, depression symptoms, PTSD symptoms, and posttraumatic growth). The survey also included hurricane specific measures (elapsed time since Hurricane Sandy and number of hurricane exposures).

2.2.2 Independent variables

Eligibility for the L2C program was based on a screening rubric containing criteria to measure mental health burden (Table 1). A participant was eligible if he or she had elevated mental health symptoms scores, substance abuse, or a
TABLE 1  Screening criteria to determine eligibility for project restoration

| Mental health outcomes | Measure used                                      | Description | Screen-in criteria |
|------------------------|--------------------------------------------------|-------------|-------------------|
| Problem alcohol use    | NIAAA USDHHS guidelines on binge drinking         | Usage response of “Monthly” or more frequently   |
| Recreational drug use  | NIDA guidelines                                  | Usage response of “Monthly” or more frequently   |
| Family substance abuse | Answer of “Yes” to Are you currently being impacted by the substance use of a family member? |
| Perceived stress       | Perceived Stress Scale                            | 10 items (range 0–4)                            | Minimum of FIVE items with a 3 or greater response |
| Depression             | Patient Health Questionnaire-4 (items 1–2)       | 2 items (range 1–4)                             | Average score of 2 or above |
| Anxiety                | Patient Health Questionnaire-4 (items 3–4)       | 2 items (range 1–4)                             | Average score of 2 or above |
| Posttraumatic stress disorder | Posttraumatic Stress Disorder Checklist- Specific | 17-items (range 1–5)                           | Minimum of EIGHT items with a 3 or greater response or Minimum or FOUR items with a 5 response |

Note. NIAAA = National Institute on Alcohol Abuse and Alcoholism; NIDA = National Institute on Drug Abuse.

family member with substance use. Cut-points for eligibility for the L2C program were below diagnostic standards, to provide a potential linkage to care for as many participants as possible. Following any linkage to care, further assessment was done by clinicians to determine what, if any, treatment was needed on an individual basis.

Alcohol misuse was defined using criteria for excessive drinking. If in the past year a male drank five or more drinks in a day (four drinks for a female) on a monthly basis or drank 15 or more drinks a week (≥ eight drinks for a female), then he or she was categorized as engaging in alcohol misuse (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015). Illicit drug use was defined as using drugs monthly or more frequently within the last year according to the National Institute on Drug Abuse (2013).

Mental health symptom scores evaluated were PTSD, stress, anxiety, and depression symptoms. PTSD symptoms were measured using the self-reported Post-Traumatic Stress Disorder Checklist Specific, a validated 17-item checklist widely used in previous disaster studies (Weathers, Litz, Herman, Huska, & Keane, 1993). Each item in the checklist asked if participants experienced a certain PTSD symptom specifically when thinking about Hurricane Sandy ($\alpha = 0.96$).

Anxiety ($\alpha = 0.85$) and depression ($\alpha = 0.82$) symptoms were measured using the first two questions and the last two questions of the Patient Health Questionnaire, respectively (Kroenke, Spitzer, Williams, & Löwe, 2009).

Perceived stress was defined using the 10-item Perceived Stress Scale ($\alpha = 0.74$), which is validated and has been used in previous disaster studies (Cohen, Kamarck, & Mermelstein, 1983; Hyre et al., 2008). Participants may have been eligible for linkage to care on multiple criteria.

Mental health symptom burden (MHSB) was defined as a dichotomous variable by collapsing number of screening criteria (range 1–6) met by a participant into one criteria versus two or more criteria.

2.2.3 | Outcome variables

Acceptance of linkage to care

Participants who met screening criteria on a mental health difficulty (alcohol abuse, recreational drug abuse, family substance abuse, anxiety symptoms, depression symptoms, PTSD symptoms) were offered linkage to mental health care. Acceptance of linkage to care was dichotomized as yes or no.
2.2.4 | Attendance at first appointment
Participants who agreed to being linked to mental health care were followed by research staff. During follow-up phone calls, participants confirmed if they had attended at least one mental health care appointment. Attendance at first appointment was dichotomized as yes or no.

2.2.5 | Study covariates
Demographics included age, gender, race (White, Black, or other), ethnicity (Hispanic or Non-Hispanic), and level of education (completed high school or above, or some HS or below). Current smokers were assessed based on a question asking for current smoking status (Global Adult Tobacco Survey Collaborative Group, 2011). Those who indicated having been diagnosed with a mental health condition before the hurricane were categorized as having a history of mental illness. Current mental health treatment status was measured with a yes or no question. Elapsed time since Sandy was the time in months from Hurricane Sandy to the survey date.

Hurricane exposure was measured using a checklist for hurricane exposure, which included 30 check-off items (Harville et al., 2011; Norris, Perilla, Riad, Kaniasty, & Lavizzo, 1999) of possible hurricane experiences. These items included personal exposure measures such as injury or death of a friend or family member and property exposure such as a damaged or destroyed home (Schwartz et al., 2015). This measure was derived from Hurricane Katrina (Harville et al., 2011) and Hurricane Andrew (Norris et al., 1999) exposure tools and has been used in previous research (Schwartz et al., 2016a; Schwartz et al., 2015, 2018).

2.3 | Analysis
Frequency and percent of categorical study variables were compared by acceptance of linkage to care and attendance at first appointment. Differences were assessed using chi-square tests. For continuous variables, mean and standard deviation (SD) or median and interquartile range (IQR) were calculated and differences were assessed using Mann-Whitney rank-sum test.

A multivariable logistic regression model was used to assess the association between MHSB and acceptance while adjusting for demographics, history of mental illness, current mental health treatment status, and elapsed time since Hurricane Sandy. The model was then rerun with hurricane exposure to determine if it moderated the effect of MHSB on acceptance. For those who accepted services (N = 315), a multivariable logistic regression was also fitted to evaluate the association between MHSB and attendance at first appointment using the same adjustments. Total exposure was also tested as a moderator.

Model discrimination was assessed using the c-statistic, which measures how well the model differentiates the observed data at different levels of the outcome. A c-statistic of 0.7 or above is considered acceptable. Adjusted odds ratios (aOR), 95% confidence intervals (95% CI), c-statistic, and P values are reported. Significance is considered p < 0.05. All analyses were conducted using Stata (version 15.1) statistical software.

3 | RESULTS
3.1 | Sample statistics
Of the 488 study participants who met screening criteria for linkage to care, 54.1% were female and 39.12% identified as White, 52.72% as Black, and the majority identified as non-Hispanic (82.22%). Mean age among participants was 44.63 years (SD = 14.52). About 200 (42.15%) participants reported having previously been diagnosed with a mental health difficulty and 31.77% were currently in mental health treatment.
Almost half (48.35%) of the participants screened in on substance abuse, 16.43% screened in on substance abuse of a family member, 38.52% screened in on perceived stress, 217 (44.47%) screened in on anxiety, 197 (40.37%) screened in on depression, and 226 (46.31%) screened in on PTSD. A total of 298 (60.04%) participants screened in on two or more criteria. It is important to note that community partnerships may have contributed to the high proportion of participants who screened in on substance abuse and who were already in mental health treatment. PR and the L2C program partnered with FRTC and several recruitment events took place in the FRTC lobby.

3.2 | Univariate analysis

3.2.1 | Agreeing to linkage to care

Overall, 315 (64.55%) participants accepted at the time of screening to being linked into mental health care. Percent acceptance was lower for males compared with females (58.93% vs. 69.32%) and those identifying as non-Hispanic compared with Hispanics (62.09% vs. 75.29%; Table 2). Those who accepted linkage to care had a significantly shorter median time since Hurricane Sandy than those who did not (31.84 [22.86–41.48] months versus 38.39 [28.65–43.39] months).

Having a history of mental health difficulties and currently being in mental health treatment were also significantly associated with acceptance to participate in services. There were significant associations between screening in on perceived stress, anxiety, depression and/or PTSD, and acceptance of being linked to services. Screening positive on substance abuse and substance abuse of a family member were not significantly associated with acceptance of services. Finally, those who had a higher MHSB (e.g. screened in on two or more criteria; 75.84%) had a higher rate of acceptance compared with those who screened in on one criteria (46.84%).

3.2.2 | Attending first appointment

Of the 315 participants who agreed to be linked to care, 143 (45.40%) reported attending their first mental health treatment appointment (Table 3). Their report of attendance was verified by the provider. No association was found between demographics and attendance of first appointment. Screening in on substance abuse was associated with an increased rate of attending a first appointment (51.95% vs. 39.38%, \( p = 0.025 \)); however, no other screening criteria were associated with attendance. Having a history of mental health difficulties and currently being in mental health treatment were significantly associated with appointment attendance.

3.3 | Multivariable analysis

Individuals who screened in on more than one criteria vs. only one criterion had 2.68 greater odds of accepting services (95% CI [1.68, 4.26]; Table 4). No association was found between demographics and acceptance. Those with a history of mental illness (aOR = 2.17, 95% CI [1.30, 3.60]) and those currently in mental health treatment (aOR = 3.47, 95% CI [1.89, 6.37]) had increased odds of acceptance. Hurricane exposure was not independently associated with acceptance (aOR = 1.00, 95% CI [0.94, 1.04]). Hurricane exposure also did not moderate the effect on mental health burden, measured by including the interaction between the two factors in the model (interaction \( p = 0.56 \)).

In the multivariable model performed on participants who accepted to participate in services (N = 283, 89.6%), mental health burden was not significantly associated with attending a first appointment (\( p = 0.80 \)). Those currently in mental health treatment had an increased odds of attending their first appointment than those not in treatment (aOR = 4.92, 95% CI [2.77, 8.73]). Total hurricane exposure was not significantly associated with attendance. No association was found between demographics and attendance.
## TABLE 2  Acceptance (%) to linkage to care according to demographics and screening criteria

| Variable                        | Category         | Sample N (%) | Acceptance to Linkage to Care |                      |                      |                      |
|---------------------------------|------------------|--------------|--------------------------------|----------------------|----------------------|----------------------|
|                                 |                  |              | Yes (N = 315) | No (N = 173) | P valuea             |                      |
| Age (years), mean (SD)          |                  | 44.63 (14.52) | 44.84 (13.79) | 44.24 (15.79) | 0.58                 |                      |
| Gender                          | Male             | 224 (45.9)   | 132 (58.93)  | 92 (41.07)    | 0.017*               |                      |
|                                 | Female           | 264 (54.1)   | 183 (69.32)  | 81 (30.68)    |                      |                      |
| Race                            | White            | 187 (39.12)  | 124 (66.31)  | 63 (33.69)    | 0.784                |                      |
|                                 | Black            | 252 (52.72)  | 159 (63.10)  | 93 (36.90)    |                      |                      |
|                                 | Other            | 39 (8.16)    | 25 (64.10)   | 14 (35.90)    |                      |                      |
| Ethnicity                       | Non-Hispanic     | 393 (82.22)  | 244 (62.09)  | 149 (37.91)   | 0.021*               |                      |
|                                 | Hispanic         | 85 (17.78)   | 64 (75.29)   | 21 (24.71)    |                      |                      |
| Education                       | HS or less       | 119 (25.27)  | 85 (71.43)   | 34 (28.57)    | 0.062                |                      |
|                                 | Above HS         | 352 (74.73)  | 218 (61.93)  | 134 (38.07)   |                      |                      |
| Hurricane Exposure Score, median (IQR) | 34.62 (24.21–41.56) | 31.84 (22.86–41.48) | 38.39 (28.65–43.39) | 0.002*               |                      |
| Elapsed time since Hurricane Sandy (months), median (IQR) | 6 (3–10) | 6 (3–10) | 6 (3–9) | 0.36 |                      |
| History of mental health illness | Yes              | 204 (42.15)  | 167 (55.30)  | 37 (12.25)    | < 0.001**            |                      |
|                                 | No               | 280 (57.85)  | 146 (87.43)  | 134 (80.24)   |                      |                      |
| Current mental health treatment | Yes              | 149 (31.77)  | 131 (87.92)  | 18 (12.08)    | < 0.001**            |                      |
|                                 | No               | 320 (68.23)  | 171 (53.44)  | 149 (46.56)   |                      |                      |
| Screening Criteria              | Substance abuse  | Yes           | 235          | 154 (65.53)  | 81 (34.47)          | 0.681                |
|                                 | No               | 251           | 160 (63.75)  | 91 (36.25)    |                      |                      |
|                                 | Substance abuse–family member | Yes          | 80           | 54 (67.50)   | 26 (32.50)          | 0.564                |
|                                 | No               | 407           | 261 (64.13)  | 146 (35.87)   |                      |                      |
|                                 | Perceived stress symptoms | Yes          | 188          | 143 (76.06)  | 45 (23.94)          | < 0.001**            |
|                                 | No               | 300           | 172 (57.33)  | 128 (42.66)   |                      |                      |
|                                 | Anxiety symptoms | Yes           | 217          | 168 (77.42)  | 49 (22.58)          | < 0.001**            |
|                                 | No               | 271           | 147 (54.24)  | 124 (45.76)   |                      |                      |
|                                 | Depression symptoms | Yes          | 197          | 154 (78.17)  | 43 (21.83)          | < 0.001**            |
|                                 | No               | 291           | 161 (55.33)  | 130 (44.67)   |                      |                      |
|                                 | PTSD symptoms    | Yes           | 226          | 166 (73.45)  | 60 (26.55)          | < 0.001**            |
|                                 | No               | 262           | 149 (56.87)  | 113 (43.13)   |                      |                      |
|                                 | Mental health symptom burden | 1         | 190 (38.93)  | 89 (46.84)   | 101 (53.16)         | < 0.001**            |
|                                 | >1               | 298 (61.07)   | 226 (75.84)  | 72 (24.16)    |                      |                      |

Note. HS = high school; SD = standard deviation; IQR = interquartile range; PTSD = posttraumatic stress disorder. Numbers may not add to total due to missing values in each characteristic.

| Category | Sample N (%) | Acceptance to Linkage to Care | P valuea |
|----------|--------------|--------------------------------|----------|
| Yes      | 315          | 44.84 (13.79)                  | 0.58     |
| No       | 173          | 44.24 (15.79)                  | 0.58     |

*p-value from chi-square tests for categorical variables, Mann-Whitney rank-sum test for age, elapsed time since Hurricane Sandy, and Hurricane Exposure score.

* p < .05, ** p < .01, *** p < .001.
| Variable                        | Category     | Sample N (%) | Attended first appointment | Attended first appointment |
|--------------------------------|--------------|--------------|-----------------------------|----------------------------|
|                                |              |              | Yes (N = 143) | No (N = 172) | P value<sup>a</sup> |              | Yes (N = 143) | No (N = 172) | P value<sup>a</sup> |              |
| Age (years), mean (SD)         |              | 45.43 (12.71)| 45.43 (1.07) | 44.35 (1.12) | 0.461            |              | 45.43 (1.07) | 44.35 (1.12) | 0.461            |              |
| Gender                         | Male         | 132          | 62 (46.97)  | 70 (53.03)   | 0.634            |              | 62 (46.97)  | 70 (53.03)   | 0.634            |              |
|                                | Female       | 183          | 81 (44.26)  | 102 (55.74)  | 0.086            |              | 81 (44.26)  | 102 (55.74)  | 0.086            |              |
| Race                           | White        | 124          | 66 (53.22)  | 58 (46.77)   | 0.086            |              | 66 (53.22)  | 58 (46.77)   | 0.086            |              |
|                                | Black        | 159          | 66 (41.51)  | 93 (58.49)   | 0.086            |              | 66 (41.51)  | 93 (58.49)   | 0.086            |              |
|                                | Other        | 25           | 9 (36.00)   | 16 (64.00)   | 0.086            |              | 9 (36.00)   | 16 (64.00)   | 0.086            |              |
| Ethnicity                      | Non-Hispanic | 244          | 108 (44.26) | 136 (55.74)  | 0.297            |              | 108 (44.26) | 136 (55.74)  | 0.297            |              |
|                                | Hispanic     | 64           | 33 (51.56)  | 31 (48.44)   | 0.086            |              | 33 (51.56)  | 31 (48.44)   | 0.086            |              |
| Education                      | HS or less   | 85           | 46 (54.12)  | 39 (45.88)   | 0.084            |              | 46 (54.12)  | 39 (45.88)   | 0.084            |              |
|                                | Above HS     | 218          | 94 (43.12)  | 124 (56.88)  | 0.084            |              | 94 (43.12)  | 124 (56.88)  | 0.084            |              |
| Hurricane Exposure Score,      |              |              | 6 (3–9)     | 7 (3–10.5)   | 0.3712           |              | 6 (3–9)     | 7 (3–10.5)   | 0.3712           |              |
| median (IQR), median           |              |              |              |              |                  |              |              |              |                  |              |
| Elapsed time since Hurricane    |              | 31.84        | 32.51        | 31.78        | 0.74             |              | 31.84        | 32.51        | 31.78        | 0.74             |
| Sandy (months), median (IQR)   |              | (24.67–40.86)| (24.67–40.86)| (21.21–43.39)|<sup>b</sup>        |              | (24.67–40.86)| (24.67–40.86)| (21.21–43.39)|<sup>b</sup>        |              |
| History of mental health        | Yes          | 167          | 92 (55.09)  | 75 (44.91)   | <0.001**         |              | 92 (55.09)  | 75 (44.91)   | <0.001**         |              |
| illness                        | No           | 146          | 50 (34.25)  | 96 (65.75)   | 0.084            |              | 50 (34.25)  | 96 (65.75)   | 0.084            |              |
| Current mental health treatment | Yes          | 131          | 91 (69.47)  | 40 (30.53)   | <0.001**         |              | 91 (69.47)  | 40 (30.53)   | <0.001**         |              |
|                                | No           | 171          | 50 (29.24)  | 121 (70.76)  | 0.084            |              | 50 (29.24)  | 121 (70.76)  | 0.084            |              |
| Screening Criteria             |              |              |              |              |                  |              |              |              |                  |              |
| Substance abuse                | Yes          | 154          | 80 (51.95)  | 74 (48.05)   | 0.025*           |              | 80 (51.95)  | 74 (48.05)   | 0.025*           |              |
|                                | No           | 160          | 63 (39.38)  | 97 (60.62)   | 0.025*           |              | 63 (39.38)  | 97 (60.62)   | 0.025*           |              |
| Substance abuse–family member   | Yes          | 54           | 28 (51.85)  | 26 (48.15)   | 0.295            |              | 28 (51.85)  | 26 (48.15)   | 0.295            |              |
|                                | No           | 261          | 115 (44.06) | 146 (55.94)  | 0.295            |              | 115 (44.06) | 146 (55.94)  | 0.295            |              |
| Perceived stress symptoms      | Yes          | 143          | 67 (46.85)  | 76 (53.15)   | 0.636            |              | 67 (46.85)  | 76 (53.15)   | 0.636            |              |
|                                | No           | 172          | 76 (44.19)  | 96 (55.81)   | 0.636            |              | 76 (44.19)  | 96 (55.81)   | 0.636            |              |
| Anxiety symptoms               | Yes          | 168          | 81 (48.21)  | 87 (51.79)   | 0.283            |              | 81 (48.21)  | 87 (51.79)   | 0.283            |              |
|                                | No           | 147          | 62 (42.18)  | 85 (57.82)   | 0.283            |              | 62 (42.18)  | 85 (57.82)   | 0.283            |              |
| Depression symptoms            | Yes          | 154          | 71 (46.10)  | 83 (53.90)   | 0.805            |              | 71 (46.10)  | 83 (53.90)   | 0.805            |              |
|                                | No           | 161          | 72 (44.72)  | 89 (55.28)   | 0.805            |              | 72 (44.72)  | 89 (55.28)   | 0.805            |              |
| PTSD symptoms                  | Yes          | 166          | 80 (48.19)  | 86 (51.81)   | 0.293            |              | 80 (48.19)  | 86 (51.81)   | 0.293            |              |
|                                | No           | 149          | 63 (42.28)  | 86 (57.72)   | 0.293            |              | 63 (42.28)  | 86 (57.72)   | 0.293            |              |
| Mental health symptom burden   | 1            | 89           | 36 (40.45)  | 53 (59.55)   | 0.268            |              | 36 (40.45)  | 53 (59.55)   | 0.268            |              |
|                                | >1           | 226          | 107 (47.35) | 119 (52.65)  | 0.268            |              | 107 (47.35) | 119 (52.65)  | 0.268            |              |

Note. HS = high school; SD = standard deviation; IQR = interquartile range; PTSD = posttraumatic stress disorder. Numbers may not add to total because of missing values in each characteristic.

<sup>a</sup>p-value from chi-square tests for categorical variables, Mann-Whitney rank-sum test for age, elapsed time since Hurricane Sandy, and Hurricane Exposure score.

<sup>b</sup>p < .05. **p < .01. ***p < .001.
**TABLE 4** Multivariable logistic regression modeling of the association between mental health symptom burden and acceptance to link to care program and attendance to an appointment

| Effect                                      | Acceptance aOR [95% CI] | Attendance aOR [95% CI] |
|---------------------------------------------|-------------------------|-------------------------|
| Mental health symptom burden, > 1 vs. 1 criteria | 2.68 [1.68, 4.26]       | 0.92 [0.49, 1.72]       |
| Age (years)                                 | 1.00 [0.98–1.01]        | 1.00 [0.98, 1.02]       |
| Female vs. male                             | 1.42 [0.91, 2.21]       | 0.83 [0.48, 1.41]       |
| Race                                        |                         |                         |
| Black vs. White                             | 0.89 [0.51, 1.55]       | 0.55 [0.28, 1.10]       |
| Other vs. White                             | 0.89 [0.36, 2.17]       | 0.33 [0.12, 0.96]       |
| Hispanic vs. Non-Hispanic                   | 1.27 [0.64, 2.51]       | 0.83 [0.39, 1.81]       |
| ≥ HS vs. < HS education                     | 1.02 [0.58, 1.8]        | 0.61 [0.33, 1.13]       |
| History of mental illness, yes vs. no      | 2.17 [1.30, 3.60]       | 1.50 [0.86, 2.64]       |
| Current treatment, yes vs. no              | 3.47 [1.89, 6.37]       | 4.92 [2.77, 8.73]       |
| Time from Hurricane Sandy (months)         | 0.98 [0.95, 1.00]       | 1.00 [0.97, 1.03]       |
| Hurricane Exposure Score                    | 1.00 [0.94, 1.04]       | 0.95 [0.89, 1.01]       |

Note. HS = high school; aOR = adjusted odds ratio; CI = confidence interval.

4 | DISCUSSION

The present analysis examines the demographic and mental health characteristics associated with engagement in mental health services, conceptualized as acceptance and attendance, in the wake of Hurricane Sandy. Overall, of 1,011 participants in PR, 488 (48.27%) screened in to linkage to mental health program, and of those who screened in, 315 (64.55%) accepted to be linked to mental health care at the time of screening. After acceptance to be linked to care, 143 (45.40%) reported attending their first mental health treatment appointment.

A large proportion of individuals living with mental health concerns in the United States are not engaged in mental health treatment or are receiving inadequate care (Wang et al., 2005). Stigma surrounding mental health and mental health care is well established in the literature (Corrigan, Druss, & Perlick, 2014) and may prevent individuals from seeking care (Corrigan et al., 2014; Mojtabai, Olfson, & Mechanic, 2002). However, research suggests that stigma may be moderated by knowledge of mental illness (Corrigan et al., 2014), including in the context of a natural disaster (Price, Gros, McCauley, Gros, & Ruggiero, 2012). Among participants, those with a history of mental health concerns and those who were currently in treatment had a greater likelihood of accepting but not attending services. Our results support earlier findings that individuals who are already in contact with the mental health care system may experience less stigma and in turn be more receptive to linkage to care, though they still may face barriers to attending services (Corrigan et al., 2014; Wang et al., 2005).

A lack of knowledge regarding how to access and the location of mental health care resources has been identified as a common barrier to seeking mental health care (Henderson, Evans-Lacko, & Thomicroft, 2013; Mackenzie, Pagura, & Sareen, 2010; Sareen et al., 2007; Wells, Robins, Bushnell, Jarosz, & Oakley-Browne, 1994; Wetherell et al., 2004). The association between history of mental health concerns and acceptance of services in our sample may reflect a greater understanding of the mental health care system among individuals previously in contact with that system. In this way, earlier mental health treatment may increase self-efficacy (i.e., knowing where to go or who to see) in obtaining treatment; however, barriers to eventual attendance may still hinder treatment.

Greater MHSB (i.e., screening in on more than one mental health screening criteria) was associated with acceptance of a L2C program, after controlling for previous contact with the mental health care system, but was not associated with attendance at first appointment. Because study staff spoke with participants who screened in about the possible connection between Hurricane Sandy and their MHSB, participants may have experienced less stigma.
accepting services related to a specific, external cause (i.e., Hurricane Sandy) of their mental health issues (Corrigan et al., 2014).

Previous studies have found certain subgroups including ethnic minorities and low-resourced individuals (e.g., those without health insurance) to be more vulnerable to the mental health impacts of natural disaster; this was due in part to barriers to mental health care (Schwartz et al., 2016a; Wang et al., 2008). Our L2C program incorporated measures to increase engagement in services tailored to groups that may experience increased barriers to mental health care including having a bilingual Project Coordinator (English-Spanish) present at recruitment events. Although the literature suggests that Hispanic individuals are less likely to seek mental health services (Keyes et al., 2012; G. Kim et al., 2011; Kouyoumdjian, Zamboanga, & Hansen, 2006) and to receive adequate mental health care (Alegría et al., 2008; Simpson, Krishnan, Kunik, & Ruiz, 2007; Stockdale, Lagomasino, Siddique, McGuire, & Miranda, 2008), in our study sample, Hispanic ethnicity was significantly associated with the acceptance of linkage to mental health care, though not appointment attendance. These findings not only highlight the importance of culturally competent outreach but they also underline the continued challenges to actual engagement in services for underserved groups.

4.1 Limitations

The findings should be interpreted in the context of the study limitations. Participants were recruited through convenience sampling, which may have led to selection bias favoring individuals more receptive to mental health treatment. However, the sample’s demographics do closely match to the larger Rockaway’s population with the exception of a larger proportion of African American individuals in the study sample, possibly because of heavier recruitment on the eastern end of the peninsula, which is predominately African American (see Appendix). In addition, the study’s cross-section design precludes causal inferences. Finally, mental health symptomology was collected via self-report using validated measures. Future research could establish mental health burden through diagnosis by a mental health professional in order to reduce potential reporting bias.

4.2 Conclusions and Implications for future research

Despite these limitations, the present study has important implications for mental health treatment in a postdisaster context. Our findings underscore the importance of the dissemination of the well-established, long-term effects of mental health impacts of natural disasters (Schwartz et al., 2015, 2017, 2018; Schwartz et al., 2016b) to reduce stigma and increase engagement in mental health treatment in a postdisaster context. In addition, our results suggest that a familiarity with the mental health care system may facilitate continued or future engagement in mental health care. As such, future mental health interventions in postdisaster contexts may require additional resources to increase knowledge about the mental health care system. Future research may focus on the impact of the dissemination of such information on a wider scale on engagement in mental health services postdisaster.

ORCID

Kristin Bevilacqua https://orcid.org/0000-0002-3260-3733

REFERENCES

Alegría, M., Chatterji, P., Wells, K., Cao, Z., Chen, C., Takeuchi, D., ... Meng, X.-L. (2008). Disparity in depression treatment among racial and ethnic minority populations in the United States. Psychiatric Services, 59(11), 1264–1272. https://doi.org/10.1176/ps.2008.59.11.1264

Blake, E., Kimberlain, T., Berg, R., Cangialosi, J., & Beven J. (2013). Tropical cyclone report: Hurricane Sandy. National Hurricane Center, Retrieved from https://www.nhc.noaa.gov/data/tcr/AL182012_Sandy.pdf

Boscarino, J. A., Hoffman, S. N., Adams, R. E., Figley, C. R., & Solhkhah, R. (2014). Mental health outcomes among vulnerable residents after Hurricane Sandy: Implications for disaster research and planning. American Journal of Disaster Medicine, 9(2), 107–120. https://doi.org/10.5055/ajdm.2014.0147
Centers for Disease Control. (2013). Deaths associated with Hurricane Sandy—October–November 2012. Morbidity and Mortality Weekly Report (No. 20, 393–397). Retrieved from https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6220a1.htm

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385–396.

Contreras, C., Aguilar, M., Eappen, B., Guzmán, C., Carrasco, P., Millones, A. K., & Galea, J. T. (2018). Community strengthening and mental health system linking after flooding in two informal human settlements in Peru: A model for small-scale disaster response. *Global Mental Health, 5*.

Corrigan, P. W., Druss, B. G., & Perlick, D. A. (2014). The impact of mental illness stigma on seeking and participating in mental health care. *Psychological Science in the Public Interest, 15*(2), 37–70. https://doi.org/10.1177/1529100614531398

Durkin, E. (2017, January 2). 40% of homes damaged by Hurricane Sandy still not fixed after de Blasio promised to repair all by end of 2016. Retrieved from http://www.nydailynews.com/new-york/nyc-fixed-60-homes-hurricane-sandy-repair-program-article-1.2931064

Fergusson, D. M., Horwood, L. J., Boden, J. M., & Mulder, R. T. (2014). Impact of a major disaster on the mental health of a well-studied cohort. *JAMA Psychiatry, 71*(9), 1025–1031. https://doi.org/10.1001/jamapsychiatry.2014.652

Global Adult Tobacco Survey Collaborative Group. (2011). Tobacco questions for surveys: A subset of key questions from the Global Adult Tobacco Survey (2nd ed.). Atlanta: Centers for Disease Control and Prevention.

Gruebner, O., Lowe, S. R., Sampson, L., & Galea, S. (2015). The geography of post-disaster mental health: Spatial patterning of psychological vulnerability and resilience factors in New York City after Hurricane Sandy. *International Journal of Health Geographics, 14*, 16. https://doi.org/10.1186/s12942-015-0008-6

Hamblen, J. L., Norris, F. H., Pietruszkiwicz, S., Gibson, L. E., Naturale, A., & Louis, C. (2009). Cognitive behavioral therapy for postdisaster distress: A community based treatment program for survivors of Hurricane Katrina. *Administration and Policy in Mental Health and Mental Health Services Research, 36*(3), 206–214.

Harville, E. W., Xiong, X., Smith, B. W., Pridjian, G., Elkind-Hirsch, K., & Buekens, P. (2011). Combined effects of Hurricane Katrina and Hurricane Gustav on the mental health of mothers of small children. *Journal of Psychiatric and Mental Health Nursing, 18*(4), 288–296. https://doi.org/10.1111/j.1365-2850.2010.01658.x

Henderson, C., Evans-Lacko, S., & Thornicroft, G. (2013). Mental illness stigma, help seeking, and public health programs. *American Journal of Public Health, 103*(5), 777–780.

Honan, K. (2017, October 26). 5 years after Sandy, Here’s how NYC is spending billions in federal aid. Retrieved from https://www.dnainfo.com/new-york/20171026/rockaway-beach/where-did-hurricane-sandy-money-go-fema-hud/

Hyre, A. D., Benight, C. C., Tynes, L. L., Rice, J., DeSalvo, K. B., & Muntner, P. (2008). Psychometric properties of the Hurricane Coping Self-Efficacy measure following Hurricane Katrina. *The Journal of Nervous and Mental Disease, 196*(7), 562–567. https://doi.org/10.1097/NMD.0b013e18174016c

Kaplan, L., & Kaplan, C. P. (2003). Between ocean and city: The transformation of Rockaway. New York: Columbia University Press.

Katz, C. L., Pelegrino, L., Pandya, A., Ng, A., & DeLisi, L. E. (2002). Research on psychiatric outcomes and interventions subsequent to disasters: A review of the literature. *Psychiatry Research, 110*(3), 201–217.

Keyes, K. M., Martins, S. S., Hatzenbuehler, M. L., Blanco, C., Bates, L. M., & Hasin, D. S. (2012). Mental health service utilization for psychiatric disorders among Latinos living in the United States: The role of ethnic subgroup, ethnic identity, and language/social preferences. *Social Psychiatry and Psychiatric Epidemiology, 47*(3), 383–394. https://doi.org/10.1007/s00127-010-0323-y

Kim, G., Aguado Loi, C. X., Chiriboga, D. A., Jang, Y., Parmelee, P., & Allen, R. S. (2011). Limited English proficiency as a barrier to mental health service use: A study of Latino and Asian immigrants with psychiatric disorders. *Journal of Psychiatric Research, 45*(1), 104–110. https://doi.org/10.1016/j.jpsychires.2010.04.031

Kim, H., Schwartz, R. M., Hirsch, J., Silverman, R., Liu, B., & Taioli, E. (2016). Effect of Hurricane Sandy on Long Island emergency departments visits. *Disaster Medicine and Public Health Preparedness, 10*(3), 344–350. https://doi.org/10.1017/dmp.2015.189

Kouyoumdjian, H., Zamboanga, B. L., & Hansen, D. J. (2006). Barriers to community mental health services for Latinos: Treatment considerations. *Clinical Psychology: Science and Practice, 10*(4), 394–422. https://doi.org/10.1093/c clinpsy. bpg041

Kroenke, K., Spitzer, R. L., Williams, J. B. W., & Löwe, B. (2009). An ultra-brief screening scale for anxiety and depression: The PHQ-4. *Psychosomatics, 50*(6), 613–621. https://doi.org/10.1176/appi.psy.50.6.613

Lieberman-Cribbin, W., Liu, B., Schneider, S., Schwartz, R., & Taioli, E. (2017a). Self-Reported and FEMA flood exposure assessment after Hurricane Sandy: Association with mental health outcomes. *PLOS ONE, 12*(1), e0170965. https://doi.org/10.1371/journal.pone.0170965
Liebman-Cribbin, W., Liu, B., Schneider, S., Schwartz, R., & Taioli, E. (2017b). Self-reported and FEMA flood exposure assessment after Hurricane Sandy: Association with mental health outcomes. PLOS ONE, 12(1), e0170965. https://doi.org/10.1371/journal.pone.0170965

Liu, A.-N., Wang, L.-L., Li, H.-P., Gong, J., & Liu, X.-H. (2017). Correlation between posttraumatic growth and posttraumatic stress disorder symptoms based on Pearson correlation coefficient: A meta-analysis. The Journal of Nervous and Mental Disease, 205(5), 380–389. https://doi.org/10.1097/NMD.0000000000000605

Low, S. R., Manove, E. E., & Rhodes, J. E. (2013). Posttraumatic stress and posttraumatic growth among low-income mothers who survived Hurricane Katrina. Journal of Consulting and Clinical Psychology, 81(5), 877–889. https://doi.org/10.1037/a0033252

Mackenzie, C. S., Pagura, J., & Sareen, J. (2010). Correlates of perceived need for and use of mental health services by older adults in the collaborative psychiatric epidemiology surveys. The American Journal of Geriatric Psychiatry, 18(12), 1103–1115.

Maclean, J. C., Popovici, I., & French, M. T. (2016). Are natural disasters in early childhood associated with mental health and substance use disorders as an adult? Social Science & Medicine (1982), 151, 78–91. https://doi.org/10.1016/j.socscimed.2016.01.006

Maslin Nir, S. (2012, November 4). In sight of Manhattan skyline, living forlorn and in the dark. The New York Times. Retrieved from https://www.nytimes.com/2012/11/05/nyregion/in-sight-of-manhattan-skyline-a-population-lives-forlorn-and-in-the-dark.html

Mojtabai, R., Olsson, M., & Mechanic, D. (2002). Perceived need and help-seeking in adults with mood, anxiety, or substance use disorders. Archives of general psychiatry, 59(1), 77–84.

Neria, Y., & Shultz, J. M. (2012). Mental health effects of Hurricane Sandy: Characteristics, potential aftermath, and response. JAMA, 308(24), 2571–2572. https://doi.org/10.1001/jama.2012.110700

National Institute on Drug Abuse. (2013). NIDA-modified ASSIST V2.0. Retrieved from https://www.drugabuse.gov/sites/default/files/files/QuickScreen_Updated_2013%281%29.pdf

Nonko, E. (2017, October 27). Inside the failures of post-Hurricane Sandy Build it Back program. Retrieved from https://ny.curbed.com/2017/10/27/16554180/hurricane-sandy-relief-build-it-back-housing

Norris, F. H. (1992). Epidemiology of trauma: Frequency and impact of different potentially traumatic events on different demographic groups. Journal of Consulting and Clinical Psychology, 60(3), 409–418.

Norris, F. H., Perilla, J. L., Riad, J. K., Kaniasty, K., & Lavizzo, E. A. (1999). Stability and change in stress, resources, and psychological distress following natural disaster: Findings from hurricane Andrew. Anxiety, Stress, and Coping, 12(4), 363–396. https://doi.org/10.1080/10615809908249317

North, C. S., & Pfefferbaum, B. (2013). Mental health response to community disasters: A systematic review. JAMA, 310(5), 507–518.

Price, M., Gros, D. F., McCauley, J. L., Gros, K. S., & Ruggiero, K. J. (2012). Nonuse and dropout attrition for a web-based mental health intervention delivered in a post-disaster context. Psychiatry: Interpersonal and Biological Processes, 75(3), 267–284. https://doi.org/10.1521/psyc.2012.75.3.267

Rasul, R., Watson, A., Schenider, S., Kerath, S., Liu, B., Lieberman-Cribbin, W., ... Schwartz, R. M. (2017, November). Linkage to mental health care in the Rockaways after Hurricane Sandy. Oral presentation at the American Public Health Association Annual Meeting, Atlanta, GA.

Ruskin, J., Rasul, R., Schneider, S., Bevilacqua, K., Taioli, E., & Schwartz, R. M. (2018). Lack of access to medical care during Hurricane Sandy and mental health symptoms. Preventive Medicine Reports, 10, 363–369. https://doi.org/10.1016/j.pmedr.2018.04.014

Sareen, J., Jagdeo, A., Cox, B. J., Clara, I., ten Have, M., Belik, S. L., ... Stein, M. B. (2007). Perceived barriers to mental health service utilization in the United States, Ontario, and the Netherlands. Psychiatric services, 58(3), 357–364.

Schwartz, R., Liu, B., Sison, C., Kerath, S. M., Breil, T., Murphy, L., & Taioli, E. (2016a). Study design and results of a population-based study on perceived stress following Hurricane Sandy. Disaster Medicine and Public Health Preparedness, 10(3), 325–332. https://doi.org/10.1017/dmp.2015.157

Schwartz, R. M., Gillezeau, C. N., Liu, B., Lieberman-Cribbin, W., & Taioli, E. (2017). Longitudinal impact of Hurricane Sandy exposure on mental health symptoms. International Journal of Environmental Research and Public Health, 14(9). https://doi.org/10.3390/ijerph14090957

Schwartz, R. M., Rasul, R., Kerath, S. M., Watson, A. R., Lieberman-Cribbin, W., Liu, B., & Taioli, E. (2018). Displacement during Hurricane Sandy: The impact on mental health. Journal of Emergency Management (Weston, Mass.), 16(1), 17–27. https://doi.org/10.5055/jem.2018.0350
Schwartz, R. M., Rothenberg, P., Kerath, S. M., Liu, B., & Taioli, E. (2016b). The lasting mental health effects of Hurricane Sandy on residents of the Rockaways. Journal of Emergency Management (Weston, Mass.), 14(4), 269–279. https://doi.org/10.5055/jem.2016.0292

Schwartz, R. M., Sison, C., Kerath, S. M., Murphy, L., Breil, T., Sikavi, D., & Taioli, E. (2015). The impact of Hurricane Sandy on the mental health of New York area residents. American Journal of Disaster Medicine, 10(4), 339–346. https://doi.org/10.5055/ajdm.2015.0216

U.S. Department of Health and Human Services and U.S. Department of Agriculture. (2015). Dietary Guidelines for Americans 2015–2020 (8 ed.). Available at: Retrieved from https://health.gov/dietaryguidelines/2015/guidelines/

Shukman, D. (2012, October 29). Hurricane Sandy ‘largest storm recorded in Atlantic’- BBC News. Retrieved from http://www.bbc.co.uk/news/world-us-canada-20128931

Simpson, S. M., Krishnan, L. L., Kunik, M. E., & Ruiz, P. (2007). Racial disparities in diagnosis and treatment of depression: A literature review. Psychiatric Quarterly, 78(1), 3–14. https://doi.org/10.1007/s11126-006-9022-y

Stein, D. J., Chiu, W. T., Hwang, I., Kessler, R. C., Sampson, N., Alonso, J., … Nock, M. K. (2010). Cross-National Analysis of the Associations between traumatic events and suicidal behavior: Findings from the WHO World Mental Health Surveys. PLOS ONE, 5(5), e10574. https://doi.org/10.1371/journal.pone.0010574

Stockdale, S. E., Lagomasino, I. T., Siddique, J., McGuire, T., & Miranda, J. (2008). Racial and ethnic disparities in detection and treatment of depression and anxiety among primary health care visits, 1995–2005: Medical Care, 46(7), 668–677. https://doi.org/10.1097/MCR.0b013e3181789496

Subaïya, S., Moussavi, C., Velasquez, A., & Stillman, J. (2014). A rapid needs assessment of the rockaway peninsula in New York City after Hurricane Sandy and the relationship of socioeconomic status to recovery. American Journal of Public Health, 104(4), 632–638. https://doi.org/10.2105/AJPH.2013.301668

Thienkrua, W., Cardozo, B. L., Chakkraband, M. L. S., Guadamuz, T. E., Pengjuntr, W., & Tantipiwatanaskul, P., … Thailand Post-Tsunami Mental Health Study Group. (2006). Symptoms of posttraumatic stress disorder and depression among children in tsunami-affected areas in southern Thailand. JAMA, 296(5), 549–559. https://doi.org/10.1001/jama.296.5.549

United States Census Bureau. (2016). American Community Survey 1-year estimates. Retrieved from https://censusreporter.org/profiles/01000US-united-states/

van Griensven, F., Chakkraband, M. L. S., Thienkrua, W., Pengjuntr, W., Lopes Cardozo, B., & Tantipiwatanaskul, P., … Thailand Post-Tsunami Mental Health Study Group. (2006). Mental health problems among adults in tsunami-affected areas in southern Thailand. JAMA, 296(5), 537–548. https://doi.org/10.1001/jama.296.5.537

Wang, P. S., Gruber, M. J., Powers, R. E., Schoenbaum, M., Speier, A. H., Wells, K. B., & Kessler, R. C. (2008). Disruption of existing mental health treatments and failure to initiate new treatment after Hurricane Katrina. The American Journal of Psychiatry, 165(1), 34–41. https://doi.org/10.1176/appi.ajp.2007.07030502

Wang, P. S., Lane, M., Olifson, M., Pincus, H. A., Wells, K. B., & Kessler, R. C. (2005). Twelve-month use of mental health services in the United States: Results from the National Comorbidity Survey Replication. Archives of General Psychiatry, 62(6), 629–640. https://doi.org/10.1001/archpsyc.62.6.629

Weathers, F., Litz, B., Herman, D., Huska, J. A., & Keane, T. (1993). The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility. San Antonio, TX: Annual Convention of the International Society for Traumatic Stress Studies.

Wells, J. E., Robins, L. N., Bushnell, J. A., Jarosz, D., & Oakley-Browne, M. A. (1994). Perceived barriers to care in St. Louis (USA) and Christchurch (NZ): Reasons for not seeking professional help for psychological distress. Social Psychiatry and Psychiatric Epidemiology, 29(4), 155–164.

Wetherell, J. L., Kaplan, R. M., Kallenberg, G., Dresselhaus, T. R., Sieber, W. J., & Lang, A. J. (2004). Mental health treatment preferences of older and younger primary care patients. The International Journal of Psychiatry in Medicine, 34(3), 219–233.

**How to cite this article:** Bevilacqua K, Schneider S, Rasul R, Taioli E, Schwartz RM. Engagement in linkage to mental health care program in the Rockaways after Hurricane Sandy. J Community Psychol. 2019;47:743–756. https://doi.org/10.1002/jcop.22150
APPENDIX

Demographic distribution of study sample and the Rockaway’s population based on 2015 census

| Variable  | Category       | Sample (%) | Population of Rockaways (%) |
|-----------|----------------|------------|----------------------------|
| Gender    | Male           | 45.9       | 45.26                      |
|           | Female         | 54.1       | 54.66                      |
| Race      | White          | 39.12      | 48.48                      |
|           | Black          | 52.72      | 38.33                      |
|           | Other          | 8.16       | 13.23                      |
| Ethnicity | Non-Hispanic   | 82.22      | 76.11                      |
|           | Hispanic       | 17.78      | 23.89                      |
| Education | < HS less      | 25.27      | 22.82                      |
|           | HS or more     | 74.73      | 77.18                      |

Note. HS = high school.
Rockaways population data based on the American Community Survey 2015 for Rockaways zip codes. Percents were weighted to represent the size of the population in each zip code. For gender and education, the population comprised residents aged 18 years or older. For race and ethnicity, the entire population was used.