

Study	Main Finding(s)	Health Policy Implications
<p><i>Under Review</i></p> <p>Lowe, S.R, Willis, M & Rhodes, J. (2013). Health Problems among Low-Income Parents in the Aftermath of Hurricane Katrina. Manuscript (under review).</p>	<p>The mental and physical health effects of exposure to traumatic events during the hurricane persist over time. More specifically, rates of physical illnesses rose sharply and persisted for several years after Hurricane Katrina, with migraines, headaches, and back problems more common than digestive problems. Indeed, the proportion of respondents experiencing migraines increased by nearly 40% over the four waves of data collection, from 16% at baseline to 54% at the second post-Katrina wave. Importantly, these rates are much higher than that of women in the general population (20%). Additionally, those who experienced more psychological distress were at higher risk of developing chronic health problems. Bereavement also significantly increased the odds of developing each problem, such that participants who experienced bereavement were 3.23 times more likely to develop migraines, 2.99 times more likely to develop digestive problems, and 2.50 times more likely to develop back</p>	<p>Besides mental health, disasters also take a significant toll on survivors' physical health for many years after the event. As such, crisis and post-disaster medical units should screen for physical health conditions in addition to psychological distress, especially among survivors who have experienced bereavement. Disaster survivors, in particular those from ethnic minority groups, might also be more likely to present with common physical health problems rather than psychological distress; by assessing health problems, practitioners might be able identify survivors at risk for psychological symptoms and in need of mental health services. Furthermore, since many survivors of disasters come into contact with service agencies (e.g., FEMA, non-profit organizations) after a disaster, the events might provide unique opportunities to detect latent health problems and to offer or refer to treatment. Stronger connections among services agencies and health providers are needed to facilitate appropriate referrals. The majority of low-income adults in the United States with health problems and serious mental illness do not receive adequate care (Wang, Demler, & Kessler, 2002; Young, Klap, Sherbourne, & Wells, 2001). Redressing the structural barriers that impede service use among this group is especially important (Miranda & Green, 1999).</p>

problems, respectively.

In Press

Lowe, S.R., Manove, E., & Rhodes, J., (in press). Posttraumatic Stress and Posttraumatic Growth Among Low-Income Mothers who Survived Hurricane Katrina. Journal of Consulting and Clinical Psychology.

Post Traumatic Stress (PTS), assessed at both one and three years after Hurricane Katrina, was significantly and positively associated with Post Traumatic Growth (PTG), assessed at three years post-disaster. Additionally, survivors with probable PTSD at each time point, as indicated by clinical cutoff scores, reported significantly higher levels of PTG. Also, women with higher pre-disaster distress had significantly higher post-disaster PTS.

Particularly in light of the persistent PTSD among many survivors, these results highlight the need for disaster preparedness efforts that minimize exposure to hurricane-related stressors, including plans for evacuation via public transportation, guidelines for what conditions necessitate a mandatory evacuation, and means for enforcing such mandates. Policies that ensure that adequate medical care and necessary medications are available during disasters might also prevent disaster-related fatalities and the psychological toll of bereavement. Efforts in the aftermath of disasters to connect survivors with affordable mental health services, particularly those with pre-existing mental health conditions and those who have faced high levels of hurricane exposure, would help to prevent posttraumatic stress reactions. Once affected survivors are identified, mental health practitioners should strive to employ culturally sensitive and empirically supported interventions to both reduce PTS and promote PTG. Meaning-making interventions would also enhance survivors' optimism and purpose, promoting positive psychological outcomes.

Lowe, S.R., & Rhodes, J. (in press). Trajectories of psychological distress among low-income, female survivors of Hurricane Katrina. American Journal of Orthopsychiatry.

Over half of the survivors' fit into a trajectory consistent with resilience; that is, they maintained low levels of psychological distress over the course of the study, but experienced an elevation in symptoms at the first pre-disaster time point followed by a return to pre-disaster levels by PK2. The other trajectories reflected a range of psychological responses to disasters, and indicated that pre-disaster functioning had a major influence on post-disaster

Pre-disaster levels of psychological distress had a clear influence on post-disaster psychological trajectories. Pre-disaster data provides insight into how natural disasters alter the developmental course of psychological symptoms, particularly if multiple data points have been collected. The results also provide support for group-based statistical approaches. Although a resilient trajectory represented the majority of the sample, there were clear subgroups of participants that deviated from this pattern. With traditional latent growth curve modeling, we would have overlooked participants with consistent distress and delayed responses, as well as those who experienced improvements in functioning in the post-disaster period. The psychological trajectories have implications for post-disaster clinical interventions. Slight elevations in psychological symptoms should be

psychological outcomes. Degree of exposure to hurricane-related stressors, social support, and socioeconomic status were significant predictors of trajectory group membership.

normalized, and communities exposed to disaster should be informed that these symptoms often occur in mild forms (e.g., with low levels of frequency and intensity) and, in most instances, dissipate over time. At the same time, psycho-educational interventions should provide information on what individuals can do in the event of more intense, persistent psychological symptoms. Additionally, the findings of the study demonstrate that not all survivors are equally vulnerable to post-disaster psychological distress, and suggest factors predictive of adverse reactions (e.g., higher pre-disaster psychological symptoms, lower social support). Screening for these factors could help practitioners identify survivors that might be in particular need of mental health services, to whom they could deploy empirically supported treatments, address grief responses to human and pet bereavement, and bolster social support networks. Disaster policies should likewise include measures for protecting individuals suffering from psychological distress from disaster exposure, including those ensuring timely evacuation, food and shelter during the storm and its aftermath, and access to medicine and medical care. Including means for evacuating pets and reuniting survivors with their animals could also protect against distressing symptoms. Lastly, policies that promote the long-term financial stability of low-income survivors, including diverse training and educational opportunities, increased earnings, affordable childcare, and enforcement of anti-discrimination laws, could help promote the long-term psychological adjustment of low-income

2013

**Chan, C. & Rhodes, J. (2013).
Disaster Exposure and its
Short- and Long-Term
Mental Health Impact on
Hurricane Katrina Survivors.
Manuscript in preparation.**

The six items most strongly associated with poor functioning were bereavement, property loss, pet loss, lack of food, lack of medicine, and not evacuating

Assessing just six disaster related stressors: survivors' bereavement, property loss, pet loss, food and medicine shortage, and evacuation status can predict whether or not a survivor develops probable PTSD as well as a more exhaustive list (i.e., 12 items) of disaster related stressors. More disaster studies should include these 6 items.

Lowe, S. R., Godoy, L.,

Exposure was associated with

The results suggest the importance of practices that bolster schools

Rhodes, J., & Carter, A. (2013). Predicting Mothers' Reports of Children's Mental Health Three Years after Hurricane Katrina. *Journal of Applied Developmental Psychology*, 34, 1, 17-27.

increased maternal psychological distress and increased school mobility in the first post-disaster year. Three years post-disaster, exposure was also associated with child's internalizing and externalizing symptoms indirectly, through their impact on maternal psychological distress.

and families' readiness for disasters. This might include additional means for reaching out to parents and tracking students in the aftermath of disasters, both to ensure that students are connected with new schools and to foster communication amongst students, teachers, counselors, and other school personnel during transitions. Students who maintain some connection to their former school might feel supported even as they enter a new school and community. To the extent possible, post-disaster policies should prioritize and facilitate temporary locations for damaged schools, and planning for their reconstruction. Policies that promote the long-term stability of low-income families, who are particularly likely to face a large number co-occurring stressors, in the aftermath of disasters would also protect against frequent school transitions and psychological distress (Yoshikawa et al., 2012). The results suggest that children who change schools frequently in the aftermath of disasters would be appropriate targets for mental health services. Routine screening of new students for mental health problems would help identify children in need, and identified children could receive counseling services during the school day. Schools represent an ideal setting for screening and the provision of psychological services for children in the aftermath of disasters, given that they are a common point of entry, provide services for children with mental health needs, and that they can serve as "nurturing environments." Given this role, schools could help foster prosocial behaviors and help to prevent mental health problems. Mental health services for low-income mothers in the aftermath of disasters could also offset the impact of disasters on the psychological functioning of children; practitioners could connect with mothers through their children's school or through religious communities, housing developments, social service agencies, and community health centers to provide support and advocacy. Finally, clinicians should take into account structural barriers that often prevent low-income mothers from receiving services, including lack of insurance, childcare, and transportation (Miranda & Green, 1999).

2012

Chan, C. S., Rhodes, J. E., & Perez, J. E. (2012). A prospective study of religiousness and psychological distress among female survivors of Hurricanes Katrina and Rita. American Journal of Community Psychology, 49, 168-181; Chan, C. & Rhodes, J. (in press). Religious coping, posttraumatic stress, psychological distress, and posttraumatic growth among female survivors four years after Hurricane Katrina. Journal of Traumatic Stress.

Pre-disaster religious involvement and faith were predictive of better post-disaster social resources, which, in turn, were associated with lower levels of psychological distress. Building on these findings, we examined the role of religious coping on post-hurricane outcomes. When the hurricane was interpreted as resulting from the wrath or punishment of God, or from demonic involvement then there was a higher risk for psychological disturbance. There was also a higher risk for psychological distress if the hurricane led to spiritual tension, questioning, or discontent. By contrast four years after Hurricane Katrina, positive religious coping was associated posttraumatic growth (PTG), above and beyond the protective effects of social support and optimism. Consistent with previous research, PTG was found to be strongly positively associated with symptoms of PTSD at the first follow-up wave.

Relief workers and mental health care providers should take note of the protective role of religion in the lives of survivors, and make efforts to restore faith-based organizations (e.g., to provide a place for and means to worship and practice one's faith); however they should also be aware of the potential risk that negative religious coping might pose for long-term symptomatology.

Lowe, S. R. & Rhodes, J. (2012). Community college re-enrollment after Hurricane Katrina. Journal of College Student Retention.

High levels of pre- and post-hurricane educational optimism were significant predictors of re-enrollment, as were lower post-hurricane psychological distress and

Particularly in light of the high attrition rates in community colleges (Summers, 2003), especially in two- and four-year community colleges in Louisiana (Southern Regional Education Board, 2003), it is noteworthy that a single item of educational optimism could significantly predict re-enrollment after the hurricane. Colleges

14, 229-251.

fewer post-hurricane hours employed. In addition, experiencing a greater number of moves since the hurricane was a marginally significant predictor of post-hurricane re-enrollment.

seeking to screen students at risk of dropping out might consider administering this item at various stages of their education. In addition to educational optimism, a few other variables emerged as significant predictors of re-enrollment. A marginally significant predictor of re-enrollment was the number of moves experienced between the hurricane and the post-hurricane assessment. This finding suggests that a lack of stable residence can be a major hindrance to re-enrollment. To counter the negative impact of frequent moves on re-enrollment after natural disasters, community college services, both in the affected area and in communities to which survivors have relocated, could connect students with resources related to housing and advocate on students' behalf if necessary. Residential instability might also be a proxy indicator of low psychosocial resources. In particular, displacement after a disaster is associated with greater depression and post-traumatic stress (Najarian et al., 2001), as well as lower socioeconomic status (Brodie et al., 2006). In non-disaster contexts, previous research has also found frequent moves to be associated with decreased tangible support and companionship (Magdol & Bessel, 2003), health declines (Larson, Bell & Young, 2004), and increases in psychological distress among women (Magdol, 2002). Number of moves, therefore, could be related to participants' access to psychosocial and economic resources that would enable them to reenroll in school after the hurricane. In a similar vein, participants' hours of employment were inversely related to their likelihood of community college re-enrollment. This, too, could be a proxy for socioeconomic status in the aftermath of Hurricane Katrina. Participants with lower economic resources may have been more likely to prioritize stable employment over returning to school. This might have been particularly the case for participants who were unable to navigate the bureaucracies that might help them to re-establish their lives. Community college personnel, in the affected area and elsewhere, should reach out to survivors of major stressors to provide them with information about

financial aid. Reduced tuition or scholarships to survivors could alleviate financial stress and thereby promote re-enrollment. Lastly, participants' psychological distress after Hurricane Katrina was a negative predictor of re-enrollment. This study adds to research connecting psychological distress and educational attainment and provides evidence that increased psychological distress after natural disasters can prevent adult survivors from re-engaging in their long-term goals. To offset the potential negative impact of psychological distress on educational attainment, community colleges could work to relocate former students and inform them of counseling services both on campus and in the community. This finding also provides support for well-advertised and affordable counseling services for natural disaster survivors.

Lowe, S., Green, G., & Rhodes (2012). What can multi-wave studies teach us about disaster research?: An analysis of low-income Hurricane Katrina survivors. Journal of Traumatic Stress, 25, 299-306.

Post-disaster cross-sectional estimates of the impact of traumatic stress exposure produce somewhat inflated estimates of disaster and social support effects.

Recovery efforts that fail to take into account pre-disaster mental health may overestimate the effects of the disaster.

Lowe, S. R., Rhodes, J., & Scoglio, A. (2012). Changes in Marital and Partner Relationships in the Aftermath of Hurricane Katrina: An Analysis of Low-Income Women. Psychology of Women Quarterly, 36, 286-300.

Many survivors reported external stressors following the hurricane including unemployment and prolonged separation, changes in their partner's perceived psychosocial functioning, and changes in the relationship process, particularly pertaining to relationship communication styles. Some survivors reported that the strain negatively impacted their relationships. Two of the forty

Survivors in the study were attuned to the negative impact of disaster-related stress on their partners' functioning (including increases in mental health symptoms as well as alcohol and substance use). In the aftermath of a hurricane, health care workers should be vigilant for spousal abuse. Financial as well as psychological problems following a large natural disaster can impact relationships and women's physiological well being. Increasing the financial stability of families by helping both men and women secure jobs may help mitigate some of these strains. However it is important to keep in mind that not all individuals will experience a hurricane as strain on their relationship, especially for those who are able to quickly find employment a hurricane may be seen as an opportunity for growth.

survivors also cited the strain resulting from Katrina as the instigating factor that led their partner to physically abuse them. With one participant stating that strain from the hurricane led her partner to drink and become abusive and another noting that financial strain from the hurricane led her to return to her abusive partner. However, other survivors reported that their relationships grew stronger (18 of 40) following the hurricane. Those who reported stronger relationships noted that following the hurricane they had experienced decreased their economic distress and that this in turn benefited their relationships. Respondents who reported stronger relationships also noted that the hurricane brought about a greater sense of perspective.

Healthcare workers should be careful not to assume that a natural disaster has led to relationship instability.

Paxson, C., Rhodes, J., Waters, M. & Fussell, E. (2012). Five Years Later: Recovery from Post Traumatic Stress and Psychological Distress Among Low-Income Mothers Affected by Hurricane Katrina. Social Science and Medicine, 74, 150-157.

Exposure to traumatic hurricane experiences (e.g. lack of food or water; not knowing where children were) and losses varied widely: 80.8% experienced home damage and 32.1% experienced the death of a friend or relative. By the second wave of data collection after Katrina (about 4 years after the hurricane), nearly 30% of our sample had levels of psychological distress high

Home damage has serious consequences for mental health, greatly increasing the risk of developing chronic post traumatic stress symptoms (PTSS), with or without psychological distress (PD). Fully 94% of those who had PTSS at the second follow-up had experienced home damage. The importance of home damage for PTSS may be due to the “secondary traumas” associated with the loss of community and the sometimes prolonged search for a new home (Gill 2007). These secondary traumas may have been more severe in the case of Hurricane Katrina, especially for low-income individuals. Another conclusion is that the effects of exposure to traumatic events during the hurricane on mental health have not faded over time.

enough to indicate probable mental illness. Although this represents a decline from the initially post hurricane prevalence rate of 36% (about 1 year after the hurricane), it is still substantially higher than the pre-hurricane prevalence rate of 24% (Rhodes, Chan, Paxson, Rouse, Waters, & Fussell, 2010). By the second wave of data collection symptoms of PTSD have also declined, but one third of the survivors still meet criteria of probable post-traumatic stress disorder. Factors associated with high levels of continuing symptoms of PTSD, especially in combination with psychological distress, include housing loss, traumatic experiences during the hurricane, and death of a family or friend

Although many individuals who experience PTSS and PD in the short run do recover, individuals exposed to trauma and loss continue to be at heightened risk of psychological problems long after the event is over. We found that pre-hurricane SES played a small role in protecting individuals from chronic mental health problems. This may be because higher-earning individuals may have been better positioned to find employment after the hurricane or to afford the costs of rebuilding or resettlement. Having social support was also protective against PD at the second follow-up.

2011

Lowe, S. R., Chan, C. S., & Rhodes. (2011). The impact of child-related stressors on the psychological functioning of lower-income mothers after Hurricane Katrina. *Journal of Family Issues*, 32, 1303-1324.

Lacking knowledge of a child's safety during the hurricanes was a significant predictor of heightened - psychological distress and PTSD, even after controlling for demographic variables, pre-disaster psychological distress, evacuation timing, and bereavement.

Given that separations from children were significantly predictive of postdisaster maternal mental health, systems that quickly reunite children with primary caregivers in the aftermath of disasters, including the National Emergency Child Locator Center within the National Center for Missing Children and FEMA's National Emergency Family Registry and Locator System, should be strengthened. Research and development grants to improve technologies that track missing children would be helpful in this regard (Shriver et al., 2009). Second, disaster preparedness should also include means to fulfill survivors' basic needs, including adequate shelter, food, and clothing (Madrid & Grant, 2008), which

was a primary concern of mothers in the current study. Structural barriers, including lack of adequate housing, transportation, employment and educational opportunities, and childcare, should also be addressed along- side psychological concerns. Likewise, policies that address structural barriers are needed to promote lower- income families' long-term stability and functioning. Additionally, disaster policies should increase readiness of health care facilities that serve children. Preparedness measures, such as evacuation medication packs, easily transferable immunization information systems, and electronic medical files, would protect against adverse physical and mental health outcomes among children, particularly those with chronic health conditions. Last, our findings suggest the need for expanded access to empirically supported, culturally competent, and developmentally appropriate mental health services in the aftermath of disasters (Weems, & Pina, 2009).

2010

Lowe, S. R., Chan, C. , & Rhodes, J. E. (2010). Pre-Hurricane social support protects against psychological distress: An analysis of young, low-income, predominantly African-American mothers. Journal of Consulting and Clinical Psychology. 78, 551-560.

Pre-disaster social support protects survivors against post-disaster psychological distress; this effect was mediated through its effects on pre-disaster psychological distress, exposure to hurricane-related stressors, and post-disaster social support.

Efforts to mobilize and fortify social support can help to attenuate individuals' exposure to natural disaster and reduce adverse outcomes in their aftermath. In addition to bolstering social support, specialized post-disaster mental health services should be made more available.

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American mothers. Journal of Consulting and Clinical Psychology. 78, 551-560.

Rhodes, J., Chan, C., Paxson, C., Rouse, C. E., Waters, M. & Fussell, E. (2010). The impact of Hurricane Katrina on the mental and physical health of low-income parents in New Orleans. American Journal of Orthopsychiatry, 80, 237-247.

support.

The prevalence of probable serious mental illness doubled, and nearly half of the respondents exhibited probable PTSD. Higher levels of hurricane-related loss and stressors were generally associated with worse health outcomes, controlling for baseline socio-demographic and health measures. Higher baseline resources predicted fewer hurricane-associated stressors, but the consequences of stressors and loss were similar regardless of baseline resources. Adverse health consequences of Hurricane Katrina persisted for a year or more, and were most severe for those experiencing the most stressors and loss. Additionally, higher personal income, more perceived social support, and ownership of a car predicted fewer hurricane-related stressors, but other resources, such as receipt of public benefits and mental and physical health, did not.

Affordable housing would help to promote the immediate safety as well as the long-term stability of fragile young families that are represented in this study. Likewise, the inclusion of women in the post-Katrina work force, both through the skills-training and enforcement of anti-discrimination laws, would help the survivors benefit from the influx of economic resources into the region. Educational resources and assistance are vitally needed to ensure that survivors can return to their educational goals.

Zwiebach, L., Rhodes, J., & Roemer, L. (2010). Resource loss, resource gain, and mental health among survivors of Hurricane

Losses of social and other resources (i.e. personal property, physical health) were significantly associated with post-disaster psychological stress (Zwiebach, Rhodes, &

Declines in physical and mental health are related; the importance of shoring up services for survivors in these two domains is paramount. Counseling interventions are needed to help restore hope and expectations for the future, as well as to minimize and manage the elevated stress resulting from natural disasters. Most of the

Katrina. Journal of Traumatic Stress, 23, 251-258

Roemer, 2010).

participants were single mothers, suggesting that timely intervention could offset problems in younger generations as well. Since many survivors of disasters come into contact with service agencies after a disaster, there may be unique opportunities to offer or refer to treatment. Finally, a priority of organizations working with disaster victims should be a focus on community-wide initiatives, attempting to preserve existing neighborhoods and social networks while fostering the formation of new social connections.

2009

Lowe, S.R., Rhodes, J., Zweibach, L., & Chan, C. (2009). The impact of pet loss on the perceived social support and psychological distress of Hurricane Survivors. Journal of Traumatic Stress, 22, 244-247.

Pet loss was a significant predictor of post-hurricane distress, particularly for those with less robust social networks.

In addition to effective local planning, more pet-friendly policies in emergency shelters and hotels are needed. Furthermore, coordinated community efforts to reunite pets with their owners are also needed. With implementation of these policies, we may be able prevent at least some of the difficulties experienced following a natural disaster.