From multiple perspectives, the current mental health concerns in the Gulf Coast communities began not on April 29, 2010, when BP’s Deepwater Horizon drilling rig exploded, but on August 29, 2005, when Hurricane Katrina hit much of the area now affected by the oil rig blowout. The impact of Hurricane Katrina on mental health reflected the enormity of the devastation, including destruction of the infrastructure, which resulted in a dramatic and tragic loss of an entire system of care: hospitals, clinics, doctors, nurses, and therapists, among others. During the past 5 years, an incomplete recovery has occurred, with mental health symptoms being persistent or easily reawakened.

After Hurricane Katrina, Kessler and colleagues, using a panel design with high retention rates, demonstrated an increase in frequency and severity of mental health symptoms, but a concomitant decrease in use of services and prescribed medications. The household needs assessment surveys created by the Centers for Disease Control and Prevention showed that half of adults still living in New Orleans after the hurricane experienced psychological distress. Surveys of first responders done by the Louisiana State University Health Sciences Center Department of Psychiatry trauma team from 2006–2009 found persistently elevated symptoms of posttraumatic stress disorder (PTSD) and depression, as well as increased use of alcohol and partner conflict. The same group, using the National Child Traumatic Stress Network Hurricane Assessment and Referral Tool, modified with school personnel for cultural sensitivity, completed more than 25,000 assessments on students between 2005 and 2010 returning to New Orleans, St Bernard, and Plaquemines Parish schools. Forty-five percent met the cut-off for mental health symptoms in 2005–2006, whereas the prevalence declined to 30% in 2006–2007; it has remained at that rate since. This has been attributed in part to the evacuation in 2008 for Hurricane Gustav; the economic recession; personal, family, and community complexities; and the persistent challenges of recovery from Katrina. Despite continued improvement, symptoms have remained elevated over expectable postdisaster levels. Complex or repeated traumatic experiences, such as those occurring prior to and resulting from Hurricane Katrina, can lead to increased vulnerability. The Center of the Developing Child at Harvard describes such traumatic experiences as toxic trauma. (http://developingchild.harvard.edu). Thus, mental health symptoms were still present when the Deepwater Horizon disaster occurred.

Mental Health Effects of the Gulf Oil Spill

MENTAL HEALTH DATA FROM PREVIOUS OIL SPILLS

Natural disasters like Katrina are not unique in traumatizing affected communities. In a community survey conducted 1 year after the 1989 Exxon Valdez oil spill in Alaska, Palinkas et al found a 2- to 3-fold increase in rates of anxiety disorder, PTSD, and depression among residents reporting a high level of exposure to the oil spill and subsequent cleanup efforts. Exposure was also associated with significantly increased rates of alcohol and substance use, domestic violence, and symptoms of chronic physical conditions, and a significant decline in social relationships. Commercial fishermen, Alaska Natives who relied on the region for subsistence activities, cleanup workers, and families and children were particularly vulnerable to these outcomes. Eight years after the spill, with survey data gathered using a quasi-experimental design, Picou and Arata reported elevated symptoms of depression, intrusive stress, avoidance, and family conflict. In a 2009 Minerals Management Service report, Picou et al described continuing economic losses for fishermen and support businesses; social conflict between those affected community members with different roles; declines in community cohesiveness; declines in a sense of safety of place and home; long-term uncertainties; loss of trust in responsible parties; continuing disruptions to families; feelings of hopelessness, betrayal, and anger; and increased prevalence of depression, anxiety, avoidance, PTSD, and alcohol and drug abuse. Continuing childhood problems included fear of being left alone and declines in school performance, both of which are expectable risk factors after disasters.

Similar patterns of increased anxiety and depression were noted in communities near the Sea Empress oil spill in Wales in 1996. Exposure was not related to anxiety or depression; however, concerns about health, financial issues, and perceived environmental risk were related to mental health symptoms. After the Prestige oil spill off the Galician coast in northwestern Spain in 2002, mental health findings were mixed. Overall, mental health scores were similar to a normative population. Mental health scores suggested that most difficulties were higher in people experiencing greater levels of exposure to the disaster. Individuals with high social support, satisfaction, and avoidant coping strategies had lower scores. In a preliminary white paper published after the Deepwater Horizon oil spill, Redlener and Abramson found that almost 20% of the parents reported that their children experienced either mental health or both mental health and physical health symptoms, which they attributed to the oil spill. Parents were more likely to report symptoms in their children in relation to the severity of exposure.

Although these findings suggest effects that are similar to those experienced after Hurricane Katrina and other natural disasters, oil spills bring with them a unique set of stressors. Unlike natural disasters, in which recovery can begin in a matter of hours after the events, oil spills persist for an extended time, sometimes even decades, as with the Exxon Valdez oil spill. The destruction of the ecosystem may last even longer, with significant effects on communities that rely on natural resources for...
their social, economic, and cultural livelihood.\textsuperscript{15} One of the most profound effects is the disruption of traditional networks of social support that communities rely upon to cope with this and other traumatic events. The prospect of ongoing litigation to extract compensation from corporations deemed responsible for the disaster only serves to prolong the trauma.

**METHODOLOGICAL CONCERNS**

Kessler and colleagues describe methodological challenges in implementing mental health needs assessments after disasters and have found that studies often reveal varying degrees of rigor in their assessments of disaster-related stressors and postdisaster mental health symptoms.\textsuperscript{16} Frequently, predisaster baseline data are not available, measures are not validated, studies are cross-sectional, and postdisaster sampling times miss important contributing variables. Masten and Osofsky\textsuperscript{17} and Pfefferbaum and North\textsuperscript{18} raise similar questions regarding child and adolescent assessments related to comparison studies and data based on parental reports rather than information obtained directly from children and adolescents. Galea et al\textsuperscript{19} discuss difficulties in defining, finding, and sampling populations. Raphael\textsuperscript{20} expands these concerns by describing the difficulties in comparing the results of studies related to different measures of exposure and mental health in disasters in addition to the diversity of population groups and of research approaches.

It is important to recognize that susceptibility to the mental health effects of disasters may be increased by a variety of factors, including extent of exposure, female gender, being middle aged, ethnicity or minority status, preexisting mental and physical health problems, and economic and psychosocial resources.\textsuperscript{21} As noted, the effects of the Deepwater Horizon disaster are likely to be influenced by the affected population, which is still recovering from Hurricane Katrina and other recent traumas.\textsuperscript{22–24} Research in the affected areas also must take into account the unique history and the potential strengths and vulnerabilities of ethnic and cultural minorities in the populations most affected by disaster (eg, Vietnamese fishing communities).\textsuperscript{25–27}

**GULF OIL SPILL MENTAL HEALTH NEEDS ASSESSMENT**

With funding from the Louisiana Department of Social Services, the Louisiana State University Health Sciences Center Department of Psychiatry is carrying out the mental health needs assessment of the parishes in the state most affected by the Deepwater Horizon disaster. The quantitative assessment, developed with consultations from stakeholders, local leaders, and state and national consultants, includes demographics (including Hurricane Katrina experiences, oil spill experiences and impact), physical health, mental health, substance use, anger and conflict, stressful experiences, quality of life, and impact on children.

In addition, since July, qualitative assessments have included fishermen and other community stakeholders. These assessments indicate that symptoms identified from prior research are already being observed, including suspiciousness and mistrust; the beginnings of dissension within communities; uncertainties about the future; anger, anxiety, and symptoms of generalized anxiety disorder; acute stress reactions with early symptoms of PTSD; increased use of alcohol, drugs, and cigarettes; more impatience and, at times, harsher behaviors toward children; and increased fighting and domestic violence. Many worry that symptoms will increase over time, for example, when BP-funded jobs are terminated, if tourists do not return to the region, or if oil industry jobs are lost as a result of the moratorium. Many also describe strengths and the desire to support programs that aid in building individual, family, and community resilience.

**SUMMARY AND CONCLUSIONS**

The Deepwater Horizon well has been capped, it is hoped, with long-term success. However, the mental health effects of the spill are far from over and are likely to endure. Whether the effects will be similar to those seen after other oil spills, especially the Exxon Valdez spill, is not known at this time. Furthermore, the early mental health symptoms that are being reported are consistent with those reported after the Exxon Valdez oil spill. In the BP event, many of the people most affected were still recovering from the severe devastation brought by Hurricane Katrina. Stakeholders and local leaders worry that the impact will increase substantially over time. In designing assessments and services it will be important to be sensitive to the many ethnic and cultural differences between and within communities, direct exposure, economic impact, and factors that have been supportive or divisive with other oil spills. It will also be important to be attentive to the interdependence of mental health and medical issues and concerns about possible toxicological effects. We need to continue to gain knowledge and use that information to benefit service availability and quality. Providers from all disciplines will need to be attentive to individual and family medical, mental health, substance abuse, and behavioral concerns/symptoms, especially if they have emerged or increased since the oil spill. Furthermore, resilience building and self-care will be extremely important for individuals, families, and communities. We stress that for providers, although the work is rewarding, it is difficult. Compassion fatigue and vicarious traumatization (at times referred to as secondary traumatic stress) are continuing concerns.\textsuperscript{15,28,29} For all providers, self-care, time off, and structured support should be built into their work. We know that much can be learned from the Gulf oil spill that can help those who have been affected by this disaster and that will be beneficial in preparing for oil spills that will, undoubtedly, occur in the future.

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