International Journal of Emergency Mental Health and Human Resilience, Vol. 17, No.1, pp. 234-238, ISSN 1522-4821

Assessing Community Reactions to Ebola Virus Disease and Other Disasters: Using Social Psychological Research to Enhance Public Health and Disaster Communications

Joseph A. Boscarino, PhD, MPH[1,2,3], Richard E. Adams, PhD[4]

[1]Center for Health Research, Geisinger Clinic, Danville, PA

[2]Department of Psychiatry, Temple University School of Medicine, Philadelphia, PA

[3]Departments of Medicine & Pediatrics, Mount Sinai School of Medicine, New York, NY

[4]Department of Sociology, Kent State University, Kent, OH

ABSTRACT: *Drawing on the lessons learned from previous disaster and disease outbreak studies over the past two decades, in the following article we review research related to social psychological assessment of community attitudes, knowledge, and beliefs associated with the recent Ebola outbreak and other public health threats, and discuss the use of this information to assist in future disaster planning and crisis communications. Psychologists, physicians, and others in the healthcare field need to be aware of these developments and involved with preparations related to mitigating the psychological impact of Ebola disease outbreaks among different populations, as well as other potential public health threats in the future.*

Key words: *Preparedness, risk communications, public health, disease outbreaks, disasters, bioterrorism, social psychology*

INTRODUCTION

Given the scope of the recent Ebola outbreak in West Africa, exportation of Ebola virus disease (EVD) to other parts of the world is likely to continue (Farrar & Piot, 2014; Toner, Adalja, & Inglesby, 2014). At this time, much is to be learned about EVD virology and epidemiology (Toner et al., 2014). Several metropolitan areas in the US serve as ports of entry for travelers from West Africa and have communities of immigrants who regularly travel to West Africa, as well as healthcare workers who travel to this region (Benowitz et al., 2014). In New York City (NYC) during November, 2014, several hundred persons believed to be exposed to the virus were being monitored by health department officials (Hartocollis, 2014). Many public health agencies have experience with controlling previous disease outbreaks, such as Severe Acute Respiratory Syndrome (SARS), measles, novel influenza strains with pandemic potential, Lyme disease, and more recently, Middle East Respiratory Syndrome (MERS) (Benowitz et al., 2014). Nevertheless, it is unclear how prepared the US and other countries are for a major outbreak of EVD (Farrar & Piot, 2014; Gostin, Hodge, & Burris, 2014). It has been noted that caring for patients with Ebola will be a challenge for most healthcare facilities (Kortepeter, Smith, Hewlett, & Cieslak, 2014). A recent survey of infectious disease prevention specialists in the US indicated that only 6% reported their facilities were prepared to receive EVD patients (Association for Professionals in Infection Control and Epidemiology, 2014). As in most large-scale disasters, the preparedness of healthcare systems and first-line healthcare professionals is typically an ongoing public health challenge (Loke, Fung, & Liu, 2013; Redlener & Reilly, 2012). Building on previous disaster experiences (Institute of Medicine and US Department of Health and Human Services, 2014), we review existing social psychological research related to assessing community attitudes, knowledge, and beliefs related to EVD and other potential public health threats, and discuss the use of this information to assist in future disaster planning and crisis communications.

*Correspondence regarding this article should be directed to: jaboscarino@geisinger.edu

OBJECTIVE

This review is based on previous research related to bioterrorism, the environmental health impact of major disasters, and disease outbreaks over the past two decades (Boscarino, 1988; Boscarino & DiClemente, 1996; Boscarino et al., 2003; Boscarino et al., 2004; Boscarino et al., 2006; Boscarino, Adams, & Figley, 2011; Boscarino et al., 2012; Boscarino et al., 2013; Galea et al., 2002). These events not only increase the public's concern about environmental health threats, but also have affected the psychological well-being of local populations. For example, research suggested that 11% of New York adults, approximately 700,000 persons, suffered a panic attack during the World Trade Center (WTC) attacks (Boscarino, Adams, & Figley, 2004). Other studies, conducted nationally and within the New York area following the WTC attacks, also reported widespread psychological distress (Schlenger et al., 2002; Silver et al., 2002). Findings related to the sudden occurrence of environmental health threats among other populations provide further evidence of the adverse psychological impact of such events, including the Tokyo Sarin gas attack (DiGiovanni, 1999; Ohbu et al., 1997), the Scud missile attacks in Israel during the Gulf War (Karsenty et al., 1991), and the West Nile virus outbreaks in the US (Covello, Peters, Wojtecki, & Hyde, 2001). The onset of psychogenic illnesses have often been reported following such events (Boscarino et al., 2013; Hallman et al., 2003; Wessely et al., 2001), and even a limited EVD outbreak would likely have a significant psychological impact, making public health management difficult (Boscarino et al., 2006; Foa et al., 2005). Consequently, to assist with community preparedness, we suggest that future research needs to be focused on the following objectives:

- Assessment of level of knowledge, attitudes, and beliefs in the community related to the perceived environmental health threat.
- Evaluation of community preparedness and evacuation planning, including perceptions of public safety and beliefs about quarantining.
- Identification of higher risk subgroups, including key demographic, socioeconomic, and psychosocial groups, which have less knowledge, are misinformed, and are poorly prepared for a major environmental health threat.
- Appraisal of urban versus rural locality, gender, income, education, race, ethnicity, and healthcare facility access, as these relate to beliefs, knowledge, misinformation, and disaster preparedness.
- Discovery of the most effective means to disseminate disaster information through local/regional communications, social networks, and public/professional release of results.

From a public health perspective, managing psychological reactions among the public after a major environmental threat, and even before it occurs, is important (Boscarino et al., 2012; DiGiovanni, 1999; Glass & Schoch-Spana, 2002). Despite this realization, most of the public health preparedness activities to date have focused on the technological and biomedical aspects of these events, not the psychological impact (Bravata et al., 2002; Committee on R&D Needs for Improving Civilian Medical Response to Chemical and Biological Terrorism Incidents, 1999; Keim & Kaufmann, 1999; US Department of Homeland Security, 2014). To examine the social psychological aspects of bioterrorism threats in New York following the WTC attacks a decade ago, we studied a random sample of nearly 1,700 adult residents (Boscarino, Adams, Figley et al., 2006). We found that 45% of these residents were concerned about future attacks and that nearly 20% reported a fear level of "10" on a 10-point analog fear scale. In addition, while 43% indicated that they would wait for evacuation instructions following a chemical, biological, or nuclear event, 34.4% (95% C.I. = 31.5-37.3) reported that they would evacuate immediately without instructions from health or police department officials, actions that might result in greater civilian casualties. In this WTC study, predictors of higher fear levels included Hispanic ethnicity (odds ratio [OR]=2.0, p=0.006), lower levels of education (OR=4.4, p<0.001, and OR=3.7, p<0.001, respectively, for non-high school and high school graduates, compared to college graduates), being exposed to recent stressful life events (OR=1.6, p=0.048), having posttraumatic stress disorder (OR=3.1, p<0.001), having a high fear of death (OR=2.5, p=0.002), and reporting a high likelihood of fleeing an event against official advice (OR=1.5, p=0.034) (Boscarino, Adams, Figley et al., 2006). In 2013, we reported that 6 months following Hurricane Sandy at the New Jersey Shore, 48% of area local residents reported major environment health concerns and those who had these concerns were more likely to have psychological problems, including posttraumatic stress disorder and depression, and/or to have sought mental health treatment (Boscarino et al., 2013). Thus, previous research suggests that better understanding of the public's perception of health threats is important for efficient preparedness planning, risk communications, and disaster management (Boscarino et al., 2003; Boscarino et al., 2006; Boscarino et al., 2013; Covello et al., 2001; Foa et al., 2005).

We note that past disaster research findings are consistent with terror management theory, a social psychological concept, which suggests that a key to understanding reactions to environmental threats is understanding of the fear of death (Pyszczynski, Greenberg, & Solomon, 1999; Strachan et al., 2007). Similar to stress-process theory (Adams & Boscarino, 2005; Adams & Boscarino, 2011; Boscarino et al., 2014), this fear is affected by social factors, level of education, self-esteem, and social support -- factors responsible for buffering individuals against traumatic episodes and the subsequent adverse cognitive processes associated with these events (Boscarino & Figley, 2012; Pyszczynski et al., 1999; Strachan et al., 2007). It is noted that our New York terrorism study found that residents had the greatest level of trust in disaster evacuation information provided by local police and fire department officials (69%) (Boscarino et al., 2003). This was followed by trust in information from their private doctors (59%), state health department officials (53%), US government officials (49%), and friends and neighbors (41%) (Boscarino et al., 2003). Interestingly, residents had the least trust (17%) in evacuation information provided by health insurance companies or managed care plans, an important public health revelation at the time, suggesting that different risk communication strategies should be deployed (Boscarino et al., 2003).

Given the threat to public health and the possible adverse impact on healthcare delivery systems, community interventions should be planned and implemented, including community surveys, workplace and family-based education and public service announcements (Engel & Katon, 1999; Foa et al., 2005), as well as provider-focused interventions (Adams et al., 2013; Gershon et al., 2004; Hu et al., 2006). Post-event health surveillance also should be planned in the aftermath of a major event or disease outbreak (Boscarino et al., 2012; Boscarino et al., 2014; Engel & Katon, 1999; Foa et al., 2005). Drawing on past experiences, it has been suggested that public education and communication can reduce or limit adverse population reactions (Covello et al., 2001; Foa et al., 2005). It has been previously suggested that "risk communication" can have the effect of not only reducing fear, but also promoting self-protecting behaviors (e.g., stockpiling emergency supplies, planning escape routes), building trust, and preventing the spread of misinformation (Covello et al., 2001; Foa et al., 2005). Without these efforts, vulnerable persons and groups may increase the level of social disruption in the community (Boscarino et al., 2003; Boscarino, Adams, Figley et al., 2006). The nature of these threats makes both media coverage and risk communications critical, warranting disaster planning considerations (Foa et al., 2005; North & Pfefferbaum, 2002). It has been noted that a particular challenge with new disease outbreaks, such as EVD, is that much of the medical science is still unknown at the time the disease emerges (Rosenbaum, 2014). Consequently, risk communications would need to incorporate this uncertainty, not ignore it, much like meteorologists do in forecasting extreme weather events using various "warning systems," such as with hurricanes or tornados (Rosenbaum, 2014). Of course, this was the same challenge with the outbreak of HIV disease in the 1980s (Boscarino, 1988; Boscarino & DiClemente, 1996). Interestingly, our WTC disaster study indicated that simple, worksite crisis interventions offered by NYC employers immediately after the WTC attacks were effective in reducing a number of mental health problems post-disaster, including binge drinking, depression, PTSD severity, and anxiety symptoms (Boscarino, Adams, & Figley, 2005; Boscarino, Adams, Foa et al., 2006), clearly a positive public health finding.

RESEARCH METHODS

Much of our past disaster research was based on random community surveys of household adults in the affected disaster areas (Adams & Boscarino, 2006; Adams, Boscarino, & Galea, 2006; Boscarino et al., 2003; Boscarino et al., 2004; Boscarino, Adams, Figley et al., 2006; Boscarino et al., 2013; Galea et al., 2002). These household population surveys were typically stratified geographically

with the population sampled proportionately. At least one follow-up survey is also recommended, if research funds are available. For the follow-up surveys, typically, the investigator attempts to re-interview the participants 6-12 months after the baseline survey. For both baseline and follow-up surveys, trained interviewers using a computer-assisted telephone interviewing (CATI) system are preferred. In-person and mailed surveys are also sometimes feasible (Freedy, Kilpatrick, & Resnick, 1993), but telephone surveys have several key advantages (Groves et al., 2009). Generally, the duration of these surveys would be about 30-40 minutes for a baseline survey and about 20-30 minutes for a follow-up survey. For both surveys, sampling weights would normally be developed to correct for potential selection bias (Boscarino et al., 2004; Boscarino, Adams, Figley et al., 2006; Boscarino & Adams, 2009; Boscarino et al., 2011). The goal should be to complete at least 600-800 interviews, in order to have sufficient statistical power to test specific hypotheses and to allow for analyses of important subgroups (Boscarino et al., 2004; Hulley et al., 2013). One of the limitations of the telephone survey, however, is the cost (Groves et al., 2009). These studies can be expensive to conduct, depending on the sample size, length of the interview, and the use incentives to increase participation (Groves et al., 2009). As a result, other methods for data collection are sometimes used, generally considered more qualitative, such as focus groups and on-line internet surveys (Groves et al., 2009). The other chief method used in public health disaster research is the post-disaster research registry (Institute of Medicine and US Department of Health and Human Services, 2014; Jordan et al., 2011; North et al., 1999). Registries are disease surveillance systems chiefly developed by epidemiologists to track disease outcomes over time (Rothman, Greenland, & Lash, 2012). One of the more well known of these post-disaster registries is the World Trade Center Disaster Registry (Institute of Medicine and US Department of Health and Human Services, 2014; Jordan et al., 2011). Another one is the World Trade Center Responder Registry (Pietrzak et al., 2014). However, regardless of the methodology used, it is extremely important for investigators to use reliable and validated research instruments in data collection (Boscarino et al., 2003; Boscarino et al., 2004; Boscarino, Adams, Figley et al., 2006; Boscarino et al., 2013; Boscarino et al., 2014; Galea et al., 2002). If not, data issues may confound the study results for years afterwards (Dohrenwend et al., 2006; Kilpatrick, 2007). Finally, studies of healthcare professional and first responders are also important for disaster planning and may warrant special research considerations (Adams, Figley, & Boscarino, 2008; Boscarino, Figley, & Adams, 2004).

CONCLUSION

Given current threats and emerging knowledge related to both environmental and human-made disasters, we think that interventions should be considered, including community, workplace and family-based programs and public service announcements, based on new and existing research (Boscarino, Adams, Figley et al., 2006; Boscarino et al., 2012; Boscarino et al., 2014; Engel & Katon, 1999; Foa et al., 2005). Post-event health surveillance also should be planned in the aftermath of major incidents. The World Trade Center Disaster Registry is one of the more well known of these approaches (Institute of Medicine and US Department of Health and Human Services, 2014; Jordan et al., 2011). Drawing on past experiences, it has been suggested that public education and communication can reduce adverse population outcomes (Boscarino et al., 2013; Covello et al., 2001; Foa et al., 2005). It has been previously suggested that effective "risk communication" can have the effect of not only reducing fear, but also promoting self-protecting behaviors, and preventing misinformation (Boscarino, Adams, Figley et al., 2006; Covello et al., 2001; Foa et al., 2005). Without these efforts, vulnerable persons, including the elderly and the disabled, might increase social disruptions and the burden of healthcare utilization in the community (Boscarino et al., 2003; Boscarino et al., 2014). The very nature of these threats make media coverage, risk communications, and social media critical, warranting advanced disaster planning considerations (Boscarino, Adams, Figley et al., 2006; Boscarino et al., 2014; Foa et al., 2005). As suggested, our post-WTC study indicated that simple, workplace "psycho-educational" interventions offered by NYC employers after the WTC disaster were highly effective in reducing future mental health problems among employees, including significant reductions in anxiety symptoms (Boscarino et al., 2005; Boscarino, Adams, Foa et al., 2006; Boscarino et al., 2011), clearly a positive public health finding.

In summary, while there is concern related to adverse events following the outbreak of EVD and gaps in knowledge currently exist, the research tools needed to mitigate the impact of these threats are available (Boscarino, Adams, Figley et al., 2006; Boscarino et al., 2014; Engel & Katon, 1999; Foa et al., 2005). Psychologists, physicians, and others in the public health sector need to be aware of these developments and become more involved with preparations related to the psychosocial mitigation of disease outbreaks, and other public health threats in the future.

Source of Funding

Supported in part by grants from the National Institute of Mental Health (Grant # R01-MH-066403 and R21-MH-086317) and Pennsylvania Department of Health (Contract # 4100042573), Boscarino PI.

Acknowledgements

The assistance of Joseph J. Boscarino, Department of Psychology, Ramapo College, Mahwah, NJ, is gratefully acknowledged in the preparation of this manuscript.

REFERENCES

Adams, R. E., & Boscarino, J. A. (2005). Stress and well-being in the aftermath of the World Trade Center attack: The continuing effects of a communitywide disaster. Journal of Community Psychology, 33, 175-190. doi:10.1002/jcop.20030

Adams, R. E., & Boscarino, J. A. (2006). Predictors of PTSD and delayed PTSD after disaster: The impact of exposure and psychosocial resources. The Journal of Nervous and Mental Disease, 194, 485-493. doi:10.1097/01.nmd.0000228503.95503.e9

Adams, R. E., & Boscarino, J. A. (2011). A structural equation model of perievent panic and posttraumatic stress disorder after a community disaster. Journal of Traumatic Stress, 24, 61-69. doi:10.1002/jts.20603; 10.1002/jts.20603

Adams, R. E., Boscarino, J. A., & Galea, S. (2006). Social and psychological resources and health outcomes after the World Trade Center disaster. Social Science & Medicine (1982), 62, 176-188. doi:10.1016/j.socscimed.2005.05.008

Adams, R. E., Figley, C. R., & Boscarino, J. A. (2008). The compassion fatigue scale: Its use with social workers following urban disaster. Research on Social Work Practice, 18, 238-250. doi:10.1177/1049731507310190

Adams, R. E., Laraque, D., Chemtob, C. M., Jensen, P. S., & Boscarino, J. A. (2013). Does a one-day educational training session influence primary care pediatricians' mental health practice procedures in response to a community disaster? Results from the Reaching Children Initiative (RCI). International Journal of Emergency Mental Health, 15, 3-14.

Association for Professionals in Infection Control and Epidemiology. (2014). APIC Ebola Readiness Poll: Results of an Online Poll of Infection Preventionists. Washington, DC: Association for Professionals in Infection Control and Epidemiology (APIC).

Benowitz, I., Ackelsberg, J., Balter, S. E., Baumgartner, J. C., Dentinger, C., Fine, A. D., et al. (2014). Surveillance and preparedness for Ebola Virus Disease -- New York City, 2014. MMWR.Morbidity and Mortality Weekly Report, 63(41), 934-936. doi:mm6341a5 [pii]

Boscarino, J. A. (1988). Surveying the public's attitudes on AIDS. Health Care Strategic Management, 6(6), 14-17.

Boscarino, J. A., & Adams, R. E. (2009). PTSD onset and course following the World Trade Center disaster: Findings and implications for future research. Social Psychiatry and Psychiatric Epidemiology, 44, 887-898. doi:10.1007/s00127-009-0011-y

Boscarino, J. A., Adams, R. E., & Figley, C. R. (2004). Mental health service use 1-year after the World Trade Center disaster: Implications for mental health care. General Hospital Psychiatry, 26, 346-358. doi:10.1016/j.genhosppsych.2004.05.001

Boscarino, J. A., Adams, R. E., & Figley, C. R. (2005). A prospective cohort study of the effectiveness of employer-sponsored crisis interventions after a major disaster. International Journal of Emergency Mental Health, 7, 9-22.

Boscarino, J. A., Adams, R. E., & Figley, C. R. (2011). Mental health service use after the world trade center disaster: Utilization trends and comparative effectiveness. The Journal of Nervous and Mental Disease, 199, 91-99. doi:10.1097/NMD.0b013e3182043b39

Boscarino, J. A., Adams, R. E., Figley, C. R., Galea, S., & Foa, E. B. (2006). Fear of terrorism and preparedness in New York City 2 years after the attacks: Implications for disaster planning and research. Journal of Public Health Management and Practice, 12, 505-513. doi:00124784-200611000-00002 [pii]

Boscarino, J. A., Adams, R. E., Foa, E. B., & Landrigan, P. J. (2006). A propensity score analysis of brief worksite crisis interventions after the World Trade Center disaster: Implications for intervention and research. Medical Care, 44, 454-462. doi:10.1097/01.mlr.0000207435.10138.36 [doi]; 00005650-200605000-00010 [pii]

Boscarino, J. A., & DiClemente, R. J. (1996). AIDS knowledge, teaching comfort, and support for AIDS education among school teachers: A statewide survey. AIDS Education and Prevention, 8, 267-277.

Boscarino, J. A., & Figley, C. R. (2012). Understanding the neurobiology of fear conditioning and emergence of posttraumatic stress disorder psychobiology: Commentary on Blanchard et al. The Journal of Nervous and Mental Disease, 200, 740-744. doi:10.1097/NMD.0b013e318266b5ea; 10.1097/NMD.0b013e318266b5ea

Boscarino, J. A., Figley, C. R., & Adams, R. E. (2003). Fear of terrorism in New York after the September 11 terrorist attacks: Implications for emergency mental health and preparedness. International Journal of Emergency Mental Health, 5, 199-209.

Boscarino, J. A., Figley, C. R., & Adams, R. E. (2004). Compassion fatigue following the September 11 terrorist attacks: A study of secondary trauma among New York City social workers. International Journal of Emergency Mental Health, 6, 57-66.

Boscarino, J. A., Galea, S., Adams, R. E., Ahern, J., Resnick, H., & Vlahov, D. (2004). Mental health service and medication use in New York City after the September 11, 2001, terrorist attack. Psychiatric Services, 55, 274-283.

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, 107-120. doi:10.5055/ajdm.2014.0147 [doi]

Boscarino, J. A., Hoffman, S. N., Kirchner, H. L., Erlich, P. M., Adams, R. E., Figley, C. R., & Solhkhah, R. (2013). Mental health outcomes at the Jersey Shore after Hurricane Sandy. International Journal of Emergency Mental Health, 15, 147-158.

Boscarino, J. A., Kirchner, H. L., Hoffman, S. N., & Sartorius, J. (2012). Use of the New York PTSD risk score to predict PTSD: Current and future research efforts. General Hospital Psychiatry, 34, 317-319. doi:10.1016/j.genhosppsych.2012.01.00510.1016/j.genhosppsych.2012.01.005

Boscarino, J. A., Kirchner, H. L., Hoffman, S. N., Sartorius, J., Adams, R. E., & Figley, C. R. (2012). The New York PTSD risk score for assessment of psychological trauma: Male and female versions. Psychiatry Research, 200(2-3), 827-834. doi:10.1016/j.psychres.2012.04.022; 10.1016/j.psychres.2012.04.022

Bravata, D. M., McDonald, K., Owens, D. K., Buckeridge, D., Haberland, C., Rydzak, C., et al. (2002). Bioterrorism Preparedness and Response: Use of Information Technologies and Decision Support Systems. Summary, Evidence Report/Technology Assessment: Report Number 59. Agency for Healthcare Research and Quality, Rockville, MD.

Committee on R&D Needs for Improving Civilian Medical Response to Chemical and Biological Terrorism Incidents. (1999). Chemical and Biological Terrorism: Research and Development to Improve Civilian Medical Response. Washington, DC: National Academy Press. doi:NBK230677 [bookaccession]

Covello, V. T., Peters, R. G., Wojtecki, J. G., & Hyde, R. C. (2001). Risk communication, the West Nile Virus epidemic, and bioterrorism: Responding to the communication challenges posed by the intentional or unintentional release of a pathogen in an urban setting. Journal of Urban Health, 78, 382-391.

DiGiovanni, C., Jr. (1999). Domestic terrorism with chemical or biological agents: Psychiatric aspects. The American Journal of Psychiatry, 156, 1500-1505.

Dohrenwend, B. P., Turner, J. B., Turse, N. A., Adams, B. G., Koenen, K. C., & Marshall, R. (2006). The psychological risks of Vietnam for U.S. veterans: A revisit with new data and methods. Science, 313(5789), 979-982. doi:10.1126/science.1128944

Engel, C. C., & Katon, W. J. (1999). Population and need-based prevention of unexplained physical symptoms in the community. In L. M. Joellenbeck, P. K. Russell & S. B. Guze (Eds.), Strategies to Protect the Health of Deployed US Forces: Medical Surveillance, Record-keeping, and Risk Reduction (pp. 173-212). Washington, DC: National Academy Press.

Farrar, J. J., & Piot, P. (2014). The Ebola emergency--immediate action, ongoing strategy. The New England Journal of Medicine, 371, 1545-1546. doi:10.1056/NEJMe1411471 [doi]

Foa, E. B., Cahill, S. P., Boscarino, J. A., Hobfoll, S. E., Lahad, M., McNally, R. J., & Solomon, Z. (2005). Social, psychological, and psychiatric interventions following terrorist attacks: Recommendations for practice and research. Neuropsychopharmacology, 30, 1806-1817. doi:10.1038/sj.npp.1300815

Freedy, J. R., Kilpatrick, D. G., & Resnick, H. S. (1993). Natural disasters and mental health: Theory, assessment, and intervention. Journal of Social Behavior and Personality, 8, 49-103.

Galea, S., Ahern, J., Resnick, H., Kilpatrick, D., Bucuvalas, M., Gold, J., & Vlahov, D. (2002). Psychological sequelae of the September 11 terrorist attacks in New York City. The New England Journal of Medicine, 346, 982-987. doi:10.1056/NEJMsa013404

Gershon, R. R., Qureshi, K. A., Sepkowitz, K. A., Gurtman, A. C., Galea, S., & Sherman, M. F. (2004). Clinicians' knowledge, attitudes, and concerns regarding bioterrorism after a brief educational program. Journal of Occupational and Environmental Medicine, 46, 77-83. doi:10.1097/01.jom.0000105903.25094.e6 [doi]

Glass, T. A., & Schoch-Spana, M. (2002). Bioterrorism and the people: How to vaccinate a city against panic. Clinical Infectious Diseases, 34, 217-223. doi:CID011333 [pii]

Gostin, L. O., Hodge, J. G., & Burris, S. (2014). Is the United States prepared for Ebola? JAMA, *312,* 2497-2498. doi:10.1001/jama.2014.15041 [doi]

Groves, R. M., Fowler, F. J., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2009). Survey Methodology, Second Edition. New York, NY: Wiley.

Hallman, W. K., Kipen, H. M., Diefenbach, M., Boyd, K., Kang, H., Leventhal, H., & Wartenberg, D. (2003). Symptom patterns among Gulf War registry veterans. American Journal of Public Health, 93, 624-630.

Hartocollis, A. (2014). With persistence and phone calls, defending against Ebola. The New York Times, New York Edition, November, 11, pp. A20.

Hu, Y. Y., Adams, R. E., Boscarino, J. A., & Laraque, D. (2006). Training needs of pediatricians facing the environmental health and bioterrorism consequences of September 11th. The Mount Sinai Journal of Medicine, 73, 1156-1164.

Hulley, S. B., Cummings, S. R., Browner, W. S., Grady, D. G., & Newman, T. B. (2013). Designing Clinical Research (Fourth ed.). Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins.

Institute of Medicine and US Department of Health and Human Services. (2014). Enabling Rapid and Sustainable Public Health Research During Disasters. Washington, DC: National Academies Press.

Jordan, H. T., Miller-Archie, S. A., Cone, J. E., Morabia, A., & Stellman, S. D. (2011). Heart disease among adults exposed to the September 11, 2001 World Trade Center disaster: Results from the World Trade Center Health Registry. Preventive Medicine, 53, 370-376. doi:10.1016/j.ypmed.2011.10.014

Karsenty, E., Shemer, J., Alshech, I., Cojocaru, B., Moscovitz, M., Shapiro, Y., & Danon, Y. L. (1991). Medical aspects of the Iraqi missile attacks on Israel. Israel Journal of Medical Sciences, 27(11-12), 603-607.

Keim, M., & Kaufmann, A. F. (1999). Principles for emergency response to bioterrorism. Annals of Emergency Medicine, 34, 177-182. doi:S0196064499002371 [pii]

Kilpatrick, D. G. (2007). Confounding the critics: the Dohrenwend and colleagues reexamination of the National Vietnam Veteran Readjustment Study. Journal of Traumatic Stress, 20, 487-493. doi:10.1002/jts.20262

Kortepeter, M. G., Smith, P. W., Hewlett, A., & Cieslak, T. J. (2014). Caring for patients with Ebola: A challenge in any care facility. Annals of Internal Medicine, doi:10.7326/M14-2289 [doi] (in press).

Loke, A. Y., Fung, W. M., & Liu, X. (2013). Mainland China nurses' willingness to report to work in a disaster. American Journal of Disaster Medicine, 8, 273-282. doi:10.5055/ajdm.2013.0134 [doi]

North, C. S., Nixon, S. J., Shariat, S., Mallonee, S., McMillen, J. C., Spitznagel, E. L., & Smith, E. M. (1999). Psychiatric disorders among survivors of the Oklahoma City bombing. JAMA, 282, 755-762.

North, C. S., & Pfefferbaum, B. (2002). Research on the mental health effects of terrorism. JAMA, 288, 633-636. doi:jed20044 [pii]

Ohbu, S., Yamashina, A., Takasu, N., Yamaguchi, T., Murai, T., Nakano, K., et al. (1997). Sarin poisoning on Tokyo subway. Southern Medical Journal, 90, 587-593.

Pietrzak, R. H., Feder, A., Singh, R., Schechter, C. B., Bromet, E. J., Katz, C. L., et al. (2014). Trajectories of PTSD risk and resilience in World Trade Center responders: An 8-year prospective cohort study. Psychological Medicine, 44, 205-219. doi:10.1017/S0033291713000597 [doi]

Pyszczynski, T., Greenberg, J., & Solomon, S. (1999). A dual-process model of defense against conscious and unconscious death-related thoughts: An extension of terror management theory. Psychological Review, 106, 835-845.

Redlener, I., & Reilly, M. J. (2012). Lessons from Sandy--preparing health systems for future disasters. The New England Journal of Medicine, 367, 2269-2271. doi:10.1056/NEJMp1213486; 10.1056/NEJMp1213486

Rosenbaum, L. (2015). Communicating uncertainty - Ebola, public health, and the scientific process. The New England Journal of Medicine, *372*, 7-9. doi:10.1056/NEJMp1413816 [doi]

Rothman, K. J., Greenland, S., & Lash, T. L. (2012). Modern Epidemiology, Third Edition. Philadelphia: Lippincott Williams & Wilkins.

Schlenger, W. E., Caddell, J. M., Ebert, L., Jordan, B. K., Rourke, K. M., Wilson, D., et al. (2002). Psychological reactions to terrorist attacks: findings from the National Study of Americans' Reactions to September 11. JAMA, 288, 581-588. doi:joc20110 [pii]

Silver, R. C., Holman, E. A., McIntosh, D. N., Poulin, M., & Gil-Rivas, V. (2002). Nationwide longitudinal study of psychological responses to September 11. JAMA, 288, 1235-1244. doi:joc21181 [pii]

Strachan, E., Schimel, J., Arndt, J., Williams, T., Solomon, S., Pyszczynski, T., & Greenberg, J. (2007). Terror mismanagement: evidence that mortality salience exacerbates phobic and compulsive behaviors. Personality & Social Psychology Bulletin, 33, 1137-1151. doi:0146167207303018 [pii]

Toner, E., Adalja, A., & Inglesby, T. (2014). A primer on Ebola for clinicians. Disaster Medicine and Public Health Preparedness. doi:S1935789314001153 [pii] (in press).

US Department of Homeland Security. (2014). National Preparedness Report, March 30, 2014. Washington, DC: US Department of Homeland Security.

Wessely, S., Hyams, K. C., & Bartholomew, R. (2001). Psychological implications of chemical and biological weapons. BMJ, 323(7318), 878-879.