An Investigation of the Psychological Effects of the September 11, 2001, Attacks on New York City: Developing and Implementing Research in the Acute Postdisaster Period

By Sandro Galea, MD, MPH, David Vlahov, PhD, Heidi Resnick, PhD, Dean Kilpatrick, PhD, Michael J. Bucuvalas, PhD, Mark D. Morgan, and Joel Gold, MD

ABSTRACT

The September 11, 2001, attack on New York City was the largest human-made disaster in United States history. In the first few days after the attack, it became clear that the scope of the attacks (including loss of life, property damage, and financial strain) was unprecedented and that the attacks could result in substantial psychological sequelae in the city population. Researchers at the Center for Urban Epidemiologic Studies at the New York Academy of Medicine designed and implemented an assessment of the mental health of New Yorkers 5–8 weeks after the attacks. To implement this research in the immediate postdisaster period, researchers at the center had to develop, in a compressed time interval, new academic collaborations, links with potential funders, and unique safeguards for study respondents who may have been suffering from acute psychological distress. Results of the assessment contributed to a New York state mental health needs assessment that secured Federal Emergency Management Agency funding for mental health programs in New York City. This experience suggests that mechanisms should be in place for rapid implementation of mental health assessments after disasters.

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INTRODUCTION

The September 11, 2001, terrorist attacks on the World Trade Center (WTC) in New York City (NYC) were unprecedented in scope in the United States. Approximately 3,000 people were killed in the attacks, 18 times more people than died in the Oklahoma City bombing, previously the largest terrorist attack on US soil.[1,2] The days that followed September 11th were characterized by shock at the magnitude of the damage incurred. Early estimates of the number of people who died varied widely, with official estimates rising to over 6,000.[3] In the weeks following the attacks, federal law enforcement officials issued repeated warnings about the potential for other terrorist attacks. Letters containing anthrax were received by media companies in NYC and elsewhere, resulting in illness and death among reporters, postal service employees, and members of the general public.[4,5]

Compounding the general mood of uncertainty and fear, large parts of NYC suffered service disruptions and other inconveniences as a result of the attack. Phone service was down for many residents of Manhattan; mail delivery was cancelled after anthrax became a concern; and transportation disruptions, including subway stoppages and changes in driving regulations, affected commuter patterns throughout the surrounding metropolitan area.

In the immediate aftermath of the attack, healthcare personnel were mobilized to provide care to those injured and affected by the attacks. Mental health clinicians began assisting families of the deceased, rescue personnel who were working at the disaster site, and eventually, to residents of NYC at large.

The New York State Psychiatric Institute (NYSPI) began working with the Substance Abuse and Mental Health Services Administration to prepare a mental-health needs

Dr. Galea is medical epidemiologist at, and Dr. Vlahov is director of, the Center for Urban Epidemiologic Studies at the New York Academy of Medicine in New York City. Dr. Resnick is psychologist at, and Dr. Kilpatrick is director of, the National Crime Victims' Research and Treatment Center, Medical University of South Carolina in Charleston. Dr. Bucuvalas is senior partner, and Mr. Morgan is vice president, with the research firm Schulman, Ronca, and Bucuvalas. Dr. Gold is research fellow at the Center for Urban Epidemiologic Studies and attending psychiatrist at Bellevue Hospital Center in New York City.

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Please direct all correspondence to: Sandro Galea, MD, MPH, Center for Urban Epidemiologic Studies, New York Academy of Medicine, 1216 Fifth Ave, New York, NY 10029; Tel: 212-822-7378; Fax: 212-876-6220; E-mail: sgalea@nyam.org.

assessment that could be used as part of an application for Federal Emergency Management Agency (FEMA) funding for mental health services.[6] In its early stages, the assessment began to draw on published research. Previous postdisaster research suggested there would be substantial psychological consequences, primarily posttraumatic stress disorder (PTSD) and depression, among those directly affected by the attacks (eg, relatives of the deceased, people who had been injured in the attacks, or those who were in the WTC buildings).[7-9] However, previous research also suggested that significant psychological sequelae were observed in the general population after human-made disasters resulted in widespread property damage, extensive loss of life, or long-term financial strain.[10,11] The September 11th attacks met all these criteria; as such, it was anticipated that the scope of mental health problems in NYC would be substantial and extend beyond the direct victims of the attacks. A survey carried out 3–5 days after September 11th by a research team in California found that 44% of adults nationwide had substantial symptoms of stress after the attacks,[12] further confirming this suspicion.

Although previous research estimated prevalence of postdisaster mental health problems, published data had limited applicability to the NYC context for two reasons. First, comparison with other postdisaster PTSD research was limited by the different diagnostic scales and postdisaster time frames employed in different studies. Most postdisaster assessments of the mental health consequences of disasters were carried out 6 months after the event, thus offering relatively little guidance about mental health needs in the immediate postdisaster period. Second, there were relatively few postdisaster studies that documented mental health problems in the general population. The studies that had been carried out provided estimates of mental health problems ranging from 2% to 18.3%.[13,14] Thus, it became clear that a primary role for public health researchers in NYC would be to characterize the mental health consequences of the attacks in NYC, both among those directly affected by the attacks, and in the NYC population at large.

The Center for Urban Epidemiologic Studies (CUES) is a division of the New York Academy of Medicine. CUES is a research institute comprised of epidemiologists and physicians with an interest in the health of urban populations. CUES research is funded by the Centers for Disease Control and Prevention, the National Institutes of Health (NIH), and private foundations. CUES investigators have a research interest in the epidemiology of emergent conditions, including the epidemiology of mental health after severe trauma. Approximately a week after September 11th, in consultation with NYSPI, the New York Department of Health, and the Substance Abuse and Mental Health Services Administration, CUES investigators began designing and implementing research that could estimate the prevalence of mental health problems in the general population and identify groups who were particularly at risk of psychopathology and could benefit from acute mental health intervention.

ESTABLISHING COLLABORATIONS

In deciding to develop an assessment to document the mental health consequences of the September 11th attacks in the NYC population at large, CUES investigators sought to collaborate with other investigators and institutions with specific experience in postdisaster research. The National Crime Victims Research and Treatment Center (NCVC) is a division of the Department of Psychiatry and Behavioral Sciences at the Medical University of South Carolina in Charleston. The primary focus of NCVC investigators is to understand the impact of violence on adults, children, and their families. In more recent years, NCVC research efforts have expanded to include an examination of the mental health impact of natural disasters and urban violence. NCVC studies have been sponsored by agencies and organizations such as the NIH and the National Institute of Justice. Center researchers are often involved in providing consultation to other researchers and agencies interested in pursuing work related to the psychological consequences of severe trauma and disasters.

One of the major projects carried out by NCVC was the National Women's Study (NWS), a large epidemiological research project that involved the assessment of national household probability samples of adult women about a variety of topics including history of traumatic events, PTSD, and major depression.[15,16] These assessments happened via telephone over a 3-year period between 1989 and 1993. As part of this project, NCVC researchers had developed and validated modified diagnostic measures for PTSD and depression that were particularly relevant to the work that CUES investigators were considering in NYC.

CUES investigators had previously collaborated with Schulman, Ronca, and Bucuvalas, an NYC-based research firm based, in conducting the Harlem Social Environment Study.[17] SRB specializes in public policy and opinion surveys, health care, and communications and has a track record of collaborating with academic institutions. SRB also had been responsible for implementing the NWS in collaboration with NCVC investigators. Thus, a collaboration between CUES, NCVC, and SRB was established to guide the planned research.

CHOOSING A RESEARCH DESIGN

There were several considerations that guided the choice of research design at project inception. Principal among these was the necessity for a rapid assessment that could contribute data to the ongoing NYSPI and SMHSA mental health needs assessment. Three primary investigative methods were considered. First was the possibility of carrying out in-person interviews. However, in the first weeks after the disaster, security measures throughout NYC prevented movement south of Canal Street (the area closest to the WTC) making door-to-door contact with an important portion of NYC residents difficult. In addition, experience at SRB suggests that door-to-door interviews in NYC is particularly difficult given the high prevalence of high-rises with

doormen preventing access to a random sampling of households. Second was the possibility of carrying out a phone survey with a complex, stratified, phone sampling technique that would selectively oversample persons who were directly affected by the event (eg, families of victims, persons who were in the WTC during the attacks). This option was considered not feasible due to the cost that would be associated with screening for these subgroups specifically. Although the September 11th attacks affected a large number of persons, screening for those directly affected in NYC at large would require an estimated 50 screening interviews for every target person interviewed making the cost associated with such a project prohibitive. The third option—the one eventually chosen by the research group—was a simple area probability random-digit dial (RDD) survey of residents of NYC. This option was considered feasible, and would provide the research team with estimates of mental health problems in NYC that could guide the ongoing needs assessment.

There were a number of reasons why it was considered optimal to carry out an RDD telephone survey in this context. First, telephone survey methods have been shown to be an efficient way to collect information from large representative samples of respondents at a relatively low cost with nonsignificant response bias or detection of critical variables of interest as compared with in-person interview approaches.[18,19] One study compared telephone with in-person assessment of *Diagnostic and Statistical Manual of Mental Disorders*, Third Edition (*DSM-III*), Axis I disorders, including anxiety disorders, affective disorders, alcoholism, and no mental disorder using a structured diagnostic interview.[20] Kappa's ranging from .69 to.84 were obtained, even with a delay between in-person and telephone methods of 12–19 months.[20] In addition, the RDD telephone-survey method is routinely used to complete the Centers for Disease Control Behavioral Risk Factor Surveillance System, which assesses risk behaviors within the adult population.[21]

Having decided to implement an RDD survey, researchers had to decide on the area to sample and languages to use in the surveying. Although there was a strong interest in carrying out an assessment of all of NYC and in a variety of languages, uncertainty about funding for this project suggested that a more limited sampling frame would have to be selected. After some discussion it was decided to sample residents of Manhattan living south of 110th Street for three primary reasons. First, this was the area of Manhattan closest to the WTC site of the September 11th attacks. Second, given finite resources, a broader geographic focus would have diluted the representation of those directly affected. Third, a substantial proportion of residents of Manhattan's Upper West and Upper East sides worked in southern Manhattan, and were thus more likely to witness the attacks or to be affected by the attacks, either directly (through loss of relatives or colleagues) or indirectly (through loss of employment). Surveying was carried out in English and Spanish using bilingual interviewers. Subsequent work by the research team has sampled all of NYC and included other languages in the assessments.

INSTRUMENT DEVELOPMENT

In developing a survey instrument for this assessment, investigators followed the lead established by NCVC in previous postdisaster research (primarily after Hurricane Hugo and the Los Angeles civil disturbances). This work builds on a multivariate risk-factor model that conceptualizes natural disasters as specific events within a more general stress model for coping with life events. This model allows the application of general stress theories[22] to theories of posttrauma adaptation,[23] and considers posttrauma events as processes unfolding in time, whereby factors present before and after the event interact with individual or environmental characteristics to shape mental health. Within this paradigm, predisaster factors, such as demographic characteristics, prior mental health problems,[24] life events,[25] resource loss,[26] and social support,[27] are (together with specific event experiences) important individual characteristics that shape the posttrauma event, psychological pathology, and recovery.

Therefore, the final survey instrument included demographic measures (age, race/ethnicity, gender, household income, educational achievement, and residential location); exposure to the events of September 11th (proximity to the WTC, injury, perception of life threat, witnessing injury or death, deaths of family members or close friends, and significant concerns about the safety of loved ones during the incident); loss of resources (including physical and psychological resources); life events and recent lifetime stressors; media exposure to images soon after the event; social supports; substance use, including cigarettes, alcohol, and marijuana; acute emotional and psychological reactions; and measures of PTSD and depression. The latter measures were adapted from previous NCVC work in the NWS. As described in more detail elsewhere, the NWS measure of PTSD has been evaluated to determine the degree of reliability between a structured PTSD measure administered by nonclinicians and the Structure Clinical Interview for the *DSM-III-R*, the "gold standard" of PTSD measures, which is administered by clinicians.[15,28,29] The coefficient of agreement between the two measures at the diagnostic level was 0.77 for lifetime PTSD and 0.71 for current PTSD.[28] In our assessment, diagnosis of PTSD was based on the presence of at least one reexperiencing symptom (eg, recurrent intrusive memories, distressing dreams); three avoidance symptoms (eg, efforts to avoid thoughts associated with the trauma, loss of interest in significant activities); and two hyperarousal symptoms (eg, difficulty falling asleep or concentrating) on the NWS module of PTSD. All symptoms were required to have occurred for 2 weeks or longer, most recently within the previous 30 days, to qualify as current PTSD symptoms. In addition, where symptoms had specific content (eg, memories or thoughts) we asked about the content: Symptoms related to the September 11th attacks qualified the PTSD as related to the September 11th attacks.

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Major depression as defined by *DSM-IV* criteria was measured by a modified version of the questions that were used by NCVC in previous studies of persons exposed to natural disasters; this measure has been shown to have an alpha of 0.79.[30] These instruments were modified to obtain the time of most recent occurrence of these mental health problems in order to assess both lifetime and current disorder. Further details about how these measures were used in this assessment is given elsewhere.[31,32]

FUNDING

One of the primary difficulties faced by the research group in carrying out this work was obtaining funding, or assurance of funding. Although all the investigators were donating their time to the project in kind, financial resources were needed to fund the data collection. It was clear early on that if the assessment was to be implemented early after September 11th, preparations for the research would have to be made in the absence of assurances of funding. In the early weeks after the September 11th attacks, several NYC foundations were formed with the explicit intent of funding post-September 11th relief efforts. However, the vast majority of these resources were earmarked for clinical relief services. In the weeks after September 11th, the investigative team approached private foundations and federal funding agencies for resources to carry out the assessment. Although the majority of the requests were unsuccessful, assurances of funding eventually were obtained from the NIH (in the form of an administrative supplement to an ongoing research project) and from The New York Community Trust/United Way consortium that had been formed to administer donations received for post-September 11th work. Assurances of funding were received about a week before the start of data collection.

PROVISIONS FOR MENTAL HEALTH COUNSELING

Early in the decision making about carrying out this assessment, members of the investigative team met with the chair of the institutional review board (IRB) at the New York Academy of Medicine to discuss the nature of the planned assessment and what precautions should be taken, given the unique circumstances surrounding the September 11th attacks. Two primary IRB concerns were raised and addressed. First, it was decided that the research should be anonymous; that no identifying data would be collected about any respondent enrolled in the study. This precluded longitudinal follow-up of respondents or collection of any potentially identifying data, such as addresses (the intersection closest to respondents' residence was instead collected as a means of determining distance from the WTC site). Second, the IRB and investigators were both concerned about the research potentially retraumatizing persons affected by the disaster. Extensive experience by NCVC researchers interviewing persons directly affected by disasters suggested that most persons contacted after disasters were glad to be given the opportunity to talk about their experiences. However, proactive screening for mental health problems, such as the planned assessment, is likely to identify persons with significant emotional distress.[33] As such, given the unique NYC context, both in scope of the disaster and in our attempt to obtain an early postdisaster assessment of mental health problems, the investigative team established a psychological counseling backup system that would provide all respondents with an opportunity to receive counseling if they needed it.

At the end of every survey (or earlier if a participant wished to terminate the survey), all participants were asked whether the questions were disturbing to them, and whether they were disturbed by their participation in the study. Participants were then asked if they would like a mental health professional connected with the study to call him or her again. If participants indicated that they would like to be contacted by a counselor, we collected the participant's name, address, and telephone number, and provided assurance that this information was being collected only for the purposes of counselor follow-up and would not be associated with study responses in any way. Participants who wished to be contacted by a counselor were given the option of having a mental health professional contact them immediately in order to provide immediate assistance or contacted the following business morning. A psychiatrist on the research team carried a pager throughout the course of the study and was paged by the SRB interviewers if any respondents needed immediate assistance. Respondents who asked for assistance the next day were contacted by a mental health professional from NCVC the next morning. Mental health professionals contacting the respondents used their clinical judgment in arranging follow-up or further contact with respondents as needed. Once any such case was resolved, the participants' contact information was destroyed. With these backup mechanisms in place, the IRB provided expedited approval of the study protocols on October 2, 2001.

SUMMARY OF STUDY RESULTS

The study was conducted between October 16 and November 15, 2001. A total of 1,008 persons were interviewed and 20 responses were not analyzed due to missing weighting variables. Overall survey cooperation rate[34] was 64% and more than 98% of respondents who started the survey finished it, suggesting a high proportion of respondents eager to talk about the events of September 11th once they started the interview. Preliminary analysis of data from the first 500 respondents was presented to the NYSPI post-September 11th mental health planning committee on November 2, 2001, and a report from the preliminary analyses was written and submitted to the NYSPI and Substance Abuse and Mental Health Services Administration needs assessment group and to the Department of Health.[6] Detailed description of principal results from this study (including analyses of service utilization after September 11th, increase in substance use comorbid with PTSD and

depression, and the role of important covariates in predicting mental health sequelae of September 11th) are provided elsewhere.[31,32,35-37]

Figures 1 and 2 show the distribution of respondents' residences and where they were when they first learned of the attacks. Figure 1 clearly shows the preponderance of Manhattan residents' locations in the Upper West and Upper East sides of Manhattan, while Figure 2, which shows the distribution of respondents during the attacks, reflects that the attacks happened when most people were at work (predominantly in midtown Manhattan and in downtown Manhattan's financial district, close to the WTC). Table 1 summarizes the prevalence of the primary mental health outcomes investigated in this study and estimates of the population prevalence of mental health problems associated with these prevalences. In summary, the prevalences documented in this study suggest that among residents of Manhattan living south of 110th Street, approximately 67,000 persons had symptoms consistent with PTSD, and approximately 87,000 persons had symptoms consistent with depression during the time of the study. Although, as discussed earlier, it is difficult to compare these results with those from other postdisaster research, this prevalence was about twofold to threefold higher than baseline PTSD and depression prevalence in nondisaster samples.[38,39]

Subsequent to this research, the investigators at CUES, NCVC, and SRB continued to collaborate on evaluations of the mental health status of residents of NYC 4 months after September 11th and of residents of the NYC metropolitan area 6 months after the attacks.

CONCLUSION

In the aftermath of the September 11th terrorist attacks, epidemiologists at CUES in collaboration with NCVC and SRB conducted an assessment of the psychological conse-

FIGURE 1. Respondents' residences on September 11, 2001. Figure shows sampling frame of assessment of residents of Manhattan living south of 110th Street.

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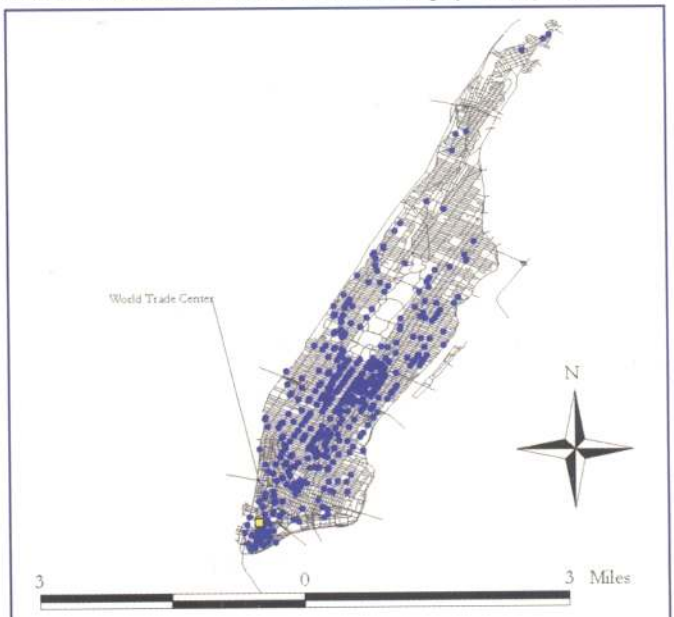

FIGURE 2. Where respondents were when they first learned about the events of September 11, 2001.

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TABLE 1. PREVALENCES OF PTSD AND DEPRESSION MEASURED 5–8 WEEKS AFTER SEPTEMBER 11, 2001, IN RESIDENTS OF MANHATTAN LIVING SOUTH OF 110TH STREET (N=988).*

		Prevalence (%)	95% Confidence Intervals	Population Estimates**
PTSD	Lifetime†	19.3	16.7–22.0	180,000
	Current‡	8.8	7.0–10.8	82,000
	Current related to September 11th¶	7.5	5.7–9.3	67,000
Depression	Lifetime†	27.0	23.9–30.1	248,000
	Current‡	9.7	7.3–11.3	87,000

*More detailed documentation about these prevalences can be found in other work by this research team.[31,32]
**Based on US Census estimates 2000 that there were approximately 918,000 adults 18 years of age or over living in Manhattan south of 110th Street; rounded to the nearest 1,000.
†Lifetime represents prevalence of respondents ever having symptoms consistent with a diagnosis of PTSD or depression.
‡Current denotes symptoms consistent with a diagnosis of PTSD or depression within the previous 30 days.
¶Content-specific PTSD symptoms related to events of September 11th (eg, nightmares about the terrorist attacks).

PTSD=posttraumatic stress disorder; US=United States.

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quences of the attacks on the general population of Manhattan. The assessment, started on October 16, 2001, documented a prevalence of PTSD and depression in the general population that was 2–3 times higher than baseline. Preliminary results from this assessment contributed to a mental health needs assessment being conducted by the NYSPI and Substance Abuse and Mental Health Services Administration as part of New York state's application for FEMA funds.

Several issues arose in the process of designing, implementing, and evaluating this assessment that may serve to inform a discussion about systems to assist future rapid postdisaster assessments. First, there was no preexisting mechanism in NYC to conduct rapid mental health needs assessments that could guide service delivery or inform requests for federal funds and assistance. As NYSPI began compiling evidence from the literature that could contribute to a formal needs assessment, it became clear that there was little data that could reliably be extrapolated to the general NYC population. Second, there was no mechanism in place to provide rapid funding to researchers who had the necessary skills and infrastructure to develop and implement a rapid assessment. The principal researchers on this project spent much of the first month after September 11th searching for funds that could be used for such an assessment. Assurances of funding to cover surveying costs were received only days before surveying was scheduled to begin. In addition, sufficient funding became available to conduct only a limited assessment of Manhattan during the first wave of surveying, making extrapolation to the rest of NYC difficult. Third, all researchers involved in the project devoted an inordinate amount of time and energy to developing this assessment, often at the expense of other ongoing projects. While this is not surprising in the context of an emergent, unexpected event, more readily available funding would have permitted the engagement of dedicated project management personnel to facilitate the administrative aspect of the work. Fourth, in the absence of a predesigned and prereviewed research protocol, the investigators involved in this project had to work closely with the New York Academy of Medicine IRB to ensure that a project was developed that adequately protected human subjects while achieving the needed assessment in a tight timeframe. This was only possible in the context of a responsive IRB that was willing to guide the researchers into developing a protocol that could address possible psychological effects of the assessment itself. Fifth, overall, NYC residents contacted were eager to participate in the assessment, and there was relatively little recourse to the psychological support system established.

The experience of CUES, NCVC, and SRB in conducting this rapid mental health assessment suggests that it is feasible to carry out assessments of the psychological sequelae of large-scale disasters a month after the event. Information from this assessment helped guide a New York state needs assessment and the delivery of services to the NYC area. Key elements necessary for such an assessment are a willing group of investigators with the shared expertise in epidemiological assessment and postdisaster research; responsive institution that can divert human resources temporarily to the project; and funders willing to allocate money to the assessment in a relatively short period of time. Prewritten, and preapproved protocols should be in place to permit the implementation of epidemiologically sound, rapid mental health assessments after future disasters. CNS

REFERENCES

1. Dead and missing. *New York Times*. December 26, 2001:B2.
2. McCarthy M. USA talks of war after more than 5000 killed in terrorist attacks. *Lancet*. 2001;358:939.
3. Tally of twin towers death is down sharply. *New York Times*. November 21, 2001:A1,B9.
4. Bush LM, Abrams BH, Beall A, Johnson CC. Index case of fatal inhalational anthrax due to bioterrorism in the United States. *N Engl J Med*. 2001;345:1607-1610.
5. Jernigan JA, Stephens DS, Ashford DA, et al. Bioterrorism-related inhalational anthrax: The first 10 cases reported in the United States. *Emerg Infect Dis*. 2001;7:933-944.
6. Herman D, Susser E, Felton C. Rates and treatment costs of mental disorders stemming from the World Trade Center terrorist attacks: an initial needs assessment. The Center for Mental Health Services, Substance Abuse and Mental health Services Administration; 2002.
7. Hidalgo RB, Davidson JRT. Posttraumatic stress disorder: epidemiology and health-related considerations. *J Clin Psychiatry*. 2000;61(suppl7):5-13.
8. Green BL, Lindy JD. Post-traumatic stress disorder in victims of disasters. *Psych Clin N America*. 1994;17:301-309.
9. Solomon SD, Green BL. Mental health effects of natural and human-made disasters. *PTSD Research Quarterly*. 1992;3:1-8.
10. Rubonis AV, Bickman L. Psychological impairment in the wake of disaster: the disaster-psychopathology relationship. *Psych Bull*. 1991;10:384-399.
11. Norris FH. 50,000 disaster victims speak: an empirical review of the empirical literature, 1981-2001. *Psychiatry*. In press.
12. Schuster MA, Stein BD, Jaycox LH, et al. A national survey of stress reactions after the September 11, 2001, terrorist attacks. *N Engl J Med*. 345:1507-1512.
13. Carr VJ, Lewin TJ, Webster RA, Kenardy JA. A synthesis of the findings from the Quake Impact Study: a two-year investigation of the psychosocial sequelae of the 1989 Newcastle earthquake. *Soc Psychiatry Psychiatr Epidemiol*. 1997;32:123-136.
14. Hanson RF, Kilpatrick DG, Freedy R, Saunders BE. Los Angeles County after the 1992 civil disturbances: degree of exposure and impact on mental health. *J Consult Clin Psychol*. 1995;63:987-96.
15. Resnick HS, Kilpatrick DG, Dansky BS, Saunders BE, Best CL. Prevalence of civilian trauma and PTSD in a representative national sample of women. *J Consult Clin Psychol*. 1993;61:984-991.
16. Kilpatrick DG, Acierno R, Resnick HS, Saunders BE, Best, CL. A two year longitudinal analysis of the relationship between violent assault and alcohol and drug use in women. *J Consult Clin Psychol*. 1997;65:834-847.
17. Galea S, Ahern J, Fuller C, Freudenberg N, Vlahov D. Needle exchange programs and experience of violence in an inner-city neighborhood. *J Acqui Defic Syndr*. 2001;28:282-288.
18. Weeks MF, Kulka RA, Lessler JT, Whitmore RW. Personal versus telephone surveys for collecting household health data at the local level. *Am J Pub Health*. 1983;73:1389-1394.
19. Simon GE, Revicki D, VonKorff M. Telephone assessment of depression severity. *J Psychol Rev*. 27:247-252.
20. Paulsen AS, Crowe RR, Noyes R, Pfohl B. Reliability of the telephone interview in diagnosing anxiety disorders. *Arch Gen Psychiatry*. 1988;45:62-63.
21. Behavioral Risk Factor Surveillance System [National Center for Chronic

Disease Prevention and Health Promotion Web site]. Available at: http://www.cdc.gov/nccdphp/brfss/about.htm. Accessed November 1, 2001.
22. Folkman S. Personal control and stress and coping processes: a theoretical analysis. *J Pers Soc Psychol.* 1984;46:839-52.
23. Freedy JR, Kilpatrick DG, Resnick HS. Natural disasters and mental health: theory, assessment, and intervention. Handbook of post-disaster interventions. *J Soc Behav Person.* 1993;8(special issue):49-103.
24. Gibbs MS. Factors in the victim that mediate between stress and psychopathology: a review. *J Trauma Stress.* 1989;2:489-514.
25. Resnick HS, Kilpatrick DG, Best CL, Kramer TL. Vulnerability-stress factors in development of posttraumatic stress disorder. *J Nerv Ment Dis.* 1992;180:424-30.
26. Freedy JR, Saladin ME, Kilpatrick DG, Resnick HS, Saunders BE. Understanding acute psychological distress following natural disaster. *J Trauma Stress.* 1994;7:257-73.
27. Solomon Z, Mikulincer M, Hobfoll SE. Objective versus subjective measurement of stress and social support: combat-related reactions *J Consult Clin Psychol.* 1987;55:577-83.
28. Kilpatrick DG, Resnick HS, Freedy JR, et al. The posttraumatic stress disorder field trial: evaluation of the PTSD construct–criteria A through E. In: T Widiger, A Frances A, H Pincus, et al, eds. *DSM-IV Sourcebook,* vol 4. Washington, DC: American Psychiatric Association Press, 1998:803-844.
29. Spitzer RL, Williams JB, Gibbon M. *Structured Clinical Interview for DSM-III-R:* Non-patient version. New York, NY: Biometrics Research Department, New York State Psychiatric Institute; 1987.
30. Kilpatrick DG, Saunders BE, Smith DW. *Research in Brief: Prevalence and consequences of child victimization: Results from the National Survey of Adolescents.* Washington, DC: National Institute of Justice; 2001.
31. Galea S, Ahern J, Resnick H, Kilpatrick D, Bucuvalas M, Gold J, Vlahov D. Psychological sequelae of the September 11 terrorist attacks in New York City. *N Engl J Med.* 2002;346:982-987.
32. Galea S, Resnick H, Ahern J, et al. A Post-traumatic stress disorder in Manhattan, New York City, after the September 11th attacks. *J Urban Health.* 2002;79:2-5.
33. McDermott BM, Palmer LJ. Post-disaster service provision following proactive identification of children with emotional distress and depression. *Aust NZ J Psychiatry.* 1999;33:855-863.
34. Your opinion counts: 1988 refusal rate study. Washington, DC: Council of American Survey Organizations, 1988.
35. Vlahov D, Galea S, Resnick H, Ahern J, Boscarino JA, Bucuvalas M, et al. Increased consumption of cigarettes, alcohol, and marijuana among Manhattan residents after the September 11th terrorist attacks. *Am J Epidemiol.* In press.
36. Boscarino JA, Galea S, Ahern J, Resnick H, Vlahov D. Utilization of Mental Health Services following the September 11th terrorist attacks in Manhattan, New York City. *Int J Emerg Ment Health.* In Press.
37. Ahern J, Galea S, Resnick H, et al. Television images and psychological symptoms after the September 11th terrorist attacks. *Psychiatry.* In press.
38. US Department of Health and Human Services. Mental Health: A report of the Surgeon General. Rockville, Md: US Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, National Institutes of Health, National Institute of Mental Health, 1999. Available at: URL: http://www.surgeongeneral.gov/Library/ MentalHealth/pdfs/front.pdf. Accessed November 1, 2001.