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The National Center for PTSD
VA Medical and Regional Office Center (116D)
215 North Main Street
White River Junction
Vermont 05009-0001 USA

(802) 296-5132
FAX (802) 296-5135

Email: ptsd@dartmouth.edu
http://www.ncptsd.org

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RESEARCH ON TRAUMA AND PTSD IN THE AFTERMATH OF 9/11

Heidi Resnick, PhD[1]
National Crime Victims Research and Treatment
Medical University of South Carolina
Sandro Galea, MD, DrPH[2]
Center for Urban Epidemiologic Studies
New York Academy of Medicine
Dean Kilpatrick, PhD[3]
National Crime Victims Research and Treatment
Medical University of South Carolina
David Vlahov, PhD[4]
Center for Urban Epidemiologic Studies
New York Academy of Medicine

The urgency of the need to assess the impact of the September 11th attacks and to communicate the findings is reflected in the fact that several papers were published very quickly following the attacks. In a synthesis of the post-disaster literature, Norris (2002) found that widespread sequelae could be expected in disasters that were caused by human intent or resulted in widespread property damage, extensive loss of life, or long-term financial strain.

The September 11, 2001 terrorist attacks on the World Trade Center (WTC) in New York City and upon the Pentagon in Washington, DC were unprecedented in scope in the United States. Approximately 2,800 people were killed in the attacks, 16 times more people than died in the Oklahoma City bombing, previously the largest terrorist attack on US soil. The scope and nature of the attacks suggested that there would be substantial mental health problems in New York City after the attacks and that these problems would extend beyond the direct victims of the attacks.

The first published study of reported psychological reactions and coping behaviors within a general national population sample of 560 US adults assessed by telephone 3 to 5 days following the September 11th attacks was conducted by Schuster et al. (2001). They reported that 44% of their participants endorsed having experienced one or more PTSD symptoms since September 11th. Approximately one-third of adults with children noted one or more stress responses in a child.

A larger national study by Schlenger et al. (2002) included assessments that occurred between 1 to 2 months after the attacks with 2,273 adults with over-samples from the New York metropolitan area (N = 777), the District of Columbia metropolitan area (N = 247), and participants from other major metropolitan and other areas in the US. Study participants were part of a sample contacted prior to September 11th who were involved in a Web-enabled study pool through Knowledge Networks. Prevalence of probable PTSD in the New York metropolitan area was 11.2% and was significantly higher than the estimated prevalence of PTSD in other major metropolitan areas including Washington, DC, which did not differ from the overall national estimated prevalence of 4.3%. Findings related to more global psychological distress indicated that the national prevalence of estimated cases with clinically significant psychological distress (11.6%) was not different from what would be expected for a community sample and that the prevalence was not significantly different across the geographic areas sampled. A substantial proportion of participants with children (e.g., 60.7% in the New York metropolitan area and 57.3% in other metropolitan areas) identified at least one child who was upset in the aftermath of the September 11th attacks.

The results of this study importantly indicated that PTSD but not general clinical distress was significantly more prevalent in the New York area than other geographic areas. Schlenger et al. (2002) suggested that the greater relative geographic isolation of the Pentagon from the city and the military versus civilian identification of the Pentagon may have been factors related to lower threat perception in the general population and lower prevalence of PTSD than that observed in the New York metropolitan area. A study of more highly exposed Pentagon attack survivors found that 14% had PTSD 7 months after the attacks (Grieger et al., 2003). Women were more likely to meet criteria for PTSD and increased use of alcohol. Those with more intense emotional reactions, dissociation, and lower perceived safety were also at increased risk for PTSD.

Silver et al. (2002) examined acute and longer-term symptoms of posttraumatic stress assessed on average at 9 to 23 days, and 2 months and 6 months after the attacks occurred. This study also made use of a Knowledge Networks engaged sample of 2,729 adults. Only 2% of the sample reported having experienced direct exposure, and 96% of the sample reported no losses related to the attacks. Participants reported an average of almost 5 symptoms of acute PTSD-related stress at initial assessment. Use of self-blame and social support as coping strategies were positively associated with PTSD symptoms,

[1,3] Authors' Address: National Crime Victims Research and Treatment Center, Medical University of South Carolina, 160 Cannon Street, Charleston, SC 29425. [2,4] Authors' Address: New York Academy of Medicine, 1216 Fifth Avenue, New York, NY 10029.
Authors' Email Addresses: [1] resnickh@musc.edu
[2] sgalea@nyam.org [3] kilpatrickd@musc.edu
[4] d.vlahov@nyam.org

while use of acceptance as a coping strategy was negatively associated with PTSD symptoms. Average number of PTSD symptoms was reduced by more than half by the 6-month assessment.

A series of epidemiological studies conducted by researchers at the New York Academy of Medicine and colleagues at the National Crime Victims Research and Treatment Center focused primarily on the population living in New York City and the surrounding metropolitan area and included assessment of exposure variables (including direct exposure as well as television viewing), prior history factors, peri-event reactions, and post-event factors in addition to assessment of probable PTSD, major depression, and changes in drug, alcohol, and cigarette use over time (Ahern et al., 2002; Boscarino et al., 2002; Boscarino et al., 2003; Galea et al., 2002; Galea et al., 2003; Vlahov et al., 2002). This series of studies began with an initial study of 1008 residents of Manhattan living south of 110th Street conducted 1 month after the attacks (Galea et al., 2002). Two other cross-sectional studies were conducted at 4 months after the attacks with 2,001 adults who were residents of New York City, with an oversample of Manhattan residents south of 110th Street, and at 6 months after the attacks with 2,752 adult residents of the New York metropolitan area with oversampling of residents of Manhattan south of 110th Street and of New York City (Galea et al., 2003). This research team is currently conducting a longitudinal follow-up study with the cohort first assessed at 6 months post-attacks who are being re-assessed at 1 and 2 years post-September 11th. Seventy-one percent of the original cohort was successfully recontacted in the first completed follow-up survey wave. All of these studies were conducted using random-digit dial methods.

The major finding from the initial report by Galea et al. (2002) was that at 5-8 weeks following the attacks, the prevalence of current (i.e., past month) probable PTSD related to the terrorist attacks was 7.5% in Manhattan. As noted by Schlenger et al. (2002), this prevalence falls within the 95% confidence interval for the estimated prevalence of PTSD (11.2%) that they found in the New York metropolitan area at a similar time point following the attacks. Estimated prevalence of current major depression was 9.7%. These results supported other findings indicating that PTSD symptom reactions were prevalent in the New York City area after the September 11th attacks and showed that both exposure variables (including witnessing, loss of family or friends, displacement, and job loss), pre- and post-event factors, and demographic variables were important predictors. Similar to findings reported by Grieger et al. (2003) regarding initial reactions to the attacks, reported peri-event panic attack was a significant predictor of PTSD after controlling for other factors. In an analysis of emotional distress and dissociation as predictors of PTSD after controlling for exposure, Simeon et al. (2003) found that acute emotional distress was a significant predictor. Dissociation was a significant predictor of reexperiencing symptoms after controlling for other emotional distress. Results related to early emotional distress and panic reactions may have important implications for public health approaches or educational messages that may be beneficial in the aftermath of mass disaster or terrorism events.

A second report from this research team described the estimated prevalence of increased cigarette smoking, alcohol consumption, and marijuana use among the initial sample of 1,008 Manhattan residents (Vlahov et al., 2002). Results were that 28.8% reported increased use of any of these substances after September 11th. Increased cigarette smoking was reported by 9.7%; 3.2% reported increased marijuana use, and 24.6% reported increased alcohol consumption. PTSD was positively associated with increased cigarette and marijuana use, while depression was associated with increased use of all three substances. These findings indicated health-related behavior changes following September 11th and potential mediation of these behaviors by stress-related mental health problems. Findings were not consistent with the Silver et al. (2002) report which found no association between substance use and PTSD symptoms; however the Vlahov et al. study focused on those in the New York City area, and Silver et al. reported on those primarily outside of this New York geographic region. These results were also consistent with the report by Grieger et al. (2003) indicating that PTSD was associated with increased alcohol use. Given the findings of Schlenger et al. (2002), it is clear that those who reside in the New York area are different from those in the rest of the nation in terms of their responses to September 11th, as might well be expected. Those directly exposed to the attack on the Pentagon are also clearly different from the sample studied by Silver et al.

More recent reports have focused on functioning through the 6-month period following September 11th, 2001. Galea et al. (2003) reported prevalence of probable PTSD related to September 11th based on separate cross-sectional surveys conducted at approximately 1 month, 4 months, and 6 months post-event. Prevalence of estimated current PTSD (i.e., past month and related to the September 11th attacks) among those living in Manhattan south of 110th Street were 7.5%, 1.7%, and 0.6% at the three time points. Similar trends in the prevalence of probable PTSD at 4 and 6 months was observed among residents of the broader New York City area. Other important findings from this study were that the estimate of development of PTSD in the aftermath of September 11th was extremely reliable. The estimate of PTSD since September 11th in the 6-month cohort was 7.4% for those who lived in Manhattan south of 110th Street, which was almost identical to this estimate from the first study. Also lending support to the construct validity of the PTSD measure, prevalence of PTSD since the attacks was 37% among 10 people who were reportedly in the building complex during the attacks and 30% among 51 individuals who reported sustaining physical injuries during the attacks. This is very similar to the prevalence of PTSD of 34% observed among direct victims of the Oklahoma City bombing (North et al., 1999). These data suggest a rapid recovery in terms of probable PTSD reactions over time. They also indicate that those in the broader New

York area were also affected at similar levels to those in the more proximal Manhattan area. In contrast to the findings related to PTSD, however, Vlahov et al. (in press) found that reports of increased use of cigarettes, alcohol, and marijuana were consistent across the 1-month and 6-month post-event cross-sectional studies, indicating that these problems may be more likely to be sustained over time. An in-person interview study of residents of Manhattan conducted 3 to 6 months after the terrorist attacks found that 56% had one or more symptoms of distress related to the attacks and that prior history of disorder, loss of family or friends, job loss, displacement, and female gender were predictors of distress (Delisi et al., 2003).

Several studies in the aftermath of September 11th observed significant associations between media exposure and PTSD or symptoms of distress across populations with varying direct exposure to the events (Ahern et al., 2002; Schlenger et al., 2002; Schuster et al., 2001). More research is needed to understand potential associations between media exposure, direct exposure, and psychological reactions following similar events.

Studies have also been conducted to evaluate mental health or general health services utilization following the September 11th attacks. Boscarino et al. (2002) found that 16.9% of Manhattan residents studied 5 to 8 weeks after the attacks reported service use within the month prior to the attacks and 19.4% reported use of services in the month afterwards. Ten percent reported increased mental health service visits (one or more) after the attacks compared to prior use, and 5.3% reported decreased utilization. A second report (Boscarino et al., 2003) on psychiatric medication use indicated that changes in reported use pre- and post-attacks were small, with 8.9% reporting use of medications in the month prior to the attacks and 11.6% percent reporting medication use in the month afterwards. Data from Delisi et al. (2003) indicated that only 26.7% of those with severe distress symptoms were getting treatment. Conflicting results have been reported related to use of mental health services by veterans, with one study indicating no increase in use of VA mental health services in New York or at other sites in the 6 months after September 11th (Rosenheck & Fontana, 2003) and a second study reporting a higher volume of veterans treated for PTSD than expected in the New York and New Jersey areas over the 8-month period following September 11th (Weissman et al., 2003).

Several epidemiological studies were conducted in the aftermath of the September 11th attacks that made use of standardized assessment measures that allowed for good comparability across studies and that included design variations that allowed for focus on different segments of the U.S. and New York area populations primarily. These studies provided fairly consistent results, identifying elevated prevalence of PTSD and consistent predictors associated with PTSD in the initial few months post-event. Future research should also incorporate more sophisticated assessment of a range of coping responses such as those assessed by Silver et al. (2002) and Schuster et al. (2001). Results of the repeated cross-sectional studies of the population in New York indicate the importance of attending to additional mental health and behavioral outcomes such as substance use that may persist over longer periods following events like the attacks that occurred on September 11th. The data also point to the resilience of those in this population in terms of symptoms of PTSD over time.

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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.** *Journal of the American Medical Association, 282,* 755-762.

SELECTED ABSTRACTS

AHERN, J., GALEA, S., RESNICK, H., KILPATRICK, D., BUCUVALAS, M., GOLD, J., & VLAHOV, D. (2002). **Television images and psychological symptoms after the September 11 terrorist attacks.** *Psychiatry, 65,* 289-300. Exposure to graphic television images may exacerbate psychological symptoms in disaster situations. We tested the hypotheses that (1) more frequent viewing of television images of the September 11 terrorist attacks was associated with PTSD and depression, and that (2) direct exposure to disaster events had an interactive effect with media viewing. We recruited 1,008 adult residents of the borough of Manhattan in New York City through a random-digit-dial telephone survey conducted between October 16 and November 15, 2001. Respondents who repeatedly saw "people falling or jumping from the towers of the World Trade Center" had higher prevalence of PTSD (17.4%) and depression (14.7%) than those who did not (6.2% and 5.3% , respectively). Among respondents who were directly affected by the attacks (e.g., had a friend killed), those who watched this television image frequently were more likely to have PTSD and depression than those who did not. Among respondents not directly affected by the attacks, prevalence of PTSD and depression was not associated with frequency of television image viewing. Specific disaster-related television images were associated with PTSD and depression among persons who were directly exposed to a disaster. Future research should address causal directionality of this association.

BOSCARINO, J.A., GALEA, S., AHERN, J., RESNICK, H., & VLAHOV, D. (2002). **Utilization of mental mealth services following the September 11th terrorist attacks in Manhattan, New York City.** *International Journal of Emergency Mental Health, 4,* 143-155. To assess mental health utilization in Manhattan following the September 11th terrorist attacks, a random-digit-dial telephone survey was conducted 5 to 8 weeks afterwards, among 988 randomly selected adult householders over 17 years old (females = 52%; whites = 72%; mean age = 42). 16.9% (95% confidence interval [CI] = 14.4-19.5) of residents reported using mental health services 30 days before the attacks and 19.4% (95% CI = 16.7-22.2) reported using these services 30 days afterwards (pre/post McNemar's $\chi^2 = 8.0$, $df = 1$, $p = 0.005$, odds ratio [OR] = 2.0). 10.0% (95% CI = 7.9-12.0) increased mental health utilization 30 days after the attacks, compared to 30 days before and 5.3% (95% CI = 3.7-6.9) decreased utilization. Risk factors asso-

ciated with increased mental health utilization in multivariate analyses included: being 45-64 years of age (vs. 65+; OR = 8.3, $p = 0.011$), female gender (OR = 2.3, p = 0.004), experiencing 4+ lifetime traumatic events (vs. none; OR = 3.5, $p = 0.002$), experiencing 2+ stressful life events in the past 12 months (vs. none; OR = 3.3, $p < 0.001$), and experiencing an acute panic attack during the disaster (OR = 3.3, $p < 0.001$). Neither current PTSD nor current depression was predictive of increased post-disaster utilization when panic attack was included in the multivariate analysis. While we did find a statistically significant increase in pre- vs. post-disaster utilization among the general population in Manhattan this increase was not substantial, except among specific subgroups, including those who had a perievent panic attack, among those exposed to previous stressors, among women, and among those less than 65 years old.

BOSCARINO, J.A., GALEA, S., AHERN, J., RESNICK, H., & VLAHOV, D. (2003). **Psychiatric medication use among Manhattan residents following the World Trade Center disaster.** *Journal of Traumatic Stress, 16,* 301-306. To assess medication use in New York after the September 11th attacks, a telephone survey was conducted in October 2001 ($N = 1,008$). The prevalence of psychiatric medication use 30 days before the disaster was 8.9 and 11.6% 30 days after, a small but significant increase. The most important factor predicting postdisaster use was predisaster use—92% of those who used medications postdisaster used them predisaster. In addition, 3.3% used psychiatric medications 30 days postdisaster, but not 30 days before. Those who had panic attacks, PTSD, and insurance coverage were the most likely medicated (26.5%). However, among those who used postdisaster medications ($N = 129$), new users tended to be those with panic attacks (44.1%) and those with panic attacks and PTSD (69.2%).

DELISI, L.E., MAURIZIO, A., YOST, M., PAPPAROZZI, C.F., FULCHINO, C., KATZ, C.L., ALTESMAN, J., BIEL, M., LEE, J., & STEVENS, P. (2003). **A survey of New Yorkers after the Sept. 11, 2001, terrorist attacks.** *American Journal of Psychiatry, 160,* 780-783. *Objective:* This study examined the prevalence of psychiatric symptoms among residents/workers in Manhattan 3-6 months after the Sept. 11, 2001, terrorist attacks. *Method:* A total of 1,009 adults (516 men and 493 women) were interviewed in person throughout Manhattan. All answered questions about themselves before and after September 11 that included their emotional status. *Results:* A total of 56.3% had at least one severe or two or more mild to moderate symptoms. Women reported significantly more symptoms than men. Loss of employment, residence, or family/friends correlated with greater and more severe symptoms. The most distressing experiences appeared to be painful memories and reminders; dissociation was rare. Only 26.7% of individuals with severe symptoms were obtaining treatment. *Conclusions:* Over half of the individuals had some emotional sequelae 3-6 months after September 11, but the percent was decreasing. Only a small portion of those with severe responses was seeking treatment.

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.** *New England Journal of Medicine, 346,* 982-987. *Background:* The scope of the terrorist attacks of September 11, 2001, was unprecedented in the United States. We assessed the prevalence and correlates of acute PTSD and depression among residents of Manhattan five to eight weeks after the attacks. *Methods:* We used random-digit dialing to contact a representative sample of adults living south of 110th Street in Manhattan. Participants were asked about demographic characteristics, exposure to the events of September 11, and psychological symptoms after the attacks. *Results:* Among 1008 adults interviewed, 7.5% reported symptoms consistent with a diagnosis of current PTSD related to the attacks, and 9.7% reported symptoms consistent with current depression (with "current" defined as occurring within the previous 30 days). Among respondents who lived south of Canal Street (i.e., near the World Trade Center), the prevalence of PTSD was 20.0%. Predictors of PTSD in a multivariate model were Hispanic ethnicity, two or more prior stressors, a panic attack during or shortly after the events, residence south of Canal Street, and loss of possessions due to the events. Predictors of depression were Hispanic ethnicity, two or more prior stressors, a panic attack, a low level of social support, the death of a friend or relative during the attacks, and loss of a job due to the attacks. *Conclusions:* There was a substantial burden of acute PTSD and depression in Manhattan after the September 11 attacks. Experiences involving exposure to the attacks were predictors of current PTSD, and losses as a result of the events were predictors of current depression. In the aftermath of terrorist attacks, there may be substantial psychological morbidity in the population.

GALEA, S., VLAHOV, D., RESNICK, H., AHERN, J., SUSSER, E., GOLD, J., BUCUVALAS, M., & KILPATRICK, D. (2003). **Trends of probable post-traumatic stress disorder in New York City after the September 11 terrorist attacks.** *American Journal of Epidemiology, 158,* 514-524. The authors investigated trends in probable PTSD prevalence in the general population of New York City in the first 6 months after the September 11 terrorist attacks. Three random digit dialing telephone surveys of adults in progressively larger portions of the New York City metropolitan area were conducted 1 month, 4 months, and 6 months after September 11, 2001. A total of 1,008, 2,001, and 2,752 demographically representative adults were recruited in the three surveys, respectively. The current prevalence of probable PTSD related to the September 11 attacks in Manhattan declined from 7.5% (95% confidence interval: 5.7, 9.3) 1 month after September 11 to 0.6% (95% confidence interval: 0.3, 0.9) 6 months after September 11. Although the prevalence of PTSD symptoms was consistently higher among persons who were more directly affected by the attacks, a substantial number of persons who were not directly affected by the attacks also met criteria for probable PTSD. These data suggest a rapid resolution of most of the probable PTSD symptoms in the general population of New York City in the first 6 months after the attacks. The psychological consequences of a large-scale disaster in a densely populated urban area may extend beyond persons directly affected by the disaster to persons in the general population.

GRIEGER, T.A., FULLERTON, C.S., & URSANO, R.J. (2003). **Posttraumatic stress disorder, alcohol use, and perceived safety after the terrorist attack on the Pentagon.** *Psychiatric Services, 54,* 1380-1382. *Objective:* The authors examined PTSD, alcohol use, and perceptions of safety in a sample of survivors of the September 11, 2001, terrorist attack on the Pentagon. *Methods:* Analyses were conducted to examine the effect of past traumatic experience, trauma exposure, initial emotional response, and peritraumatic dissociation on probable PTSD, substance use, and perceived safety among 77 survivors seven months after the attack. *Results:* 11 respondents (14%) had PTSD. Those with PTSD reported higher levels of initial emotional response and peritraumatic dissociation. 10 respondents (13%) reported in-

creased use of alcohol. Women were more than five times as likely as men to have PTSD and almost seven times as likely to report increased use of alcohol. Persons with higher peritraumatic dissociation were more likely to develop PTSD and report increased alcohol use. Those with lower perceived safety at seven months had higher initial emotional response and greater peritraumatic dissociation and were more likely to have PTSD, to have increased alcohol use, and to be female. *Conclusions:* The association of perceived safety with gender, the presence of PTSD, and increased alcohol use among survivors of the terrorist attack on the Pentagon warrants further study.

ROSENHECK, R., & FONTANA, A. (2003). **Use of mental health services by veterans with PTSD after the terrorist attacks of September 11.** *American Journal of Psychiatry, 160,* 1684-1690. *Objective:* Community surveys have demonstrated significant psychological distress since the terrorist attacks of Sept. 11, 2001. Since people with PTSD and other mental illnesses are especially vulnerable to stressful events, the authors examined the use of PTSD treatment services and other mental health services at Department of Veterans Affairs (VA) medical centers in New York City and elsewhere after the attacks. *Method:* Analysis of variance was used to compare changes in average daily service use in the 6 months before and the 6 months after September 11, with changes in service use across the same months in the 2 previous years. Chi-square tests were used to examine differences from previous years in the proportion of new patients (i.e., who had not received treatment in the previous 6 months) entering treatment after September 11. *Results:* There was no significant increase in the use of VA services for the treatment of PTSD or other mental disorders or in visits to psychiatric or nonpsychiatric clinics in New York City after September 11 and no significant change in the pattern of service use from previous years. Nor was there a significant increase in PTSD treatment in the greater New York area, Washington, D.C., or Oklahoma City or in the proportion of new patients. *Conclusions:* No increase was observed in the use of mental health services among VA patients with PTSD or other mental illnesses in response to the terrorist attacks of September 11.

SCHLENGER, W.E., CADDELL, J.M., EBERT, L., JORDAN, B.K., ROURKE, K.M., WILSON, D., THALJI, L., DENNIS, J.M., FAIRBANK, J.A., & KULKA, R.A. (2002). **Psychological reactions to terrorist attacks: Findings from the National Study of Americans' Reactions to September 11.** *Journal of American Medical Association, 288,* 581-588. *Context:* The terrorist attacks of September 11, 2001, represent an unprecedented exposure to trauma in the United States. *Objectives:* To assess psychological symptom levels in the United States following the events of September 11 and to examine the association between postattack symptoms and a variety of indices of exposure to the events. *Design:* Web-based epidemiological survey of a nationally representative cross-sectional sample using the PTSD Checklist and the Brief Symptom Inventory, administered 1 to 2 months following the attacks. *Setting and Participants:* Sample of 2,273 adults, including oversamples of the New York, NY, and Washington, DC, metropolitan areas. *Main Outcome Measures:* Self-reports of the symptoms of PTSD and of clinically significant nonspecific psychological distress; adult reports of symptoms of distress among children living in their households. *Results:* The prevalence of probable PTSD was significantly higher in the New York City metropolitan area (11.2%) than in Washington, DC (2.7%), other major metropolitan areas (3.6%), and the rest of the country (4.0%). A broader measure of clinically significant psychological distress suggests that overall distress levels across the country, however, were within expected ranges for a general community sample. In multivariate models, sex, age, direct exposure to the attacks, and the amount of time spent viewing TV coverage of the attacks on September 11 and the few days afterward were associated with PTSD symptom levels; sex, the number of hours of television coverage viewed, and an index of the content of that coverage were associated with the broader distress measure. More than 60% of adults in New York City households with children reported that 1 or more children were upset by the attacks. *Conclusions:* 1 to 2 months following the events of September 11, probable PTSD was associated with direct exposure to the terrorist attacks among adults, and the prevalence in the New York City metropolitan area was substantially higher than elsewhere in the country. However, overall distress levels in the country were within normal ranges. Further research should document the course of symptoms and recovery among adults following exposure to the events of September 11 and further specify the types and severity of distress in children.

SCHUSTER, M.A., STEIN, B.D., JAYCOX, L.H., COLLINS, R.L., MARSHALL, G.N., ELLIOTT, M.N., ZHOU, A.J., KANOUSE, D.E., MORRISON, J.L., & BERRY, S.H. (2001). **A national survey of stress reactions after the September 11, 2001, terrorist attacks.** *New England Journal of Medicine, 345,* 1507-1512. *Background:* People who are not present at a traumatic event may experience stress reactions. We assessed the immediate mental health effects of the terrorist attacks on September 11, 2001. *Methods:* Using random-digit dialing three to five days after September 11, we interviewed a nationally representative sample of 560 U.S. adults about their reactions to the terrorist attacks and their perceptions of their children's reactions. *Results:* 44% of the adults reported one or more substantial symptoms of stress; 90% had one or more symptoms to at least some degree. Respondents throughout the country reported stress symptoms. They coped by talking with others (98%), turning to religion (90%), participating in group activities (60%), and making donations (36%). 84% of parents reported that they or other adults in the household had talked to their children about the attacks for an hour or more; 34% restricted their children's television viewing. 35% of children had one or more stress symptoms, and 47% were worried about their own safety or the safety of loved ones. *Conclusions:* After the September 11 terrorist attacks, Americans across the country, including children, had substantial symptoms of stress. Even clinicians who practice in regions that are far from the recent attacks should be prepared to assist people with trauma-related symptoms of stress.

SILVER, R.C., HOLMAN, E.A., MCINTOSH, D.N., POULIN, M., & GIL-RIVAS, V. (2002). **Nationwide longitudinal study of psychological responses to September 11.** *Journal of the American Medical Association, 288,* 1235-1244. *Context:* The September 11, 2001, attacks against the United States provide a unique opportunity to examine longitudinally the process of adjustment to a traumatic event on a national scale. *Objective:* To examine the degree to which demographic factors, mental and physical health history, lifetime exposure to stressful events, September 11-related experiences, and coping strategies used shortly after the attacks predict psychological outcomes over time. *Design, Setting, and Participants:* A national probability sample of 3496 adults received a Web-based survey; 2,729 individuals (78% participation rate) completed it between 9 and 23 days (75% within 9 to 14 days) after the terrorist attacks. A random sample of 1,069 panelists residing outside New York, NY, were drawn from the wave

1 sample (*N* = 2,729) and received a second survey; 933 (87% participation rate) completed it approximately 2 months following the attacks. A third survey (*N* = 787) was completed approximately 6 months after the attacks. *Main Outcome Measures:* September 11-related symptoms of acute stress, PTSD, and global distress. *Results:* 17% of the US population outside of New York City reported symptoms of September 11-related posttraumatic stress 2 months after the attacks; 5.8% did so at 6 months. High levels of posttraumatic stress symptoms were associated with female sex (odds ratio [OR], 1.64; 95% confidence interval [CI], 1.17-2.31), marital separation (OR, 2.55; 95% CI, 1.06-6.14), pre-September 11 physician-diagnosed depression or anxiety disorder (OR, 1.84; 95% CI, 1.33-2.56) or physical illness (OR, 0.93; 95% CI, 0.88-0.99), severity of exposure to the attacks (OR, 1.31; 95% CI, 1.11-1.55), and early disengagement from coping efforts (eg, giving up: OR, 1.68; 95% CI, 1.27-2.20; denial: OR, 1.33; 95% CI, 1.07-1.64; and self-distraction: OR, 1.31; 95% CI, 1.07-1.59). In addition to demographic and pre-September 11 health variables, global distress was associated with severity of loss due to the attacks (β = .07; *P* = .008) and early coping strategies (e.g., increased with denial: β = .08; *P* = .005; and giving up: β = .05; *P* = .04; and decreased with active coping: β = -.08; *P* = .002). *Conclusions:* The psychological effects of a major national trauma are not limited to those who experience it directly, and the degree of response is not predicted simply by objective measures of exposure to or loss from the trauma. Instead, use of specific coping strategies shortly after an event is associated with symptoms over time. In particular, disengaging from coping efforts can signal the likelihood of psychological difficulties up to 6 months after a trauma.

SIMEON, D., GREENBERG, J., KNUTELSKA, M., SCHMEIDLER, J., & HOLLANDER, E. (2003). **Peritraumatic reactions associated with the World Trade Center disaster.** *American Journal of Psychiatry, 160,* 1702-1705. *Objective:* The World Trade Center disaster was of unprecedented magnitude and impact in U.S. history. The authors conducted a pilot survey investigating these effects. *Method:* A questionnaire regarding the disaster was sent to responders to an advertisement. It included demographic and disaster-exposure questions and three scales applied to "during and shortly after" the disaster. *Results:* Despite widely ranging exposure, scores for distress (Peritraumatic Distress Inventory), dissociation (Peritraumatic Dissociative Experiences Questionnaire), and posttraumatic stress (Impact of Event Scale-Revised) were markedly elevated (N = 75). After covariance for exposure, the distress factor of loss of control most strongly predicted both early dissociation and posttraumatic stress. Life threat specifically contributed to arousal. Dissociation did not contribute beyond distress to posttraumatic stress, with the exception of re-experiencing. *Conclusions:* This survey of reactions to the World Trade Center disaster revealed high levels of early symptoms and suggested similar but independent pathways toward dissociation and posttraumatic stress.

VLAHOV, D., GALEA, S., RESNICK, H., AHERN, J., BOSCARINO, J.A., BUCUVALAS, M., GOLD, J., & KILPATRICK, D. (2002). **Increased use of cigarettes, alcohol, and marijuana among Manhattan residents after the September 11th terrorist attacks.** *American Journal of Epidemiology, 155,* 988-996. The September 11, 2001, terrorist attacks were the largest human-made disaster in the United States since the Civil War. Studies after earlier disasters have reported rates of psychological disorders in the acute postdisaster period. However, data on postdisaster increases in substance use are sparse. A random digit dial telephone survey was conducted to estimate the prevalence of increased cigarette smoking, alcohol consumption, and marijuana use among residents of Manhattan, New York City, 5-8 weeks after the attacks. Among 988 persons included, 28.8% reported an increase in use of any of these three substances, 9.7% reported an increase in smoking, 24.6% reported an increase in alcohol consumption, and 3.2% reported an increase in marijuana use. Persons who increased smoking of cigarettes and marijuana were more likely to experience PTSD than were those who did not (24.2% vs. 5.6% PTSD for cigarettes; 36.0% vs. 6.6% for marijuana). Depression was more common among those who increased than for those who did not increase cigarette smoking (22.1 vs. 8.2%), alcohol consumption (15.5 vs. 8.3%), and marijuana smoking (22.3 vs. 9.4%). The results of this study suggest a substantial increase in substance use in the acute postdisaster period after the September 11th attacks. Increase in use of different substances may be associated with the presence of different comorbid psychiatric conditions.

VLAHOV, D., GALEA, S., AHERN, J., RESNICK, H., BOSCARINO, J.A., GOLD, J., BUCUVALAS, M., & KILPATRICK, D. (in press). **Consumption of cigarettes, alcohol and marijuana among New York City residents six months after the September 11 terrorist attacks.** *American Journal of Drug and Alcohol Dependence.* Early analyses following the September 11 terrorist attacks on New York City showed an increase in cigarette, alcohol, and marijuana use, but it was unknown whether these increases would persist. A random-digit dial phone survey was conducted to estimate the prevalence of increased substance use among residents of New York City 6 to 9 months after the attacks. Among 1,570 adults, 9.9% reported an increase in smoking, 17.5% an increase in alcohol use, and 2.7% an increase in marijuana use compared to the month before September 11. These increases were comparable to increases reported in the first 1-2 months after September 11. Persons who increased use of cigarettes were more likely than those who did not to report symptoms consistent with post-traumatic stress disorder (PTSD) in the past month (4.3% and 1.2% respectively). Depression was more common among those who increased use of cigarettes (14.6% and 5.2% respectively), alcohol (11.8% vs. 5.2%), and marijuana (34.1% vs. 5.3%). Among residents living in Manhattan below 110th Street, the prevalence of PTSD and depression declined by more than half in the first six months after September 11 while the increase in substance use did not decline substantially. These results suggest that the increase in substance use after a disaster may be a cause for public health concern in the long-term.

WEISSMAN, E.M., KUSHNER, M., MARCUS, S.M., & DAVIS, D.F. (2003). **Volume of VA patients with posttraumatic stress disorder in the New York metropolitan area after September 11.** *Psychiatric Services, 54,* 1641-1643. The authors examined data from the Veterans Integrated Service Network of New York and New Jersey to determine whether the number of veterans who were treated for PTSD increased significantly after the terrorist attacks of September 11, 2001. They analyzed the number of veterans treated for PTSD at Veterans Healthcare Administration facilities in New York and New Jersey from September 1999 through June 2002. The number of veterans treated for PTSD in these facilities after September 11 exceeded projections based on secular trends, and the increase was more pronounced than for other diagnostic groups. The results highlight the need to ensure adequate availability of services in the wake of traumatic events.

ADDITIONAL CITATIONS
Annotated by the Editor

BUTLER, L.D., SEAGRAVES, D.A., DESJARDINS, J.C., AZAROW, J., HASTINGS, T.A., GARLAN, R.W., DIMICELI, S., WINZELBERG, A., & SPIEGEL, D. (2002). **How to launch a national internet-based panel study quickly: Lessons from studying how Americans are coping with the tragedy of September 11, 2001.** *CNS Spectrums, 7,* 597-603.

Describes problems encountered by the authors in launching a large internet-based survey to study the effects of the 9/11 attacks. The authors offer recommendations on topics such as trade-offs involved in internet research, challenges related to information technology, and human subjects issues.

CARDENAS, J., WILLIAMS, K., WILSON, J.P., FANOURAKI, G., & SINGH, A.(2003). **PTSD, major depressive symptoms, and substance abuse following September 11, 2001, in a midwestern university population.** *International Journal of Emergency Mental Health, 5,* 15-28.

Assessed PTSD, major depression, and substance abuse following the 9/11 attacks in a sample of 305 volunteer university students at a midwestern university that had been evacuated due to its proximity to the flight path of one of the planes that crashed during the attacks. Prevalence of PTSD was 5.9%. Risk factors included female gender, a low level of education, and prior history of mental health problems or psychological trauma.

BANAUCH, G., MCLAUGHLIN, M., HIRSCHHORN, R., CORRIGAN, M., KELLY, K., & PREZANT, D. (2002, September 11). **Injuries and illnesses among New York City Fire Department rescue workers after responding to the World Trade Center attacks.** *Morbidity and Mortality Weekly Report, 51(Special Issue),*1-5.

Contains articles about the aftermath of the 9/11 attacks, including: injuries and illness among New York City Fire Department rescue workers; impact on workers in the vicinity of the WTC; and community needs assessment of lower Manhattan residents.

EIDELSON, R.J., D'ALESSIO, G.R., & EIDELSON, J.I. (2003). **The impact of September 11 on psychologists.** *Professional Psychology: Research and Practice, 34,* 144-150.

Used a mailed survey to assess the effects of the 9/11 attacks on a sample of 712 psychologists, who represented 15% of the target sample. Psychologists working closest to Ground Zero reported the greatest impact on practice.

FLEISCHMAN, A.R., & WOOD. E.B. (2002). **Ethical issues in research involving victims of terror.** *Journal of Urban Health: Bulletin of the New York Academy of Medicine, 79,* 315-321.

Describes the unique ethical challenges in doing research with victims of terrorist events such as the 9/11 attacks. The authors offer specific recommendations of how to ensure that victims' rights are protected.

FORD, C.A., UDRY, J.R., GLEITER, K., & CHANTALA, K. (2003). **Reactions of young adults to September 11, 2001.** *Archives of Pediatric & Adolescent Medicine, 157,* 572-578.

Used data from a large ($N = 7{,}095$) longitudinal study of men and women age 18 to 26 to assess the impact of 9/11 on participants. Relative to participants interviewed in the several months prior to 9/11, those interviewed in the several months following 9/11 were more likely to report sadness but also were more likely to report trust in the government.

FREDRICKSON, B.L., TUGADE, M.M., WAUGH, C.E., & LARKIN, G.R. (2003). **What good are positive emotions in crises? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001.** *Journal of Personality and Social Psychology, 84,* 365-376.

Tested the role of positive emotions in mediating the relationship between resilience measured prior to the 9/11 attacks and outcomes measured after 9/11 in a sample of 46 young adult men and women in the US. Analyses showed that positive emotions following the attacks completely explained the relationship between preattack resilience and postattack outcomes.

GRIEGER, T.A., BALLY, R.E., LYSZCZARZ, J.L., KENNEDY, J.S., GRIFFETH, B.T., & REEVES, J.J. (2003). **Individual and organizational interventions after terrorism: September 11 and the USS Cole.** In R.J. Ursano, C.S. Fullerton, & A.E. Norwood (Eds.), *Terrorism and disaster: Individual and community mental health interventions* (pp. 71-89). Cambridge, UK: Cambridge University Press.

Describes the response to the 9/11 attacks and two other terrorist attacks by the US Navy's Special Psychiatric Rapid Intervention Teams—SPRINT. Elements addressed in each instance included planning and training, situational assessment, logistical considerations, and interventions.

LEVANT, R.F., BARBANEL, L., & DELEON, P.H. (2004). **Psychology's response to terrorism.** In F.M. Moghaddam & A.J. Marsella (Eds.), *Understanding terrorism: Psychosocial roots, consequences, and interventions* (pp. 265-282). Washington, DC: American Psychological Association.

Describes the efforts made by the American Psychological Association in the aftermath of the 9/11 attacks to address the effects of terrorism. The authors also discuss evidence about the effects of promoting resilience in response to terrorism.

PETERSON, C., & SELIGMAN, M.E.P. (2003). **Character strengths before and after September 11.** *Psychological Science, 14,* 381-384.

Used findings from an ongoing online survey to assess whether positive changes of self-perceived character strengths occurred following the 9/11 attacks. Responses in the two months after the attacks were more positive than responses in the two months before the attacks.

PIOTRKOWSKI, C.S., & BRANNEN, S.J. (2002). **Exposure, threat appraisal, and lost confidence as predictors of PTSD symptoms following September 11, 2001.** *American Journal of Orthopsychiatry, 72,* 476-485.

Administered questionnaires to 126 New York City workers 6 months after the September 11 attacks. PTSD symptoms were associated with direct exposure, worries about future terrorist attacks, and reduced self-confidence following the attacks.

RUDENSTEIN, S., GALEA, S., AHERN, J., FELTON, C., & VLAHOV, D. (2003). **Awareness and perceptions of a communitywide mental health program in New York City after September 11.** *Psychiatric Services, 54,* 1404-1406.

Used a random-digit-dial telephone survey of 2,001 New York City residents to assess familiarity with mental health services available for problems related to the 9/11 terrorist attack. Individuals with socioeconomic disadvantages and probable PTSD reported a higher likelihood of potential service use.

PILOTS UPDATE

A bibliographical database can be more than a mechanism for finding documents that meet certain criteria. It can also serve as a tool for understanding the evolution of a discipline and the development of its literature. This bibliometric study can lead to new discoveries with important clinical applications.

Bibliometrics — the use of quantitative and qualitative descriptive methods to examine documents or document surrogates — is a branch of scientometrics, the quantitative study of scientific activity. Ever since Derek de Solla Price published his seminal paper on "Networks of scientific papers" in 1965, the process of citation has been used to study and describe the intellectual relationships among scientific researchers. The immense collections of citation data contained in the *Science Citation Index* and the *Social Science Citation Index* are valuable resources for this work.

Data mining uses automated processes to analyze large collections of raw data and extract meaningful patterns that can be used in commercial or scientific applications. It can be applied to textual data, including large compilations of bibliographical records.

Swanson (1990) has demonstrated several instances in which literature synthesis has led to research with important clinical implications. He also suggests (1991) that literature synthesis can lead to the emergence of new hypotheses and scientific discoveries in other disciplines. Among these is the timely topic of identifying viruses with potential for development as weapons (Swanson et al., 2001). Swanson's pioneering work has inspired other information scientists to explore opportunities for literature-based discovery.

In recent years the evaluation of bibliometric findings has been augmented by the information visualization techniques made possible by advances in computer graphics. As Edwin Tufte (1997) has taught us, these techniques must be used with care, lest they lead to confusion (or even disaster) rather than enlightenment. But when they are used properly, they can tell us much more than we can possibly learn from a mere list of references. For example, information visualization could help us better to understand the application of lessons learned in the aftermath of one traumatic incident to subsequent situations.

We believe that the PTSD literature offers a fruitful field for bibliometric research. The literature is international and interdisciplinary, and its development can be traced back into the 19th century. It is large enough to allow for meaningful statistical investigation, but small enough to make such research manageable. And, as librarians would say, it is under adequate bibliographic control.

We also believe that the PILOTS database offers a valuable resource for anyone undertaking this study. Its scope reflects the international, interdisciplinary nature of the literature. Its indexing vocabulary — the PILOTS Thesaurus — allows the easy discovery and extraction of publications on narrow subjects within the literature, or elaborate combinations of search terms. And its readily availability (access is free of charge, with no registration or password required) and choice of search interfaces makes it easy for researchers to assess its utility for their purposes.

We have begun to collaborate with information scientists in using the PTSD literature as a testbed for bibliometric techniques. Our hope is that this will teach us more about the nature of this literature — and about how we can better use it to improve the care of trauma survivors.

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SWANSON, D.R., SMALHEISER, N.R., BOOKSTEIN, A. (2001). **Information discovery from complementary literatures: Categorizing viruses as potential weapons**. *Journal of the American Society for Information Science and Technology*, *52*, 797-812.

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