

Involvement in the Criminal Justice System Among Recipients of Mental Health Services After September 11

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Objective: This study examined the relative risk of arrest among recipients of mental health services in Washington, D.C., during the 23 months before and the 13 months after the terrorist attacks of September 11, 2001, with the purpose of identifying any change in involvement with the criminal justice system after the attacks. **Methods:** Analysis of anonymous data sets provided by the local mental health and police departments provided measures of risk of arrest, relative to that of the general population, for the approximately 5,000 people receiving mental health services each month. Interrupted time-series analysis was used to measure change in relative risk during the 36-month study period. **Results:** Significant increases were noted in relative risk of arrest after September 11, 2001, among male, nonwhite young-adult recipients of mental health services. Significant change was evident for eight of the 12 age, gender, and racial groups used in this analysis. **Conclusions:** Disaster planning and response should include attention to involvement with the criminal justice system among recipients of mental health services. Future research should focus on the nature of the relationship between terrorism and arrest among service recipients. (*Psychiatric Services* 56:80–84, 2005)

Shortly after the terrorist attacks of September 11, 2001, it was recognized that the events had significant potential to disrupt the lives of persons with mental illness. A needs assessment in Virginia raised concern that the events had “triggered psychotic behavior in vulnerable populations, including adults with serious mental illnesses” (1). A Washington, D.C., study found increased levels of fear and anxiety among con-

sumers of mental health services after the attacks (2). New York’s Institute for Applied Psychiatry (3) identified “people already having a psychiatric diagnosis” as among those with an elevated need for mental health services as a result of terrorism.

Despite this early concern, discussions of the impact of the events of September 11 have focused almost entirely on the general population in the United States. These discussions

included concern about the impact of terrorism on the mental health of the general population and concerns about the impact of government responses to terrorism (4). Little attention has been devoted to the impact of terrorism on persons with serious mental illness (5).

This article describes changes in levels of involvement with the criminal justice system among recipients of mental health services in the District of Columbia, relative to that of the general population, after the terrorist attacks of September 11, 2001. We compared the relative risk of arrest during the year after the attacks with that during the previous two years. Because of the substantial variation in involvement with the criminal justice system among demographic groups, our analysis focused on 12 age, gender, and race categories. The study was a follow-up study to a Vermont study that found a substantial increase in the relative risk of arrest among young adults with serious mental illness during September 2001 (6). The study reported here was conducted to provide managers of the public mental health service system in the District of Columbia with an understanding of the potential of terrorist attacks to affect the lives of recipients of mental health services.

Methods

Anonymous extracts from administrative mental health and criminal justice databases were analyzed to deter-

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mine arrest rates for each of the 36 months in the study period. Because the mental health and arrest data sets do not share unique personal identifiers, probabilistic population estimation (7) was used to determine the number of individuals represented in each mental health data set who were also represented in the corresponding criminal justice data set. Interrupted time-series analysis (8) was used to measure change in the likelihood of involvement with the criminal justice system associated with the events of September 11.

Study participants

The study participants were all adults (persons aged 18 to 64 years) who were being served by public mental health programs in Washington, D.C., during the period October 1999 through September 2002. This caseload includes about 5,000 individuals served each month. A majority of these individuals had a severe mental illness and were covered by Medicaid. Men and women were served in about equal numbers. The caseload was predominately non-white (90 percent). A majority (more than 50 percent) of persons were aged 35 to 49 years; more than 25 percent were aged 50 to 64 years, and more than 20 percent were aged 18 to 34 years. Within each of these three age groups, separate analyses were conducted for men and women and for white and nonwhite individuals to yield a total of 12 cohorts. Because this project involved program evaluation using anonymous data, institutional review board approval was not required.

Statistical analysis

The number of mental health service recipients who were arrested each month was determined by using probabilistic population estimation, a statistical procedure derived from a solution to the classic mathematical "coupon collector problem" presented by Feller (9). Probabilistic population estimation determines the number of individuals represented in data sets on the basis of distributions of dates of birth rather than unique personal identifiers. The number of individuals necessary to produce the

number of birthdays observed in a single birth year cohort would be calculated with use of this formula:

$$P_j(1_j) = \sum_{i=1}^j \frac{365}{365-i}$$

where P_j represents the number of persons and i represents the number of birth dates observed.

To probabilistically determine the number of persons shared across data sets that do not include a common person identifier, the sizes of three populations are determined and the results compared. The number of persons in each of the original data sets constitute the first two populations. The number of individuals in a data set formed by combining the two original data sets constitute the third data set.

The number of persons who are shared by the two data sets is the difference between the sum of the numbers of persons represented in the two original data sets and the number of persons represented in the combined data set. This outcome occurs because the sum of the number of individuals represented in the two original data sets involves a double count of every person who is represented in both data sets. The number of persons represented in the combined data set does not include this duplication. The difference between these two numbers is the size of the duplication between the two original data sets—the size of the caseload overlap. In terms of mathematical set theory, the intersection of two sets is the difference between the sum of the sizes of the two sets ($A + B$) and the union of the two sets ($A \cup B$):

$$(A \cap B) = (A + B) - (A \cup B).$$

This approach has the major advantage of ensuring the personal privacy of individuals and the confidentiality of medical records (10). This statistical procedure provides valid and reliable measures of the size and overlap of data sets that do not include personal identifiers (7). The approach is particularly useful when concerns about the confidentiality of medical records limit the use of personally identifying information.

The relative risk of arrest among recipients of mental health services was measured for each month during the study period. Arrest rates for each month were calculated for "current" mental health clients—those who received at least one mental health service during that month or during the previous two months. The relative risk of arrest is calculated by dividing the arrest rate for service recipients by the arrest rate for the general population. A relative risk of 1 indicates that there is no difference between the two arrest rates. A relative risk of 2 means that service recipients were twice as likely as other residents of Washington, D.C., to be arrested.

Our analysis focused on the relative risk of arrest rather than the simple arrest rates among recipients of mental health services, because we were interested in the degree to which mental health service recipients were treated differently from other residents of Washington, D.C. The relationship between catastrophic events and general social upheaval or disorganization has been observed since as early as the fifth century B.C.E., when Thucydides described "lawless extravagance" in Athens during the period of the Peloponnesian War and plague (11). The lawlessness that accompanied the 2003 collapse of the Ba'ath regime in Baghdad in 2003 is a more recent example. By examining the relative risk of involvement with the criminal justice system, we statistically controlled for any more general social upheaval that followed the events of September 11, 2001, in Washington, D.C.

Interrupted time-series analysis was used to measure change in the likelihood of involvement with the criminal justice system associated with the events of September 11 (8). Our method of interrupted time-series analysis was to fit the 36 months of relative risk with two separate linear regressions, using SPSS, version 12.0. The first portion of the time series covered the period October 1999 through August 2001. The second portion covered the period September 2001 through September 2002. This procedure provided information about the direction and statistical sig-

Table 1

Change in relative risk of arrest among recipients of community mental health services in Washington, D.C., before and after September 11, 2001

Age, gender, and race cohort	Number served		Relative risk in October 1999		Change in relative risk (annual) October 1999 to August 2001		Relative risk in September 2001		Change in relative risk (annual) September 2001 to September 2002	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
18 to 34 years										
Male ^a	256	.4	1.2	.4	.02	.4	.6	.5	2.3	.9*
Female	231	.4	4.6	1.3*	1.7	1.2	7.2	1.8	-1.2	3.1
White	30	.1	12.3	2.4*	-4.7	2.3*	5.5	2.4*	2.2	4.1
Nonwhite	458	.6	1.2	.3	.2	.3	1	.6	1.9	1*
35 to 49 years										
Male ^a	691	1.1	1	.3	.2	.3	1.9	.4*	-1.5	.7*
Female ^a	667	1.1	2.7	.7*	.1	.6	4.9	.7	-2.3	1.1*
White	103	.2	4.6	.6*	-.1	.5	5	1.7*	-1.6	2.8
Nonwhite ^a	1,255	1.5	1	.3	.2	.2	2	.3*	-1.4	.6*
50 to 64										
Male ^a	334	.5	2.8	.5*	-.8	.5	3.3	1*	-1.1	1.8
Female ^a	389	.6	2.6	1.4	4	1.3*	11.5	2.2*	-6.7	3.7*
White ^a	103	.2	6.4	2*	-3.2	1.9	12.7	3.4*	-12.5	5.8*
Nonwhite	620	.8	2.3	.5*	-.1	.4	3.2	.9*	-.9	1.5

^a Experienced a significant change on or after September 11, 2001

* Significantly elevated compared with the general population, $p < .05$

nificance of changes that occurred before the attacks, at the time of the attacks, and after the attacks.

Durbin-Watson statistics for each of the 12 time-series analyses provided no evidence of autocorrelated residuals. Correlations ranged from -.28 to .26 and averaged .002. This result allows for direct interpretation of levels of significance on the basis of unadjusted data. To summarize the results of this interrupted time-series analysis, we report four relative risk values (Table 1). These values include the estimated relative risk, based on the time-series analysis, for October 1999, the annual change in relative risk in the two years before September 2001, the estimated relative risk in September 2001, and the annual change in relative risk during the 13 months after September 2001. The statistical significance of changes in relative risk reported in Table 1 are based on a comparison of the observed values with no change—that is, 0. The significance levels of the relative risks reported in Table 1 are based on a comparison of the observed value and no elevated risk—that is, 1. All statistical tests were *t* tests associated with the linear regression.

Results

Application of the analysis described above to each of the 12 demographic groups indicated a significant change in relative risk of involvement with the criminal justice system after September 11 for most of these cohorts. For example, among young male recipients of mental health services in Washington, D.C. (Figure 1 and Table 1), the risk of involvement with the criminal justice system was not elevated relative to that of the general population in October 1999 (mean±SE of 1.2±.4). During the two years before September 2001, no change in this relative risk was observed (annual change in relative risk=.02±.4).

Our analysis indicated that, during the month after September 11, there was a nonsignificant decrease in the relative risk of involvement with the criminal justice system (.6±.5). In the year after September 2001, there was a significant and substantial increase in relative risk of arrest among young male recipients of mental health services in Washington, D.C. (annual change in relative risk=2.3±.9). Similar analyses indicated that recipients of mental health services in eight of our 12 age-gender and age-race cate-

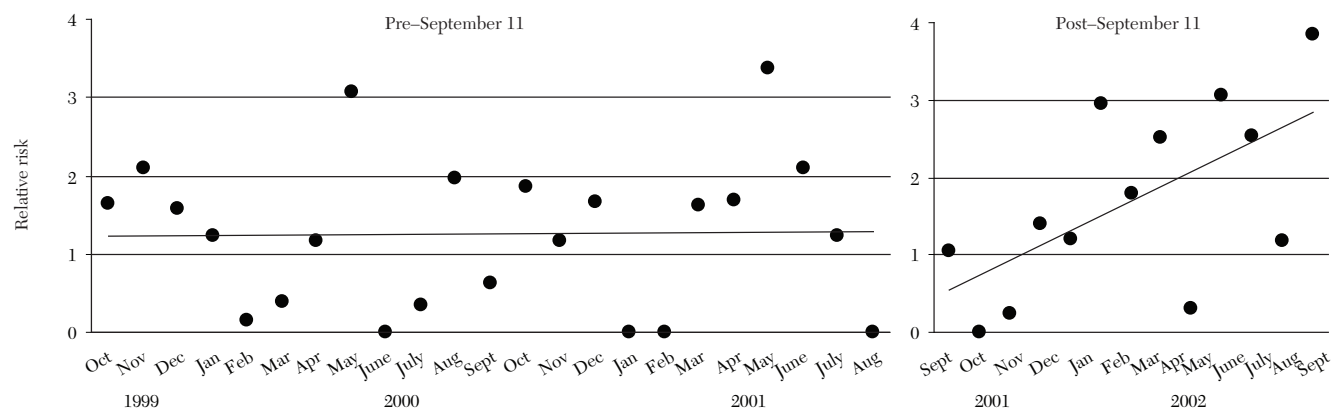
gories experienced a significant change in relative risk of arrest at the time of the terrorist attacks or during the months that followed the terrorist attacks (Table 1).

The most substantial changes in relative risk of arrest associated with the September 11 attacks were evident among young adult recipients of mental health services (persons aged 18 to 34 years). The relative risk of arrest among young male service recipients increased at an annualized rate of 2.3 during the 13 months after September 11, as described above. The relative risk of arrest among young nonwhite service recipients increased at a rate of almost 2 during this same period.

Change in the relative risk of arrest in the 35- to 49-year age group was less substantial. Women in this age group experienced a significant increase in relative risk of arrest in September 2001 that was followed by a significant decrease during the months after September 11. Men and nonwhite adults in this age group both experienced a significant decrease in relative risk during the months after September 11, after both experienced insignificant increases in September 2001.

Figure 1

Relative risk of arrest among men aged 18 to 34 years in Washington, D.C., before and after September 11, 2001



In the 50- to 64-year age group, male service recipients experienced a significant increase in relative risk in September 2001. This increase was preceded and followed by periods of no significant change. Women in this age group experienced a significant decrease in relative risk of arrest after September 11 that followed a significant increase during the months before September 11 and a significant decrease after September 11. Finally, risk of arrest for white individuals in this age group decreased during the months before September 11 to a point that was below that of the general population, and then increased to a rate that was 12 times that of the general population in September 2001. This increase was followed by a return to previous levels by the end of the study period.

Discussion

We found that young male (both white and nonwhite) recipients of mental health services in Washington, D.C., experienced a significant and continuing increase in relative risk of involvement with the criminal justice system after the events of September 11, 2001. Some other age groups experienced a significant increase in relative risk immediately after September 11, but these groups returned to their previous level of relative risk during the year after September 2001. This immediate increase, followed by a rapid decline in elevated risk of involvement with the criminal justice system, was also evident in

earlier research conducted in Vermont (6). However, in Vermont, this pattern was evident among young men as well as in other age and gender groups. Both public policy and future research in this area should be sensitive to these two distinct patterns: the predominant pattern of short-term increase followed by decline, and the specific pattern of gradual but sustained increase over time.

From a public policy perspective, developing a better understanding of the nature of the relationship between terror-related emergencies and increases in risk of arrest among recipients of mental health services should be an important goal. A number of explanations could be consistent with these findings. The elevated relative risk of arrest immediately after September 11 could have been the result of increased stress-induced acting out by service recipients or the result of less police tolerance of unusual behavior (12). Increasing relative risk of arrest after September 11 could have been the result of increasing substance use and abuse, change in the ability of formal and informal caregivers to provide necessary supports, or gradual changes in the social and economic fabric of the District of Columbia.

The relative contribution of citizens' behavior, police response, caregivers' behavior, and large socioeconomic factors are important issues that cannot be addressed with the data used in this study. Rosenheck and Fontana's (13) finding of little or

no change in symptoms among veterans with posttraumatic stress disorder suggests that immediate changes in the behavior of service recipients may be less important than changes in the behavior of the police or caregivers or changes within the larger community.

Future research should be designed to determine whether similar changes in risk of arrest occurred in other parts of the United States around the time of the terrorist attacks of September 11, 2001. Future research should also explore the possibility that other events that may induce social or cultural trauma are associated with similar consequences. Events such as the Oklahoma City bombing, the Columbine shootings, and the more recent sniper episode in the Washington, D.C., area provide obvious tests of the generalizability of the patterns found here.

Fortunately, the method used in this study allows for such studies to be conducted without invading the privacy of the individuals and communities involved, and the data that provide for the replication of this study with regard to criminal justice and other consequences are widely available.

Conclusions

The substantial increase in arrest rates among young adult recipients of mental health services after September 11, 2001, raises important concerns from a public policy perspective. These concerns relate to potential harm to the mentally ill arrestee,

additional burden on the criminal justice system, and cost to the public. Given the continuing threat of terrorist activity in the United States, the knowledge provided by this research should be part of the disaster planning process in the mental health service sector and in the public safety and service arena as a whole. Public policy planning for possible future terrorist attacks should include procedures for avoiding unnecessary involvement with the criminal justice system among young adults who have mental disorders. Such procedures could include increased availability of emergency mental health interventions, early diversion from the criminal justice system, and alternative residential treatment options when necessary. ♦

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Submissions for Datapoints Invited

Submissions to the journal's Datapoints column are invited. Areas of interest include diagnosis and practice patterns, treatment modalities, treatment sites, patient characteristics, and payment sources. National data are preferred. The text ranges from 350 to 500 words, depending on the size and number of figures used. The text should include a short description of the research question, the database and methods, and any limitations of the study.

Inquiries or submissions should be directed to Harold Alan Pincus, M.D., or Terri L. Tanielian, M.S., editors of the column. Contact Ms. Tanielian at RAND, 1200 South Hayes Street, Arlington, Virginia 22202 (terri_tanielian@rand.org).