ORIGINAL ARTICLE

Violence by People Discharged From Acute Psychiatric Inpatient Facilities and by Others in the Same Neighborhoods

Henry J. Steadman, PhD; Edward P. Mulvey, PhD; John Monahan, PhD; Pamela Clark Robbins, BA; Paul S. Appelbaum, MD; Thomas Grisso, PhD; Loren H. Roth, MD; Eric Silver, MA

Background: The public perception that mental disorder is strongly associated with violence drives both legal policy (eg, civil commitment) and social practice (eg, stigma) toward people with mental disorders. This study describes and characterizes the prevalence of community violence in a sample of people discharged from acute psychiatric facilities at 3 sites. At one site, a comparison group of other residents in the same neighborhoods was also assessed.

Methods: We enrolled 1136 male and female patients with mental disorders between the ages of 18 and 40 years in a study that monitored violence to others every 10 weeks during their first year after discharge from the hospital. Patient self-reports were augmented by reports from collateral informants and by police and hospital records. The comparison group consisted of 519 people living in the neighborhoods in which the patients resided after hospital discharge. They were interviewed once about violence in the past 10 weeks.

Results: There was no significant difference between the prevalence of violence by patients without symptoms of substance abuse and the prevalence of violence by others living in the same neighborhoods who were also without symptoms of substance abuse. Substance abuse symptoms significantly raised the rate of violence in both the patient and the comparison groups, and a higher portion of patients than of others in their neighborhoods reported symptoms of substance abuse. Violence in both patient and comparison groups was most frequently targeted at family members and friends, and most often took place at home.

Conclusions: "Discharged mental patients" do not form a homogeneous group in relation to violence in the community. The prevalence of community violence by people discharged from acute psychiatric facilities varies considerably according to diagnosis and, particularly, co-occurring substance abuse diagnosis or symptoms.

Arch Gen Psychiatry. 1998;55:393-401

From Policy Research Associates Inc, Delmar, NY (Dr Steadman, Ms Robbins, and Mr Silver); University of Pittsburgh School of Medicine, Pittsburgh, Pa (Drs Mulvey and Roth); University of Virginia School of Law, Charlottesville (Dr Monahan); and University of Massachusetts Medical School, Worcester (Drs Appelbaum and Grisso).

FOR 75 YEARS, studies have attempted to estimate the prevalence of violence committed by people discharged from psychiatric facilities in the United States, and to compare that rate with the prevalence of violence by others in their communities.[1-3] These studies have been invoked in legal and policy debates concerning standards for hospital admission and discharge, for community placement and monitoring, and for tort liability.[4] Four methodological problems consistently have compromised this work: (1) existing studies use weak markers for the occurrence of community violence, such as reliance solely on official arrest records,[5] rehospitalization records,[6] or uncorroborated self-reports (see Swanson et al[7]; compare Lidz et al[8]); (2) due to these weak markers, descriptive information essential for understanding violence in context is often missing from existing studies[9]; (3) existing studies rarely have reported data on the timing of violent acts, despite the implications for intervention that timing may have[10]; and (4) existing studies have tended to enroll only subjects who are presumed to have a high base rate of violence; eg, men with a history of violence.[8,11] Because different factors may be associated with violence among men than among women, and with repeated violence than with the first occurrence,[12] these inclusion criteria limit the generalizability of reported findings.

For editorial comment see page 403

This article reports data from the MacArthur Violence Risk Assessment

This article is also available on our Web site: www.ama-assn.org/psych.

©1998 American Medical Association. All rights reserved.
Downloaded From: http://archpsyc.jamanetwork.com/ on 02/07/2016

SUBJECTS AND METHODS

PATIENT SAMPLE

Admissions were sampled from acute inpatient facilities at 3 sites: Western Psychiatric Institute and Clinic, Pittsburgh, Pa (a university-based specialty hospital); Western Missouri Mental Health Center, Kansas City (a public mental health center); Worcester State Hospital, Worcester, Mass (a state psychiatric hospital); and the University of Massachusetts Medical Center, Worcester (a university-based general hospital). Selection criteria were (1) civil admissions, (2) between the ages of 18 and 40 years, (3) English-speaking, (4) white or African American ethnicity (or Hispanic in Worcester only), and (5) a medical record diagnosis of schizophrenia, schizophreniform disorder, schizoaffective disorder, depression, dysthymia, mania, brief reactive psychosis, delusional disorder, alcohol or other drug abuse or dependence, or a personality disorder. Eligible patients were sampled according to age, sex, and ethnicity to maintain a consistent distribution of these characteristics across sites. The mean time between hospital admission and approach by the research interviewer to obtain informed consent was 4.5 days. Eligible subjects were excluded if they had been hospitalized for 21 days or more prior to being approached. Data collection began in mid 1992 and ended in late 1995.

HOSPITAL DATA COLLECTION

Hospital data collection was conducted in 2 parts: an interview by the research interviewer to obtain data on demographic and historical factors and an interview by a research clinician (PhD or MA/MSW) to confirm the medical record diagnosis using the *DSM-III-R* checklist[13] (or to confirm a personality disorder using the Structured Interview for *DSM-III-R* Personality[14] when no eligible Axis I diagnosis was present). Checklist diagnoses corresponded to a medical record diagnosis in 85.7% of the cases. Discrepant diagnoses were resolved by a consultant psychiatrist at each site. Patients remaining in the hospital for more than 145 days were dropped from the study (n=3).

Supplementary data were abstracted from patients' records. A full discussion of all measures can be found elsewhere.[15] To obtain information on sample bias, similar medical record information was collected for a random sample of patients (≈1000 at each site) who were eligible for the study but not enrolled.

POSTHOSPITAL DISCHARGE DATA COLLECTION

Patients were recontacted in the community by the research interviewers and interviewed 5 times (every 10 weeks) for 1 year from the date of discharge. Patient interviews were in person (89%) or by telephone (11%). A collateral informant was also interviewed (in person, 45%; by telephone, 55%) on the same schedule. During each follow-up, a patient was asked to nominate as a collateral informant the person who was most familiar with his or her behavior in the community. If the nominee did not have at least weekly contact with the subject, the interviewer suggested a more appropriate person based on a review of the subject's social network data. Collateral informants were most often family members (47.1%), but were also friends (23.9%), professionals (13.9%), significant others (12.4%), or others (eg, coworkers, 2.7%). Patients and collateral informants were paid for their participation. Arrest and rehospitalization records were also obtained.

VIOLENCE CODING AND RECONCILIATION

Subjects and collateral informants were asked whether the subject had engaged in several categories of aggressive behavior in the past 10 weeks.[8] If a positive response was given, the subject or informant was asked to list the number of times the behavior occurred. Detailed information was obtained about each act, including the target and location.

Study, a project that addressed these 4 methodological issues. Prevalence rates for violence are presented that derive from 3 sources—self-report, reports of collateral informants, and official agency records. The violence is described in terms of the type of act committed, its target, and its location. Prevalence rates are examined for change over time by segmenting a 1-year follow-up into five 10-week periods. Data derive from a broad sample of recently discharged patients at 3 sites. At one site, comparative violence rates were obtained by the same research interviewers applying the same instruments both to patients recently discharged from the hospital and to other persons living in the same neighborhoods.

RESULTS

ENROLLMENT AND RETENTION

During the study period, 12 873 persons were admitted to the research facilities, of whom 7740 met eligibility criteria (**Figure 1**). We approached a quota sample of 1695 to participate. The refusal rate was 29.0% (n=492). The final sample that was given a hospital interview was 1136. The median length of hospitalization for enrolled patients at the 3 sites was 9.0 days.

At the Pittsburgh site, 4069 persons were admitted, of whom 2532 met our eligibility criteria (**Figure 2**). We approached 629 to participate. The refusal rate was 33.2% (n=209). The final sample given a hospital interview was 391. The median length of hospitalization for enrolled patients in Pittsburgh was 15.0 days.

We obtained at least 1 follow-up interview for 83.7% of the patients (Pittsburgh sample, 85.9%). Three or more follow-up interviews were obtained for 72.0% of the patients and 77.3% of the collateral informants (Pittsburgh sample, 75.4% and 79.5%, respectively) and all 5 follow-up interviews were obtained for 49.6% of the patients and 44.7% of the collateral informants (Pittsburgh sample, 58.1% and 47.9%, respectively).

For the community group, 10 566 of the 287 360 residential households in the 208 census tracts in the greater Pittsburgh area were sampled (Figure 2). Telephone

©1998 American Medical Association. All rights reserved.
Downloaded From: http://archpsyc.jamanetwork.com/ on 02/07/2016

For statistical analyses, acts were divided into 2 categories of seriousness: violence (battery that resulted in physical injury, sexual assaults, assaultive acts that involved the use of a weapon, or threats made with a weapon in hand) and other aggressive acts (battery that did not result in physical injury). Acts reported by any information source were reviewed by 2 independent coders to obtain a single reconciled report of violence. Only the most serious act for each incident was coded. A hierarchy of coding rules is available from the authors.

COMMUNITY SAMPLE: PITTSBURGH

The University of Pittsburgh's Center for Social and Urban Research identified a community sample in Pittsburgh such that the distribution of the census tracts in which that sample resided was the same as the distribution of the census tracts in which the patients resided during the year following discharge. In addition to living in a specified census tract, the community respondent had to have lived at the current address for at least 2 months, be between the ages of 18 and 40 years, and be of either white or African American ethnicity.

Sample frames were constructed by compiling lists of all addresses within the census tract. To incorporate no-telephone households, 1990 US census data were used to provide an estimate of the number of such households per census tract (3.4% of the total) and that proportion of interviews was obtained by soliciting respondents in public places.

The subjects in the community sample were interviewed only once. They and their collateral informants were questioned about the subjects' behavior in the past 10 weeks. Official arrest records were also obtained.

DATA ANALYSIS

The significance of differences in prevalence rates among diagnostic groups and across the 5 follow-up periods was tested using log linear modeling, fitting what was ultimately a 3 (diagnostic group) × 5 (follow-up) × 2 (violent/not violent) model to the data. Individual frequency values were treated as rank order data and analyzed using the nonparametric Kruskal-Wallis 1-way analysis of variance (ANOVA).

Differences in Pittsburgh between the neighborhood distributions of the community sample and the patient sample were adjusted by weighting subjects in the community sample to make the distributions equivalent. The community sample was weighted again, using an iterative proportional fit process,[16] to conform to the 1990 US census distributions on sex, ethnicity, age, and education for the census tracts in which the patients resided during the 1-year follow-up. Analyses between the Pittsburgh patient sample at each follow-up and the weighted community sample were done using hierarchical logistic regression, with violence and other aggressive acts as the binary dependent measures. We could not disaggregate both samples by a diagnosis of substance abuse or dependence, because we did not administer the *DSM-III-R* checklist to the comparison group. We did, however, administer the Michigan Alcoholism Screening Test (MAST)[17] and the Drug Abuse Screening Test (DAST)[18] to the comparison sample and to the patients at each follow-up. Therefore, we disaggregated both samples by the presence of 1 or more symptoms on either the MAST or the DAST. Demographic features (age, ethnicity, sex) and social desirability[19] (ie, bias to give socially acceptable answers), as well as all possible interaction terms among these variables, were entered first in the equation, followed by the presence of MAST or DAST symptoms. Group membership (whether in the patient group or the community group) was entered next, and the magnitude of this effect was taken as an indicator of whether the community and patient groups differed significantly. Finally, an interaction term representing group membership and presence of alcohol or drug abuse symptoms was entered to assess whether the magnitude of the relationship between symptoms and violence differed across the patient and community groups.

screening was used to determine eligibility in most (72.3%) cases. Mailings were used to recruit from households with nonpublished telephone numbers (24.3%).

An estimated 3304 (64%) of the 5175 households contacted were screened for eligibility (the remaining contacts resulting in hang-ups before the study could be explained). Of the 1306 persons screened as eligible, 680 refused and 626 consented. Those who consented during the telephone screening but were not later enrolled included 49 who refused when the interviewer arrived and 28 ultimately who were found ineligible. The refusal rate for community residents screened as eligible, therefore, was 57.0% [(680+49)/(1306–28)]. The final community sample was composed of 519 subjects.

SAMPLE DESCRIPTION

Patients who consented to participate were significantly younger, less likely to have a medical record diagnosis of schizophrenia, and more likely to have medical record diagnoses of alcohol or other drug abuse and personality disorder than patients who refused to participate (**Table 1**). Compared with enrolled patients who were lost to follow-up, patients in the follow-up sample were significantly more likely to have a medical record diagnosis of bipolar disorder, less likely to have a medical record diagnosis or a medical record history of alcohol or other drug abuse, less likely to have a legal status of gravely disabled, and less likely to have a documented history of violence toward family members or others.

Depression was the most frequent primary diagnosis determined by our research clinicians and a large proportion of cases with a primary diagnosis of mental disorder had a co-occurring diagnosis of substance abuse or dependence (**Table 2**). In Pittsburgh, as compared with the community sample, the patient sample was significantly more likely ($P<.01$) to be male (56.5% vs 47.0%) and was significantly older ($P<.01$) (30.2 years vs 28.8 years). There was no significant racial difference between the Pittsburgh samples (patients, 65.0% white; community, 70.1% white).

©1998 American Medical Association. All rights reserved.
Downloaded From: http://archpsyc.jamanetwork.com/ on 02/07/2016

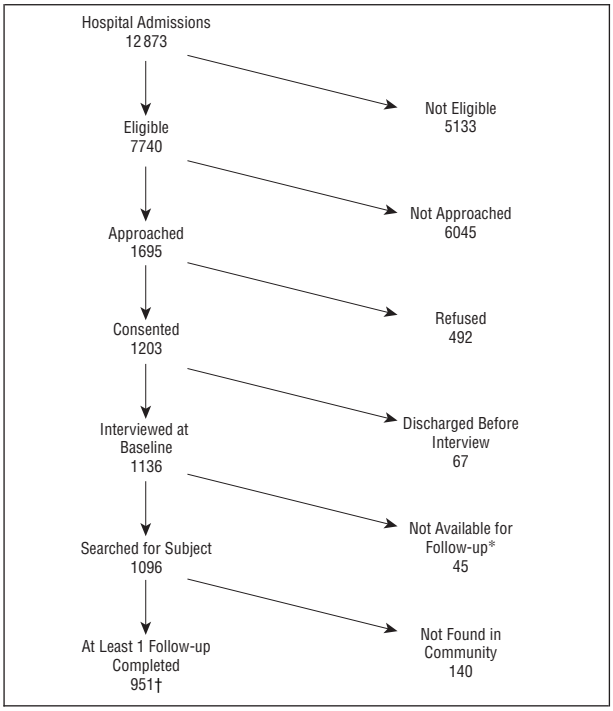

Figure 1. *Asterisk includes 34 subjects who dropped out before follow-up 1, 8 subjects with no community time during follow-up 1, and 3 subjects who stayed in the hospital more than 145 days; dagger, includes 36 subjects who subsequently dropped out.*

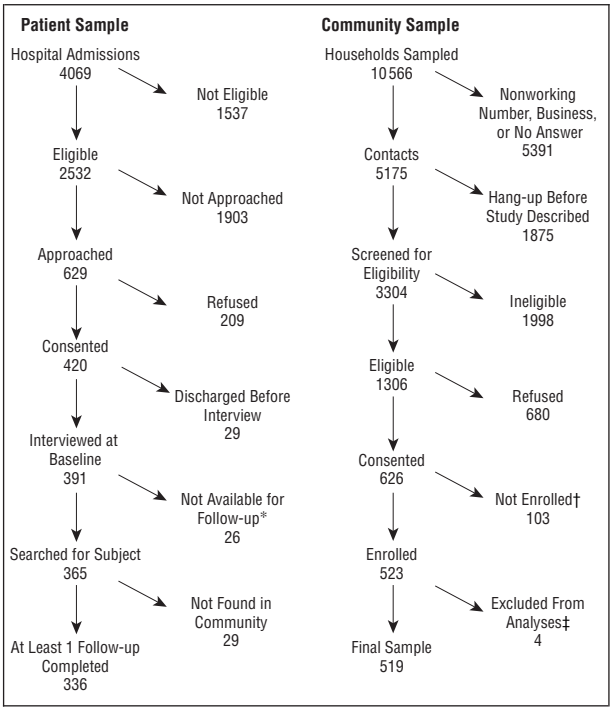

Figure 2. *Asterisk includes 23 subjects who dropped out before follow-up 1 and 3 subjects with no community time during follow-up 1; dagger, includes 49 subjects who later refused, 28 subjects later found to be ineligible, and 26 subjects not interviewed because the sample size was achieved; and double dagger, includes 4 subjects who had been in a psychiatric hospital in the past 10 weeks.*

PREVALENCE RATES OF PATIENT VIOLENCE

The proportion of patients with at least 1 act of violence during the 1-year follow-up (ie, the period prevalence rate) was 4.5% using agency records alone; 23.7% adding patient self-reported acts that had not been in agency records; and 27.5% adding collateral informant–reported acts that had not been in either agency records or patient self-reports (**Table 3**). A similar increase is seen with other aggressive acts.

Following exploratory analyses that indicated the importance of diagnosis, rates of violence and other aggressive acts were calculated separately for 3 diagnostic groups, as determined by our research clinicians. The first group (n=462) consists of patients with a diagnosis of major mental disorder (schizophrenia, schizophreniform disorder, schizoaffective disorder, depression, dysthymia, mania, cyclothymia, or other psychotic disorder [including delusional disorder, atypical psychosis, and brief reactive psychosis]) who did not also have a diagnosis of substance abuse or dependence (the MMD/NSA group). The second group (n=468) consists of patients with a diagnosis of major mental disorder and a co-occurring diagnosis of substance abuse or dependence (the MMD/SA group). The third group (n=185) consists of patients with a diagnosis of an "other" mental disorder (ie, a personality or an adjustment disorder, and several cases of "suicidality") and a co-occurring diagnosis of substance abuse or dependence (the OMD/SA group).

In addition, 21 patients received a research diagnosis of "Other Mental Disorder, No Substance Abuse (OMD/NSA)." This group was too small to permit comparison with the other diagnostic groups, and is included only in analyses of the total patient sample.

The 1-year aggregate prevalence of violence for the OMD/SA group was 43.0%, compared with 31.1% for the MMD/SA group and 17.9% for the MMD/NSA group (**Table 4**). Analyses revealed significant main effects on violence for diagnostic group (χ^2=58.69, *df*=2, *P*<.001) and time (χ^2=33.75, *df*=4, *P*<.001). The time effect was then examined within each diagnostic group. Violence decreased significantly over the course of the year for the MMD/SA group (χ^2=22.56, *df*=1, *P*<.001) and for the OMD/SA group (χ^2=9.96, *df*=1, *P*<.01), but not for the MMD/NSA group. Using other aggressive acts as the outcome, there were significant diagnostic group (χ^2=28.82, *df*=2, *P*<.001) and time (χ^2=36.99, *df*=4, *P*<.001) main effects. There was a significant decrease over time within all 3 groups (MMD/NSA group, χ^2=20.87, *df*=1, *P*<.001; MMD/SA group, χ^2=7.82, *df*=1, *P*<.01; and OMD/SA group, χ^2=9.89, *df*=1, *P*<.01). (To avoid double counting, subjects who committed both violence and an other aggressive act are reported only as "violent" in computing these rates.)

We tested 3 artifactual explanations for the decline in violence. First, the decrease may have resulted from greater attrition by patients who were violent. To test this hypothesis, we restricted the analyses for the 2 prevalence-decreasing groups to those subjects who were interviewed at all 5 follow-ups (n=212 for the MMD/SA group; n=70 for the OMD/SA group). The same significant decrease is found (χ^2=12.89, *df*=1, *P*<.001). As an additional check, we assigned sample weights to each case based on the probability of that case completing each of the follow-up interviews and recalculated the period

©1998 American Medical Association. All rights reserved.
Downloaded From: http://archpsyc.jamanetwork.com/ on 02/07/2016

Table 1. Sample Description

	Percentage				
	Sample of Eligible Admissions (n = 7740)	Refused to Participate (n = 492)	Baseline Sample (n = 1136)	Lost to Follow-up (n = 185)	Follow-up Sample (n = 951)
Demographics					
Sex					
M	57.6	60.4	58.7	64.3	57.6
F	42.4	39.6	41.3	35.7	42.4
Ethnicity					
White	55.9	69.7	69.1	70.8	68.8
African American	42.6	27.8	29.0	29.2	29.0
Hispanic	1.5	2.4	1.8	0.0	2.2
Age, y					
18-24	19.7	19.1*	24.7	30.3	23.7
25-40	80.3	80.9*	75.3	69.7	76.3
Admission diagnosis					
Depression	20.3	20.7	22.8	18.4	23.7
Bipolar disorder	27.8	32.1	35.5	26.5†	37.2
Schizophrenia	26.0	43.7‡	20.0	17.8	20.4
Alcohol/other drug abuse	59.3	42.1‡	57.7	64.9*	56.4
Personality disorder	36.6	25.8‡	37.4	39.5	37.0
Organic disorder	10.2	8.9	9.1	7.6	9.4
Any diagnosis with comorbid alcohol or drug abuse diagnosis	37.6	32.7	36.2	33.0	36.8
History of alcohol or drug abuse	83.9§	NA	72.9	82.1†	71.4
Prior hospitalizations (at least 1 prior)	67.7§	NA	72.1	68.5	72.7
Legal status					
Involuntary admission	34.7§	39.2	41.9	40.5	42.0
Danger to self	27.8§	NA	39.0	38.1	39.1
Danger to others	13.8§	NA	14.1	13.6	14.2
Gravely disabled	6.0§	NA	2.2	6.3‡	1.4
History of violence‖					
Violent/aggressive toward family	29.1§	NA	28.9	42.7‡	26.5
Violent/aggressive toward others	47.3§	NA	40.9	54.2†	38.6

A comparison of those who refused to participate with those enrolled in the baseline sample or a comparison of those lost to follow-up with those in the follow-up sample; P<.05.
†P<.01.
‡P<.001.
§Data come from a sample of 3095 cases across the 3 sites weighted by site.
‖Violent/aggressive toward family members and toward others not mutually exclusive.

prevalence rates.[20] Despite our ability to account for significant amounts of the variation in attrition, weighting cases according to their likelihood of attrition produced very little change in the prevalence rates at each follow-up (never more than 1.1%). The downward trend remained stable.

A second possible artifact could be less time at risk for committing violence in the community, owing to more time spent in hospitals or jails in the later follow-up periods. To account for this possibility, we constructed a logistic regression for each diagnostic group with violence as the dependent measure and time period and number of days in the community per follow-up as independent measures. With number of days in the community entered first, the same time effect emerges: there is still a significant decrease in violence over the follow-up periods for the MMD/SA (χ^2=20.06, df=1, P<.001) and OMD/SA (χ^2=9.02, df=1, P<.01) groups, but not for the MMD/NSA group.

Finally, the subjects' response set might have produced the decrease in violence. Subjects might have realized that reporting violence lengthened the interview and, to avoid this, might have censored their reports of violence. We tested this explanation by examining a measure of social support,[21] administered in the hospital and at each follow-up, for which a positive response also led

Table 2. Primary Patient Research Diagnosis and Co-occurrence of Substance Abuse/Dependence

	% of Sample		% With Substance Abuse Diagnosis*	
Primary Research Diagnosis	All Sites	Pittsburgh Only	All Sites	Pittsburgh Only
Depression	40.3	45.5	49.6	43.3
Schizophrenia	17.2	14.6	41.0	33.3
Bipolar disorder	13.3	14.6	37.7	31.6
Other psychotic disorder	3.5	5.9	45.0	34.8
Alcohol/other drug abuse/dependence	23.9	17.6	100.0	100.0
Personality disorder only	1.8	1.8	. . .	. . .
Total	**100.0**	**100.0**	57.5	48.8

Ellipses indicate not applicable.

©1998 American Medical Association. All rights reserved.
Downloaded From: http://archpsyc.jamanetwork.com/ on 02/07/2016

Table 3. Proportion of Patients With Follow-up Violence or Other Aggressive Acts by Information Source (n = 951)

Information Source	% With Violence by Information Source	Cumulative %* With Violence	% With Other Aggressive Acts by Information Source	Cumulative % With Other Aggressive Acts
Agency records	4.5	4.5	8.8	8.8
Subject	22.4	23.7	44.6	47.7
Collateral informants	12.7	27.5	31.8	56.1

Cumulative indicates agency records alone (row 1), agency records plus patient self-report (row 2), and agency records plus patient self-report plus collateral informant report (row 3).

Table 4. Prevalence of Violence and Other Aggressive Acts*

	Major Mental Disorder, No Substance Abuse			Major Mental Disorder, Substance Abuse			Other Mental Disorder, Substance Abuse			Total Patient Sample†		
	No.	Violence	Other Aggressive Acts Only	No.	Violence	Other Aggressive Acts Only	No.	Violence	Other Aggressive Acts Only	No.	Violence	Other Aggressive Acts Only
Prehospital admission‡	462	8.9	21.2	468	22.6	28.4	185	24.9	31.4	1136	17.4	25.8
Follow-up 1	371	6.7	22.4	340	17.9	24.7	121	22.3	34.7	852	13.5	25.2
Follow-up 2	344	5.8	18.6	334	10.2	27.5	122	22.1	22.1	818	10.3	22.7
Follow-up 3	329	4.0	14.3	310	8.4	19.4	99	11.1	30.3	755	6.9	18.8
Follow-up 4	328	6.4	14.0	298	8.7	19.8	98	9.2	24.5	739	7.6	18.0
Follow-up 5	316	4.4	10.4	295	6.1	18.3	101	11.9	12.9	726	6.3	14.2
1-Year aggregate		17.9	32.7		31.1	33.7		43.0	32.4		27.5	33.0

*All data are given as percentage unless otherwise indicated.
†Includes 21 subjects with a personality disorder and no major mental or substance abuse disorder.
‡Self-report only.

to questions that lengthened the interview. This instrument asks a subject the names of others who have been of assistance to him or her in the past 10 weeks. If subjects had learned to censor their reporting of violence, they should also have learned to censor their reporting of other interview-lengthening information. However, the median number of persons named on this social support measure across the 3 diagnostic groups did not decrease significantly over the follow-up periods within any diagnostic group. The decrease in violence over time for the 2 groups with co-occurring substance abuse, therefore, does not appear to be an artifact of our methods.

PREVALENCE RATES OF PATIENT AND COMMUNITY VIOLENCE: PITTSBURGH

Logistic regressions controlling for demographic characteristics, social desirability scores, and all possible interactions of these variables for each follow-up period produced limited evidence of the effect of patient status and strong evidence of the effects of drug and alcohol symptoms (**Table 5**). The patient sample exhibited significantly higher rates of alcohol or drug abuse symptoms than the community group during the first four 10-week follow-up periods and in terms of violence and other aggressive acts there were significant ($P<.05$) main effects for alcohol and drug abuse symptoms at each of the follow-up periods. Significant differences between the community and patient groups (controlling for demographics, social desirability, and MAST/DAST symptoms) were found during the first 10-week follow-up period for violence ($\chi^2=6.81$, $df=1$, $P<.01$) and during the second 10-week follow-up period for other aggressive acts ($\chi^2=5.89$, $df=1$, $P<.05$). There were no significant interactions between drug and alcohol symptoms and patient status at any of the follow-up periods.

Although the interaction between patient status and drug and alcohol abuse symptoms is nonsignificant in the total sample, when we disaggregate the sample into those with and without MAST/DAST symptoms, we find a significant effect of patient status for those with symptoms (violence at follow-up 1: $\chi^2=4.57$, $df=1$, $P<.05$; other aggressive acts at follow-up 2: $\chi^2=4.12$, $df=1$, $P<.05$), and no effect of patient status for those without symptoms. This suggests that where a significant effect of patient status is found in the total sample, that effect may be more strongly expressed among subjects with alcohol or drug abuse symptoms.

INDIVIDUAL FREQUENCY RATES OF VIOLENCE

The mean number of violent acts per follow-up period, for those patients who had such acts, was 1.6 (ranging between 1.2 and 1.7 for any given follow-up period). For those with other aggressive acts, the mean number of other aggressive acts per follow-up period was 2.5 (ranging between 2.1 and 2.7 for any given follow-up period). Summed across all 5 follow-up periods, the mean number of violent acts was 2.12 (SD, 1.98) for those with violent acts. The average number of other aggressive acts during the year was 4.64 (SD, 5.84).

©1998 American Medical Association. All rights reserved.
Downloaded From: http://archpsyc.jamanetwork.com/ on 02/07/2016

Table 5. Prevalence of Violence and Other Aggressive Acts in Patient and Community Samples by MAST/DAST* Symptoms: Pittsburgh

			% With Violence			% With Other Aggressive Acts Only		
	No.	% With MAST/DAST Symptoms	With MAST/DAST Symptoms	Without MAST/DAST Symptoms	Total	With MAST/DAST Symptoms	Without MAST/DAST Symptoms	Total
Patients								
Follow-up 1	314	31.5†	22.0‡	4.7	11.5‡	24.4	18.3	20.7
Follow-up 2	303	29.4†	12.3	4.2	7.3	37.7‡	17.5	25.1‡
Follow-up 3	273	25.3§	6.1	4.0	4.8	23.5	12.0	16.1
Follow-up 4	276	25.6§	11.0	5.7	7.6	29.0	13.6	19.2
Follow-up 5	266	20.2	14.1	4.3	7.1	24.4	12.8	16.2
Community sample	519	17.5	11.1	3.3	4.6	22.2	13.5	15.1

*MAST indicates Michigan Alcoholism Screening Test; DAST, Drug Abuse Screening Test.
†P<.001 compared with community sample.
‡P<.05 compared with community sample.
§P<.01 compared with community sample.

The mean annual individual frequencies of violent acts for the diagnostic groups were: MMD/NSA, 1.87 (SD, 1.68); MMD/SA, 2.39 (SD, 2.37); and OMD/SA, 1.98 (SD, 1.46). For other aggressive acts, the mean individual frequencies were: MMD/NSA, 3.67 (SD, 4.78); MMD/SA, 5.10 (SD, 6.62); and OMD/SA, 5.46 (SD, 5.55). Differences among the groups were not significant for violent acts (χ^2=3.47, *df*=2, *P*<.18), but were significant for other aggressive acts (χ^2=12.31, *df*=2, *P*<.002).

For the Pittsburgh patient sample, the mean number of violent acts was 1.58 (range, 1.10-2.25 across the follow-up periods) and 2.41 for other aggressive acts (range, 2.17-3.04 across the follow-up periods). The mean number of violent acts was 1.71 for those with MAST or DAST symptoms and 1.24 for those without symptoms; the mean number of other aggressive acts was 2.29 for those with MAST or DAST symptoms and 2.53 for those without symptoms.

The mean number of violent acts for those in the community sample who committed such acts was 1.16; the mean number of other aggressive acts was 1.93. The mean number of violent acts was 1.25 for community sample subjects with MAST or DAST symptoms and 1.06 for those without symptoms; the mean number of other aggressive acts was 2.24 for those with MAST or DAST symptoms and 1.78 for those without symptoms.

The mean number of violent acts for the Pittsburgh patient sample during the first follow-up period (2.25) was significantly higher than the rate for the community group (1.16) (χ^2=5.86, *df*=1, *P*<.05). The small number of violent or aggressive subjects in the community sample precluded disaggregating individual frequency rates by the presence of MAST/DAST symptoms.

TYPES, TARGETS, AND LOCATIONS OF VIOLENCE

For both the patient and the community samples, the acts that were coded as violence were primarily "kick/bite/choke/hit/beat up" and "weapon threat/weapon use," and the acts that were coded as other aggressive acts were primarily "throw objects/push/grab/shove/slap" (**Table 6**). The only significant patient-community difference in violence is that patient violence consisted more of forced sex and less of weapon threat/weapon use.

The targets of both violence and other aggressive acts committed by the patient sample and by the community sample were most often family members, followed by friends and acquaintances (Table 6). There are no significant patient-community differences in targets of violence, but several significant differences in other aggressive acts: patient other aggressive acts were less likely to target spouses and other family members, and more likely to target girlfriends or boyfriends, parental figures, and strangers.

For both the patient and community samples, violence or other aggressive acts were most likely to occur in the subject's home, in the home of another, outdoors or on the street, or in a bar. The only significant differences in location were that patients were more likely than the community group to commit other aggressive acts in their own home, and the community group was more likely than patients to commit other aggressive acts in a bar.

COMMENT

We sought to answer questions regarding the nature of violence by people discharged from acute mental health facilities in the United States, and whether it differed from violence committed by other people living in the same neighborhoods. Our data suggest that it is crucial for future studies to use multiple measures of violence rather than the single measures that have characterized most prior research.[22] Relying solely on agency records, we would have reported a 1-year violence rate for all discharged patients of 4.5%. By using 3 independent information sources, we reported a rate 6 times higher (27.5%).

Confirming the findings of others,[23,24] we found the presence of a co-occurring substance abuse disorder to be a key factor in violence: the 1-year prevalence was 17.9% for patients with a major mental disorder and without a substance abuse diagnosis, 31.1% for patients with a major mental disorder and a substance abuse diagnosis, and 43.0% for patients with some other form of men-

©1998 American Medical Association. All rights reserved.
Downloaded From: http://archpsyc.jamanetwork.com/ on 02/07/2016

Table 6. Types, Targets, and Locations of Violence and Other Aggressive Acts

	Violence, %			Other Aggressive Acts, %		
	Patients, All Sites (n = 608)	Patients, Pittsburgh (n = 175)	Community, Pittsburgh (n = 26)	Patients, All Sites (n = 2668)	Patients, Pittsburgh (n = 852)	Community, Pittsburgh (n = 176)
Types of Violence and Other Aggressive Acts						
Throw objects/push/grab/shove/slap	12.0	14.3	3.8	74.0	74.5	78.4
Kick/bite/choke/hit/beat up	49.3	45.1	53.8	22.0	23.1	21.6
Forced sex	5.3	14.9*	0.0	0.0	0.0	0.0
Weapon threat/weapon use	29.3	22.3*	42.3	0.0	0.0	0.0
Other/type unknown	4.1	3.4	0.0	3.9	2.3*	0.0
Targets of Violence and Other Aggressive Acts						
Family	51.1	54.5	48.1	61.9	60.8	64.3
Spouse	23.3	29.6	37.0	23.3	20.1†	32.4
Girl/boyfriend	13.8	10.1	7.4	15.2	18.5†	8.0
Parental figure	2.5	2.4	0.0	3.6	6.4†	0.6
Child	2.5	1.2	0.0	6.7	4.8	2.3
Other family	9.0	11.2	3.7	13.1	11.0†	21.0
Friend/acquaintance	35.1	34.9	29.6	27.2	26.2	31.8
Stranger	13.8	10.7	22.2	10.9	13.1†	4.0
Locations of Violence and Other Aggressive Acts						
Subject's home	43.3	42.2	38.5	60.8	53.3*	42.9
Other residence	25.7	24.1	11.5	13.9	14.4	18.1
Street/outdoors	21.6	23.5	34.6	14.9	20.2	14.1
Bar	4.5	5.4	15.4	4.4	7.4†	19.8
Outpatient clinic	0.7	1.2	0.0	1.1	1.2	0.0
Workplace	0.5	0.0	0.0	1.7	0.2	1.1
Other	3.7	3.6	0.0	3.2	3.3	4.0

*P<.05 compared with community sample.
†P<.01 compared with community sample.

tal disorder and a substance abuse diagnosis. Our findings underscore the inappropriateness of referring to "discharged mental patients" as a homogeneous class.

These prevalence rates may appear high. However, they are meaningful only in comparison to the prevalence of violence by other residents in the same communities. Studying one site, Pittsburgh, showed that the prevalence of violence among patients without symptoms of substance abuse is statistically indistinguishable from the prevalence of violence among others in their neighborhoods without symptoms of substance abuse. Substance abuse significantly raised the prevalence of violence in both patient and community samples. Among those who reported symptoms of substance abuse, the prevalence of violence among patients was significantly higher than the prevalence of violence among others in their neighborhoods during the first follow-up. The patient sample also was significantly more likely to report such symptoms of substance abuse than was the community sample.

The data on both targets and locations of violence clearly indicate that public fears[25] of violence on the street by discharged patients who are strangers to them is misdirected. The people at highest risk are family members and friends who are in their own homes or in the patient's home. The character of violence is remarkably similar whether the violence is committed by discharged patients or by their neighbors.

Our most unexpected finding is the decline in the proportion of subjects engaging in violence over time. Substantive hypotheses to account for this decline are legion. Patients may become more engaged in treatment over time or social support from family members may increase. Rates of violence may peak around the time of hospital admission, when patients are in acute crisis, and remain high for a period of time after discharge because many patients still have active mental disorders after they leave the hospital.

Caution should be exercised before using the rates reported here as summary statistics to characterize violence by discharged patients. We found that the rate of patient violence varied during the course of the 1-year follow-up for the 2 groups with co-occurring substance abuse diagnoses. The effects of hospitalization and treatment on these rates are unknown. In addition, for all 3 patient diagnostic groups, the highest rate of reported violence did not occur during the follow-up year at all, but rather during the 10 weeks prior to the hospitalization during which the patients were enrolled in the study. The prehospitalization rates are likely to be artificially high due to ascertainment bias[26] (ie, violence may have precipitated hospitalization). In addition, an inevitable limitation of research in this area is that patient refusal or attrition can compromise the representativeness of the sample studied. Some of the biases we observed are in the direction of patients in our sample being more likely to be violent than other eligible patients (eg, patients who consented were younger than patients who refused) and other biases are in the direction of patients in our sample being less likely to be violent than other eligible pa-

©1998 American Medical Association. All rights reserved.
Downloaded From: http://archpsyc.jamanetwork.com/ on 02/07/2016

tients (eg, followed-up patients were less likely to have a documented history of violence than patients lost to follow-up). It is impossible to estimate the precise effect of these countervailing biases on the results. However, we believe that our results are fairly representative of the community behavior of patients between 18 and 40 years old who are discharged from acute psychiatric facilities in the United States.

Care should also be taken in making patient-community comparisons. We sampled from the census tracts in which the patients resided after discharge. Many of these neighborhoods were disproportionately impoverished and had higher violent crime rates than the city as a whole. We sampled in this manner to control for exposure to environmental opportunities for violence between the patient and the comparison groups. The comparison group was not intended to be an epidemiologically representative sample of the general population of Pittsburgh.

Our future work will attempt to account for the decline observed in the proportion of patients engaging in violence over time. It will also attempt to isolate a variety of risk factors among the patient sample that could have clinical utility for anticipating violent behavior and for designing preventive interventions during the period of highest prevalence of violence (the first 20 weeks after discharge).

Accepted for publication December 9, 1997.

This research was supported by the Research Network on Mental Health and the Law of the John D. and Catherine T. MacArthur Foundation, Chicago, Ill, and by grant R01 49696 from the National Institute of Mental Health, Rockville, Md. During the writing of this article, Dr Appelbaum was the Fritz Redlich Fellow at the Center for Advanced Study in the Behavioral Sciences, Stanford, Calif; he acknowledges the support of the Center's Foundations Fund for Research in Psychiatry and NSF grant SBR-9022192.

We are indebted to the members of the Research Network on Mental Health and the Law, including Shirley S. Abrahamson, Richard J. Bonnie, Pamela S. Hyde, Stephen J. Morse, Paul Slovic, and David B. Wexler. We thank Seth Leon and Nan Brady for their significant contributions in data management and analysis and Scott Beach for his assistance with the community sample. We also gratefully acknowledge the contributions of William O'Connor, PhD, and Deirdre Klassen, PhD, as the site directors in Kansas City, as well as the site coordinators, research clinicians, and field interviewers at each of the 3 data collection sites: Kimberly Ackerson, PhD; Tamara Anderson; Bruce Dembling, PhD; Carolyn Hill-Fotouhi, MA; Jan Meymaris; Dawn O'Day; and Kim Trettel Smith, MA, Worcester; Jennifer King; Ray Milke; Debra Murray; Lorrie Rabin, PhD; Chelsea Ruttenburg; Carol Schubert, MPH; and Esther VonWaldow, MSW, Pittsburgh; and Julie Applegate, PhD; Ron Dancy; Heather Fitz-Charles; Lisa Johnson-Sharpe, PhD; Lisa Kuhn; Susan Kuntz; Walter Janzen, MA; Brian Lindhardt, MA; Becca Matthews; Lisa Rogers; Melba Small; Aileen Utley, PhD; and Rick Wright, Kansas City.

Reprints: Henry J. Steadman, PhD, Policy Research Associates Inc, 262 Delaware Ave, Delmar, NY 12054.

REFERENCES

1. Monahan J, Steadman H. Crime and mental disorder: an epidemiological approach. In: Morris N, Tonry M, eds. *Crime and Justice: An Annual Review of Research*. Chicago, Ill: University of Chicago Press; 1983:145-189.
2. Hodgins S, ed. *Mental Disorder and Crime*. Newbury Park, Calif: Sage Publications; 1993.
3. Link B, Stueve A. Psychotic symptoms and the violent/illegal behavior of mental patients compared to community controls. In: Monahan J, Steadman H, eds. *Violence and Mental Disorder: Developments in Risk Assessment*. Chicago, Ill: University of Chicago Press; 1994:137-159.
4. Appelbaum P. *Almost A Revolution: Mental Health Law and the Limits of Legal Change*. New York, NY: Oxford University Press; 1994.
5. Cirincione C, Steadman H, Robbins P, Monahan J. Mental illness as a factor in criminality: a study of prisoners and mental patients. *Crim Behav Ment Health*. 1994;4:33-47.
6. Klassen D, O'Connor W. A prospective study of predictors of violence in adult male mental patients. *Law Hum Behav*. 1988;12:143-158.
7. Swanson J, Holzer C, Ganju V, Jono R. Violence and psychiatric disorder in the community: evidence from the Epidemiologic Catchment Area Surveys. *Hosp Community Psychiatry*. 1990;41:761-770.
8. Lidz C, Mulvey E, Gardner W. The accuracy of predictions of violence to others. *JAMA*. 1993;269:1007-1011.
9. Reiss A, Roth J, eds. *Understanding and Preventing Violence*. Washington, DC: National Academy Press; 1993.
10. Blumstein A, Cohen J, Roth J, Visher C. *Criminal Careers and "Career Criminals."* Washington, DC: National Academy Press; 1986.
11. Steadman H, Felson R. Self-reports of violence: ex-mental patients, ex-offenders, and the general population. *Criminology*. 1984;22:321-342.
12. Mulvey E, Blumstein A, Cohen J. Reframing the research question of mental patient criminality. *Int J Law Psychiatry*. 1986;9:57-65.
13. Janca A, Helzer J. *DSM-III-R* criteria checklist. *DIS Newsletter*. 1990;7:17.
14. Pfohl B, Blum N, Zimmerman M, Stangl M. *Structured Interview for* DSM-III-R *Personality*. Iowa City, Iowa: University of Iowa; 1989.
15. Steadman H, Monahan J, Appelbaum P, Grisso T, Mulvey E, Roth L, Robbins P, Klassen D. Designing a new generation of risk assessment research. In: Monahan J, Steadman H, eds. *Violence and Mental Disorder: Developments in Risk Assessment*. Chicago, Ill: University of Chicago Press; 1994:297-318.
16. Bishop Y, Fienberg F, Holland P. *Discrete Multivariate Analysis*. Cambridge, Mass: MIT Press; 1975.
17. Pokorny A, Miller B, Kaplan H. The brief MAST: a shortened version of the Michigan Alcoholism Screening Test. *Am J Psychiatry*. 1972;129:342-345.
18. Skinner H. The Drug Abuse Screening Test. *Addict Behav*. 1982;7:363-371.
19. Crowne D, Marlowe D. A new scale of social desirability independent of psychopathology. *J Consult Clin Psychol*. 1960;24:349-354.
20. Saner H, Ellickson P. Concurrent risk factors for adolescent violence. *J Adolesc Health*. 1996;19:94-103.
21. Estroff S, Zimmer C. Social networks, social support, and violence among persons with severe, persistent mental illness. In: Monahan J, Steadman H, eds. *Violence and Mental Disorder: Developments in Risk Assessment*. Chicago, Ill: University of Chicago Press; 1994:259-295.
22. Mulvey E, Shaw E, Lidz C. Why use multiple sources in research on patient violence in the community? *Crim Behav Ment Health*. 1994;4:253-258.
23. Johns A. Substance misuse: a primary risk and a major problem of comorbidity. *Int Rev Psychiatry*. 1997;9:233-241.
24. Swanson J, Borum R, Swartz M, Monahan J. Psychotic symptoms and disorders and the risk of violent behaviour in the community. *Crim Behav Ment Health*. 1996;6:317-338.
25. Wahl O. *Media Madness: Public Images of Mental Illness*. New Brunswick, NJ: Rutgers University Press; 1995.
26. Wessely S, Taylor P. Madness and crime: criminology vs psychiatry. *Crim Behav Mental Health*. 1991;1:193-228.

©1998 American Medical Association. All rights reserved.
Downloaded From: http://archpsyc.jamanetwork.com/ on 02/07/2016