# Severe Mental Illness and Risk of Sexual Offending in Men: A Case-Control Study Based on Swedish National Registers

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***Objective:*** To examine the comorbidity of severe mental illness with sexual offending in men.

***Method:*** A case-control design was used to investigate psychiatric hospitalization and sexual offending. Data were obtained from Swedish national registers for crime, hospital discharge diagnoses (based on *International Classification of Diseases* revisions 9 and 10), demographic, and socioeconomic factors for the years 1988 through 2000. All male sexual offenders (N = 8495) in Sweden were included and compared with a random sample of male controls taken from the general population (N = 19,935). The population attributable risk fraction (the proportion of all sexual crimes throughout the study period that were committed by patients with a history of psychiatric hospitalization) was also estimated.

***Results:*** After adjustment for demographic and socioeconomic confounders, sexual offenders were 6 times more likely to have a history of psychiatric hospitalization compared with the general population (OR = 6.3, 95% CI = 5.7 to 6.9). Sexual offenders were significantly more likely to have a severe mental illness than the general population, whether this was schizophrenia (OR = 4.8, 95% CI = 3.4 to 6.7), other psychoses (OR = 5.2, 95% CI = 3.9 to 6.8), or bipolar affective disorder (OR = 3.4, 95% CI = 1.8 to 6.4). The proportion of all sexual crimes committed by hospitalized psychiatric patients (the population attributable risk fraction) was 20.1%.

***Conclusion:*** The increased relative risk of psychiatric hospitalization and severe mental illness in sexual offenders is contrary to much expert opinion in the field. If these findings are replicated in other settings, policies in the criminal justice system regarding the assessment, management, and treatment of sexual offenders may need review.

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Sexual violence is reported in almost all countries, in all socioeconomic classes, and in all age groups from childhood onward.[1] Population-based data aggregated across studies indicate that about 13% of women and 3% of men have been raped and 25% of women have been sexually coerced.[2,3] Furthermore, data from several countries suggest that increasing levels of sexual violence have been reported over the last few decades. For example, there was at least a doubling in rapes reported to police and in convictions in Australia, Canada, Holland, Sweden, and the United Kingdom in the 1990s.[4] In the United States, although such increases were not reported in the 1990s, the extent of the problem is reflected in recent statistics: in 2004, 94,635 rapes were reported to the police[5] and 140,000 prisoners were serving time for sexual offenses.[6] The prevention of sexual violence is considered to be a public health challenge of significant proportions,[7] and the *World Report on Violence and Health* calls for more research on risk factors for victims and perpetrators of sexual violence.[1]

Although there is robust evidence from different countries demonstrating that psychotic illnesses increase the risk of violent crime,[8,9] expert opinion holds the view that severe mental illness (SMI) has little role in sexual offending.[10–14] For other mental disorders, recent work has suggested high rates of affective illness,[15] substance abuse, and personality disorder in sexual offenders,[16] although their contribution to the offense has not been examined. Mental illness is not included among listed risk factors for committing rape[1] or sexual abuse[13] in literature reviews. Rather, sexual crime is thought to be caused by the interaction of developmental factors (such as

child abuse), vulnerability variables (particularly deviant sexual fantasies), and triggering events, which may include victim access and substance abuse.[17] Further, although risk factors may be different for being convicted of a first sexual offense compared with repeat offending, risk assessment measures currently used by courts and prison authorities in many countries in the prediction of repeat sexual offending rarely include SMI as a factor.[17]

To examine whether sexual offending is associated with SMI, we studied all convicted male sexual offenders over a 13-year period (1988 through 2000) in Sweden. Sweden offers high-quality national registers that allow for the investigation of risk factors for sexual offending using a case-control design. Such information has the potential to inform recent legal developments regarding sentencing, conditions for probation, and eligibility for parole, in addition to risk assessment and the need for treatment.

## METHOD

### Study Setting

In Sweden, all residents, including immigrants on arrival to the country, are given a unique identification number that is used in national registers for socioeconomic information, inpatient health care, and crime. A government agency, Statistics Sweden, holds registers that include information on every individual's income, employment, education, and living arrangements. The Hospital Discharge Register[18] monitors all psychiatric hospitals, and is the largest inpatient register worldwide. Reporting to the register is mandatory for all health care providers, including secure psychiatric hospitals and the few private hospitals. Hospital discharge diagnoses are comprehensive in terms of national coverage from 1988 onward. All patients are given 1 or more clinical diagnoses on discharge according to the *International Classification of Diseases* (ICD) revisions 9 (through 1996) and 10 (from 1997) registered by their unique identification number. The register is of high quality: of the 1,421,795 discharges from hospital for psychiatric diagnoses from 1988 through 2000, no personal identification number was available in 13,669 discharge episodes (1.0%), and these were excluded from subsequent analyses. Consequently, the register has been used in a variety of recent epidemiologic investigations in which the information on psychiatric hospitalization was linked.[19–21] Further, this register has been demonstrated to be valid and reliable for diagnoses of SMI (e.g., 86% of those diagnosed with schizophrenia had the same diagnosis confirmed by a file-based review by psychiatrists[22]). However, the validity for diagnoses other than the psychoses is not known. Bergman et al.[23] investigated the agreement between hospital discharge diagnoses and diagnoses from a 4-week inpatient assessment in a specialist forensic psychiatric unit from 1989 to 1993 (which leads to multidisciplinary consensus diagnoses for the purposes of the courts).[23] Using these data, we calculated interrater agreement between these 2 diagnostic methods using Cohen's κ—for personality disorder and substance use disorder, it was 0.20 to 0.40, indicating fair agreement (whereas a $\kappa$ of $> 0.6$ would indicate good agreement).

Thus, for the purposes of this study, we have focused on patients with SMI. These were defined as having hospital discharge diagnoses of schizophrenia, bipolar affective disorder, other psychoses, and organic psychiatric conditions. We will report separately the results for other diagnostic groups. This is partly because of the diagnostic issues cited above, but also since individuals with these diagnoses who seek hospitalization and are subsequently admitted will constitute a selected population, one which is possibly unrepresentative of all individuals in the general population with these diagnoses.

The Crime Register[24] includes conviction data on all persons aged 15 years (the age of criminal responsibility) and older. Conviction data were used because in Sweden, in common with only a few countries, individuals are convicted as guilty regardless of mental illness (i.e., being judged as not guilty by reason of insanity is not an option). Thus, conviction data included persons who received custodial or noncustodial sentences, and also included those transferred to forensic hospital (e.g., individuals who were psychiatrically assessed and are thought to have been ill with psychosis at the time of the offense). Furthermore, conviction data included those cases in which the prosecutor decided to caution or fine (e.g., in less serious sexual crimes or in some juvenile cases). In addition, as plea bargaining is not permitted in the Swedish legal system at the conviction stage, conviction data more accurately reflect the extent of officially resolved criminality in the population. Sweden does not substantially differ from other members of the European Union in the rates of violent crime and their resolution.[25] The crime register is of high quality: there were 205,846 court convictions comprising 324,383 violent (including sexual) crimes, committed by 136,931 offenders during the period from 1988 through 2000. Of the convictions, only 105 (0.05%) had incomplete personal identification numbers and were therefore excluded from subsequent analyses.

### Study Design

Sexual crimes are relatively rare in the general population and do not lend themselves easily to cohort studies. As in suicide research, case-control investigations are an alternative.[26] Using the Crime Register, 8495 men were identified who were convicted of a sexual crime during a 13-year period, 1988 through 2000 (in cases of more than 1 conviction for a sexual offense, the year of the first sexual crime during the period was taken to be the index year), yielding a total of 15,840 sexual crimes. A sexual

**Table 1. Details of Psychiatric Diagnoses From the Swedish Hospital Discharge Register**

| Diagnostic Grouping | Diagnoses Included | ICD-9 Codes | ICD-10 Codes |
|---|---|---|---|
| Organic disorder | Dementia, organic psychoses, organic personality and behavioral disorders, other organic mental disorders | 290, 293, 294, 310 | F00– F09 |
| Learning disability/mental retardation | NA | 317–319 | F70–F79 |
| Schizophrenia | NA | 295 except .7 | F20 |
| Bipolar affective disorder | NA | 296.2–6 | F31 |
| Nonpsychotic affective disorder | Depressive disorder, other affective disorder, other nonpsychotic mood disorders | 300.4, 311 | F30 except .2, F32–F33 except .3, F34, F38 |
| Other psychosis | Alcohol- or drug-induced psychosis, schizotypal disorder, other psychotic disorders | 291, 292, 295.7, 296.0–1, 296.8–9, 297, 298 | x.5 in F10–19, F21–F29, F30.2, F32.3, F33.3, F39 |
| Anxiety disorder | Panic and anxiety disorder, phobia, obsessive-compulsive disorder | 300.0, 300.2–3 | F40–F42 |
| Alcohol abuse/dependence | NA | 303, 305.0 | F10 except x.5 |
| Drug abuse/dependence | NA | 304, 305.2–9 | F11–F19 except x.5 |
| Personality disorder | NA | 301 | F60–F62 |
| Child/adolescent disorder | ADHD, conduct disorders, emotional disorders, autistic-spectrum disorders | 299, 305.1, 312–315 | F80–F98 |
| Other psychiatric disorder | Eating, sleep, sexual, and somatoform disorders | 300.1, 300.5–9, 302, 306, 307 | F17, F44–F59, F63–F69, F99 |
| Adjustment disorder | Adjustment disorder and PTSD | 308, 309 | F43 |

Abbreviations: ADHD = attention-deficit/hyperactivity disorder, ICD = *International Classification of Diseases*, NA = not applicable, PTSD = posttraumatic stress disorder.

offense was defined as rape, sexual coercion, indecent exposure, sexual harassment, and child molestation, but excluded prostitution, hiring of prostitutes, and possession of child pornography. Female offenders (N = 93) were excluded. The controls were drawn from a random selection of 50,000 individuals in the general population using the total population register based at Statistics Sweden (all individuals living in Sweden including immigrants). The randomization was stratified for time of entry for the cases so that 3846 persons (i.e., 50,000 divided by 13) for each year from 1988 up to and including 2000 were included. We then excluded individuals aged less than 15 years at index year, those who were female, and those convicted of a sexual offense resulting in a final control group of 19,935 men. Index year was the year of the offense and the equivalent year for the controls.

Psychiatric diagnoses (ICD-9 or ICD-10) were based on the principal discharge diagnosis of the first admission (see Table 1 for diagnostic codes). Demographic and socioeconomic information relating to the index year was selected on theoretical grounds, on the basis of systematic reviews that suggest that these particular variables might confound the relationship between mental disorders and sexual offending.[11,14] The variables were income, unemployment, receiving social welfare, being single, having children, immigrant status, living in a metropolitan area, education, and nonsexual violent crime during the period (see Table 2 for details).

**Table 2. Details of Sociodemographic Variables in a Case-Control Study of Severe Mental Illness and Sexual Offending in Men**

| Sociodemographic Variable | Definition |
|---|---|
| Income | Total income during the index year in US dollars. For logistic regression, these were divided into tertiles, and the low-income group was compared with the medium/high-income group |
| Unemployment | Number of days registered as unemployed during the index year |
| Social welfare | Receipt of any government monetary support during the index year |
| Single household | Individuals living by themselves or as single parents with children |
| Children | Having children (biological or adopted) |
| Immigrant | First generation or second generation (either parent born outside Sweden) |
| Metropolitan area | Living in a city area (>200,000 inhabitants) |
| Education | Highest level of education completed at index year |
| Nonsexual violent crime | Record of nonsexual violent convictions during the years 1988 through 2000 (ie, for completed or attempted homicide, manslaughter, aggravated assault, violence against an officer, robbery, arson, illegal threats, or harassment) |

### Sex Offender Subgroups

We compared diagnostic information on individuals convicted of rape with those convicted of child molestation. Rape was defined as a sexual assault involving intercourse or a comparable act associated with threat or violence. Child molestation included penetrative and other contact sexual assaults against victims aged less than 15 years (or less than 18 years if the offender was the victim's primary caregiver). Other forms of sexual offending—sexual coercion, exhibitionistic acts/indecent exposure, and sexual harassment—were excluded for this analysis of subgroups (N = 3441). For 112 individuals, this information was missing, and they were also ex-

Table 3. Sociodemographic Information for Male Sexual Offenders and Controls Matched for Index Year (1988 through 2000)

| Variable | Sexual Offenders | | Controls | | Statistic |
|---|---|---|---|---|---|
| | Value | N[a] | Value | N[a] | |
| Age, mean (SD), y | 37.07 (14.33) | 8495 | 45.26 (18.83) | 19,935 | t = –36, p < .001 |
| Income (individual), mean (SD), USD | 9,844.12 (12,195.53) | 7328 | 18,934.85 (36,398.26) | 18,486 | t = –21, p < .001 |
| Income (household), mean (SD), USD | 19,994.24 (14,629.14) | 7296 | 30,614.30 (35,754.93) | 18,426 | t = –25, p < .001 |
| Unemployment, mean (SD), d | 26.10 (69.27) | 8495 | 11.67 (46.78) | 19,935 | t = 20, p < .001 |
| Social welfare, % (N) | 38.0 (2770) | 7296 | 5.1 (947) | 18,426 | $\chi^2$ = 4556, p < .001 |
| Single household, % (N) | 67.7 (4897) | 7232 | 38.0 (6948) | 18,281 | $\chi^2$ = 1839, p < .001 |
| Children, % (N) | 44.4 (3773) | 8495 | 44.0 (8779) | 19,935 | NS |
| Immigrant, % (N) | 37.4 (3178) | 8495 | 16.2 (3220) | 19,935 | $\chi^2$ = 1543, p < .001 |
| Metropolitan area, % (N) | 31.1 (2540) | 8160 | 28.0 (5573) | 19,935 | $\chi^2$ = 28, p < .001 |
| Education, % (N) | | 6465 | | 16,354 | $\chi^2$ = 550, p < .001 |
| Not completed elementary school | 5.9 (382) | | 7.8 (1270) | | |
| Elementary school | 43.1 (2784) | | 30.8 (5032) | | |
| High school | 42.0 (2718) | | 41.7 (6814) | | |
| College | 9.0 (581) | | 19.8 (3238) | | |
| Any nonsexual violent crime, % (N) | 38.0 (3229) | 8495 | 2.7 (543) | 19,935 | $\chi^2$ = 6445, p < .001 |

[a]Information not available on all offenders and controls for income, social welfare, single household, metropolitan area, and education.
Abbreviations: NS = not significant, USD = U.S. dollars.

cluded from this analysis. Finally, to prevent overlap, individuals were excluded if they had convictions for both rape and child molestation (N = 134). Thus, comparisons were made between 2671 rapists (56%) and 2137 child molesters (44%).

### Population Attributable Risk

We calculated the population attributable risk fraction of psychiatric patients to sexual offending using standard methods.[27] This risk fraction is an estimate of the proportion of all sexual offending that can be attributed to psychiatric patients and has been recommended in order to contextualize studies of risk factors by expressing them in public health terms.[28,29] Therefore, for this part of the analysis, all sexual crimes committed by each offender were used from 1988 through 2000, rather than only the first crime in the period, to capture the total sexual criminality by offender and patient groups. The proportion of all these sexual crimes that were committed by those with hospital discharge diagnoses for psychiatric disorders was then calculated.

### Statistical Analyses

Demographic information on sexual offenders was compared with that of controls (Table 3). On the basis of this comparison, and significant associations between demographic information and psychiatric diagnoses (data not shown), 4 variables (age, immigrant status, low income, and single status) were identified as confounders and adjusted for in subsequent multivariate logistic regression models. Data on education were only available for 76% of sex offenders and 82% of controls precluding its inclusion into the model. The proportion with education data was even lower at 39% in those with a history of psychiatric hospitalization. All effect sizes with corresponding statistic, p value, and 95% confidence intervals are reported in the tables. All $\chi^2$ tests have one degree of freedom. Univariate and multivariate binary (binomial) logistic regression analyses using SPSS, version 11.5 (SPSS Inc., Chicago, Ill.), were conducted generating odds ratios (ORs; the $e^{\beta}$ estimate) with 95% confidence intervals of principal psychiatric diagnoses in sexual offenders compared with controls. For the univariate logistic regression that generated crude ORs, no adjustment was made for any of the confounders. For the multivariate regression, the adjusted ORs derived from a model in which all 4 confounders were adjusted for simultaneously.

Research ethics approval was received from Huddinge University Hospital, Sweden.

## RESULTS

Information on 8495 male sexual offenders was collected and compared with data for 19,935 male controls from the general population. All the demographic variables tested were found to be different between sexual offenders and controls, apart from having children (Table 3). The largest differences were found in the proportion convicted of any nonsexual violent crime (38% in sexual offenders vs. 3% in the controls), being on social welfare (38% vs. 5%, respectively), living in a single household (68% vs. 38%, respectively), and being a first-generation or second-generation immigrant (37% vs. 16%, respectively).

### Sexual Offending and Severe Mental Illness

The prevalence of a history of psychiatric hospitalization and of SMI was increased in sexual offenders compared with controls (Table 4). The combined prevalence of SMI (schizophrenia and other psychoses, bipolar disorder, and organic disorder) was 4.8% in sexual offend-

**Table 4. Prevalence and Odds Ratios (ORs) for Any Psychiatric Hospitalization and Severe Mental Illness Among Male Sexual Offenders Compared With General Population Controls**

| | Prevalence, % (N) | | OR | |
|---|---|---|---|---|
| Diagnosis | Sexual Offenders (N = 8495) | Controls (N = 19,935) | Crude OR (95% CI) | Adjusted[a] OR (95% CI) |
| Any psychiatric hospitalization | 24.0 (2038) | 4.7 (928) | 6.5 (6.0 to 7.0) | 6.3 (5.7 to 6.9) |
| Schizophrenia | 1.5 (130) | 0.3 (51) | 6.1 (4.4 to 8.4) | 4.8 (3.4 to 6.7) |
| Bipolar disorder | 0.3 (27) | 0.1 (20) | 3.2 (1.8 to 5.7) | 3.4 (1.8 to 6.4) |
| Other psychosis | 2.5 (212) | 0.4 (76) | 6.7 (5.1 to 8.7) | 5.2 (3.9 to 6.8) |
| Organic disorder | 0.5 (44) | 0.5 (105) | 1.0 (0.7 to 1.4) | 2.4 (1.6 to 3.6) |

[a]Simultaneously adjusted for age, immigrant status, income, and single status in multiple logistic regression models.

**Table 5. Prevalence and Odds Ratios (ORs) for Nonpsychotic Disorders Among Male Sexual Offenders Compared With General Population Controls**

| | Prevalence, % (N) | | OR | |
|---|---|---|---|---|
| Diagnosis | Sexual Offenders (N = 8495) | Controls (N = 19,935) | Crude OR (95% CI) | Adjusted[a] OR (95% CI) |
| Nonpsychotic affective disorder | 1.5 (124) | 0.5 (108) | 2.7 (2.1 to 3.5) | 2.7 (2.0 to 3.5) |
| Anxiety disorder | 0.5 (46) | 0.1 (18) | 6.0 (3.5 to 10.4) | 4.8 (2.7 to 8.5) |
| Alcohol abuse/dependence | 6.8 (574) | 1.7 (342) | 4.2 (3.6 to 4.8) | 4.0 (3.5 to 4.7) |
| Drug abuse/dependence | 1.9 (161) | 0.3 (60) | 6.4 (4.8 to 8.6) | 4.0 (2.9 to 5.4) |
| Personality disorder | 2.5 (215) | 0.1 (14) | 37.0 (21.5 to 63.5) | 29.8 (17.2 to 51.5) |
| Child/adolescent disorder | 0.6 (49) | 0.1 (11) | 10.5 (5.5 to 20.2) | 7.5 (3.9 to 14.7) |
| Adjustment disorder | 3.2 (272) | 0.3 (64) | 10.3 (7.8 to 13.5) | 8.7 (6.6 to 11.6) |
| Other psychiatric disorder | 4.8 (409) | 0.3 (51) | 7.3 (5.4 to 10.1) | 5.5 (4.0 to 7.7) |
| Learning disability/mental retardation | 0.3 (27) | 0.0 (7) | 9.1 (4.0 to 20.9) | 6.8 (2.9 to 15.8) |

[a]Simultaneously adjusted for age, immigrant status, income, and single status in multiple logistic regression models.

ers compared with 1.3% in the controls. Crude and adjusted odds ratios were also calculated for the risk of sexual offending. Adjusting for demographic and socioeconomic variables decreased the effect of most diagnostic groups, as these demographic variables were independently associated with hospital admission.

### Other Psychiatric Diagnoses

There was also an increased prevalence of nonpsychotic disorders across all diagnostic groups, and sexual offenders had an increased risk of having these disorders compared with the control population (Table 5). The prevalences of comorbid substance use and personality disorder were also calculated. Any principal or comorbid diagnosis of substance use disorder was found in 1083 sexual offenders (12.7%) compared with 474 controls (2.4%). Any principal or comorbid diagnosis of personality disorder was found in 527 sexual offenders (6.2%) compared with 44 controls (0.2%). In the adjusted models (simultaneous adjustment for age, immigrant status, income, and marital status), sexual offenders were most likely to have been hospitalized for personality disorder (OR = 29.8, 95% CI = 17.2 to 51.5), child and adolescent disorders (OR = 7.5, 95% CI = 3.9 to 14.7), and learning disability (OR = 6.8, 95% CI = 2.9 to 15.8). Only individuals convicted for sexual offenses were diagnosed with a sexual disorder/dysfunction (ICD-9 category: 302; ICD-10 categories: F52, F64–66); 32 individuals (0.4%) received this principal diagnosis during their first admission to inpatient care.

### Subgroups of Sexual Offenders

A number of differences in psychiatric morbidity were found between those convicted of rape and those convicted of child molestation. Rapists had a higher prevalence of psychiatric hospitalization, and in particular were more likely to have been diagnosed with alcohol and substance use disorders, personality disorder, and other psychoses (Table 6).

### Population Attributable Risk

To further clarify the role of mental disorder in male sexual offending, the population attributable risk fractions of specific diagnoses to sexual convictions was calculated. Thus, all 15,840 sexual crimes during the study period were individually linked to all 218,283 discharged psychiatric patients and to all 3,490,448 men who had not been psychiatric patients (using the population mean of persons of age 15 and older). In the male general population, the number of sexual crimes committed was 4.5 per 1000 inhabitants, whereas in male hospitalized psychiatric patients, it was 18.2 per 1000, and in men hospitalized

Table 6. Prevalence of Inpatient Psychiatric Diagnoses Among Rapists and Child Molesters

| Diagnosis | Prevalence, % (N) Rapists (N = 2671) | Child Molesters (N = 2137) | Statistic |
|---|---|---|---|
| Any psychiatric hospitalization | 30.6 (817) | 19.7 (421) | $\chi^2 = 74$, $p < .001$ |
| Schizophrenia | 1.1 (30) | 0.9 (20) | NS |
| Bipolar disorder | 0.3 (8) | 0.4 (9) | NS |
| Other psychosis | 3.1 (83) | 1.4 (29) | $\chi^2 = 16$, $p < .001$ |
| Organic disorder | 0.5 (13) | 0.4 (9) | NS |
| Nonpsychotic affective disorder | 1.2 (33) | 1.5 (31) | NS |
| Anxiety disorder | 0.7 (20) | 0.3 (6) | $\chi^2 = 4.8$, $p = .03$ |
| Alcohol abuse/dependence (principal diagnosis) | 10.4 (279) | 5.4 (115) | $\chi^2 = 41$, $p < .001$ |
| Drug abuse/dependence (principal diagnosis) | 3.1 (84) | 0.8 (17) | $\chi^2 = 32$, $p < .001$ |
| Personality disorder (principal diagnosis) | 3.9 (103) | 1.7 (37) | $\chi^2 = 19$, $p < .001$ |
| Child/adolescent disorder | 0.6 (16) | 0.6 (13) | NS |
| Other psychiatric disorder | 2.0 (54) | 1.8 (38) | NS |
| Adjustment disorder | 3.2 (85) | 4.3 (91) | $\chi^2 = 3.9$, $p = .05$ |
| Learning disability/mental retardation | 0.3 (9) | 0.3 (6) | NS |
| Any principal or comorbid substance abuse/dependence | 19.5 (520) | 9.1 (195) | $\chi^2 = 100$, $p < .001$ |
| Any principal or comorbid personality disorder | 8.2 (219) | 4.4 (93) | $\chi^2 = 29$, $p < .001$ |

Abbreviation: NS = not significant.

with psychotic illnesses, it was 20.1 per 1000. Overall, 1 in 5 of all sexual crimes were committed by psychiatric patients (population attributable risk fraction = 20.1%). The population attributable risk fractions for individual hospitalized diagnostic groups were as follows: psychotic illnesses, 4.8%; organic disorders, 0%; substance use disorders, 8.2%; depression and other nonpsychotic mood disorders, 1.6%; and personality disorders, 5.0%.

## DISCUSSION

This national study of the psychiatric morbidity of 8495 convicted male sexual offenders is several times larger than previous investigations combined. To our knowledge, it is the first study that adjusts for confounding factors. We found that there was a 6-fold increase in a history of psychiatric hospitalization in sexual offenders compared with the general population. In particular, sexual offenders were significantly more likely to have hospital diagnoses of SMI than the general population. These findings have a number of implications.

### The Role of Severe Mental Illness in Sexual Offending

First, contrary to expert opinion,[1,10,12,13,30] the findings suggest that the role of SMI in sexual offending may be potentially important. Established risk factors include prior sexual offenses, young age, relationship problems, and deviant sexual preferences, but there is uncertainty over mental illness. As this study looked at the risk of psychiatric hospitalization in sexual offenders compared with a control group of individuals who were not sexual offenders, inferences about the role of SMI in sexual offending need to be made with caution.

A previous study[31] investigating schizophrenia and sexual offending in 876 offenders was conducted in Australia between 1993 and 1995. It reported an odds ratio of 2.7 for schizophrenia among male sexual offenders compared with the general population.[31] The present investigation, however, is about 10 times larger and adjusts for relevant socioeconomic factors.

The increased risk of psychosis in sexual offenders reported in this study is similar to that estimated for any violent crime in prior research. Unadjusted case-control studies have estimated the risk increase for a violent conviction (including rape) in schizophrenia to be around 6 times in men,[8] compared with the general population, and from cohort studies, the relative risk has been estimated to be 3 to 4 times greater.[9,32,33] Until the early 1980s, the consensus was that severe mental illness did not increase the risk of violent crime. However, this view changed after the epidemiologic evidence from case-control and cohort studies all pointed in the same direction toward an independent association between mental illness and violent crime.[34]

In terms of population impact, the population attributable risk provides a more meaningful measure than elevation of relative risk.[29] However, as it assumes causality between mental disorders and sexual offending, population attributable risk fractions should be interpreted as an estimate of the maximum possible contribution that mental disorders diagnosed in hospital make to sexual offending. We found that 1 in 20 sexual crimes could be attributed to patients with a history of hospitalization with SMI. The population attributable risk fraction for any psychiatric hospitalization was 20%, implying that improved diagnosis and treatment of these illnesses may have a role to play in reducing the societal burden of

sexual violence—if there are etiologic links between these illnesses and sexual offending.

### Mechanisms of Association

We have simply described associations in our sample, with the inference that mental disorder contributes to the offending rather than vice versa. This will usually be a reasonable assumption: the diagnosis of a psychosis or learning disability, for example, is largely independent of offending behavior and is usually reliable and lifelong once made. However, caution is necessary for some psychiatric diagnoses, most obviously personality disorder, in which the diagnosis may have been assigned after the offense and is likely to have been influenced by the knowledge that an individual had offended.

The nature of the link with psychosis is uncertain. Psychotic symptoms may trigger sexual offending. In support, a study in serious sexual offenders with schizophrenia found that in 12 out of 15 cases, offending occurred in the context of psychotic symptoms and postdated the onset of illness.[35] Clearly, SMI may also be associated with hostility, cognitive distortions, deviant sexual fantasies, and poor social skills, which are themselves considered risk factors for sexual offending.[17,36,37] Alternatively, mental illness may act as a nonspecific disinhibiting factor both personally and socially, and interact with other risk factors at the time of the crime (such as intoxication with drugs or alcohol), which would account for the similarity in increased risk of psychoses in sexual offenders in this study and violent criminals in other case-control studies.[8] Whatever the mechanism, the results suggest that further research on associations between severe psychiatric morbidity and sexual offending is necessary.

### Other Psychiatric Diagnoses

We reported our findings for psychiatric disorders other than SMI separately due to diagnostic uncertainties, possible selection biases, and the likelihood that some of the controls would have these diagnoses. Further, as stated above, the diagnosis of personality disorder may be influenced by a previous history of sexual offending. The most common of these diagnoses was any principal or comorbid substance abuse or dependence (12.7%). In rapists alone, 1 in 5 had this diagnosis (19.5%). As these relate to diagnoses on hospital discharge, they underestimate the true extent of substance abuse. The role of substance use disorders has also been highlighted in a recent study of sex offenders referred for treatment in which the lifetime prevalence was found to be 74%.[38] Other potentially important findings that could form the basis of future research include the increased risk of sexual offending in those with child and adolescent disorders; we estimated an odds ratio of 7.5. This finding accords with research in men with paraphilias and related disorders—Kafka and Hennen[39] and Kafka and Prentky[40] found that 35% to 40% of such samples have histories of childhood attention-deficit/hyperactivity disorder.

Rapists had higher rates of psychiatric morbidity, in particular substance abuse/dependence and the psychoses, compared with those convicted of child molestation. This suggests that the relative importance of psychiatric morbidity may differ with sex offender subtype, supports typologies of sexual offending that separate rapists from child molesters,[11,41–43] and may suggest that their treatment needs may be different.

Our findings of high rates of overall psychiatric morbidity are consistent with clinical studies of sex offenders referred for treatment[38] and of men presenting with exhibitionism[44] and paraphilias.[39]

### Strengths and Limitations

Among the unique features of the Swedish Crime Register are that it includes sexual offenders who are cautioned or fined and those who are transferred to secure hospitals on account of being diagnosed with a severe mental illness. This is in contrast to countries such as the United States where crime registers would not normally include those fined, cautioned, or transferred to hospital at sentencing due to legal insanity. Nevertheless, this study has a number of limitations. First, we used only inpatient data. Inasmuch as there will be individuals with psychiatric disorders among the sexual offenders and the general population who were not admitted to hospital, our data will have underestimated absolute prevalence rates. However, in Sweden, this effect will be small for SMI because 2 studies have estimated that the proportion of the population with psychoses who will not be admitted to hospital at some point in a 13-year period is unlikely to exceed 10% of the total number of individuals with psychosis.[45,46] Furthermore, there is no reason to believe that the proportion of those with SMI who are not admitted to hospital is different for sexual offenders compared with the general population, and therefore the use of solely inpatient data is unlikely to affect the relative risks reported here. Second, we used psychiatric diagnoses that were assigned by clinicians when patients were discharged rather than diagnoses established by structured instruments.

Another limitation is that this investigation has defined sexual crime by officially recorded conviction data. This has the advantage of avoiding the reporting biases associated with self-report and informant questionnaires for crime, but it underestimates violent behavior in society.[47] For rape, it is estimated that 20% to 30% of the actual offenses lead to a conviction in Sweden, which, although higher than in the United States,[4] means that these data should not be generalized to nonconvicted individuals. However, based on the findings of other research, this underestimate of true sexual offending is unlikely to affect the validity of odds ratios. Evidence from the Dunedin cohort that was followed up for violent crime found that

the extent of the underestimation of violence was similar in psychiatric patients and controls.[48] There is no reason to believe that this would be different for sexual offending.

A further limitation is that those with SMI may be disproportionately caught and convicted compared with those without such illnesses.[49] This may lead to an overestimate of the contribution of SMI to sexual offending. In summary, in relation to the risks estimated in this study, there are limitations that may underestimate the odds ratios reported (use of inpatient data), and others that may lead to an overestimation (using official crime statistics; individuals with mental illness being more likely to be caught by police).

### The Role of Psychiatry

Society's response to sexual violence has recently been focused on new criminal justice legislation that has introduced more sexual offense subtypes and increased the punishment and supervision of sexual offenders. In the United States, Megan's Law requires public authorities to have a community notification system for convicted sex offenders who pose a risk to the public. The provisions of Megan's Law have gradually been strengthened since their introduction in the mid-1990s despite criticism that they have not been sufficiently supported by scientific evidence.[50] Recently, sexually violent predator laws in the United States, which allow for the indefinite detention of sexual offenders at the end of their prison sentence, have provided psychiatrists with a diagnostic role, although it has been argued that this serves the criminal justice system rather than the treatment and rehabilitation of mentally disordered offenders.[51]

If the diagnostic findings reported here are replicated by additional investigations in other settings, improving the detection and enhancing the treatment of significant psychiatric comorbidities among sexual offenders in the criminal justice system may reduce the risk of recidivism.

### REFERENCES


1. World Health Organization. World Report on Violence and Health. Geneva, Switzerland: World Health Organization; 2002
2. Spitzberg BH. An analysis of empirical estimates of sexual aggression victimization and perpetration. Violence Vict 1999;14:241–260
3. Johnson CF. Child sexual abuse. Lancet 2004;364:462–470
4. Farrington D, Langan P, Tonry M, eds. Cross-National Studies in Crime and Justice. Washington, DC: US Dept of Justice, Bureau of Justice Statistics; 2004. Publication NCJ 200988
5. Federal Bureau of Investigation. Crime in the United States 2004. Washington, DC: US Dept of Justice; 2005
6. Harrison PM, Beck AJ. Prisoners in 2004. Washington, DC: US Dept of Justice, Bureau of Justice Statistics; 2005. Publication NCJ210677
7. Krug EG, Mercy JA, Dahlberg LL, et al. The World Report on Violence and Health. Lancet 2002;360:1083–1088
8. Mullen P, Burgess P, Wallace C, et al. Community care and criminal offending in schizophrenia. Lancet 2000;355:614–617
9. Brennan P, Mednick S, Hodgins S. Major mental disorders and criminal violence in a Danish birth cohort. Arch Gen Psychiatry 2000;57:494–500
10. Gordon H, Grubin D. Psychiatric aspects of the assessment and treatment of sex offenders. Advances in Psychiatric Treatment 2004;10:73–80
11. Hanson RK, Bussière MT. Predicting relapse: a meta-analysis of sexual offender recidivism studies. J Consult Clin Psychol 1998;66:348–362
12. Stone J, Roberts M, O'Grady J, et al. Faulk's Basic Forensic Psychiatry. Oxford, England: Blackwell Science; 2000
13. Hilton M, Mezey G. Victims and perpetrators of child sex abuse. Br J Psychiatry 1996;169:408–415
14. Hanson RK, Morton-Bourgon K. Predictors of Sexual Recidivism: An Updated Meta-Analysis. Ottawa, Canada: Public Safety and Emergency Preparedness Canada; 2004
15. Stinson JD, Becker JV, Tromp S. A preliminary study on findings of psychopathy and affective disorders in adult sex offenders. Int J Law Psychiatry 2005;28:637–649
16. McElroy SL, Soutullo CA, Taylor P Jr, et al. Psychiatric features of 36 men convicted of sexual offenses. J Clin Psychiatry 1999;60:414–420
17. Beech A, Ward T. The integration of etiology and risk in sexual offenders: a theoretical framework. Aggression and Violent Behav 2004;10: 31–63
18. The Swedish Hospital Discharge Register. Socialstyrelsen Web site. Available at: http://www.sos.se/epc/english/ParEng.htm. Accessibility verified Jan 9, 2007
19. Fazel S, Grann M. Homicide offenders and psychiatric morbidity: a Swedish population study. Am J Psychiatry 2004;161:2129–2131
20. Hjern A, Lindblad F, Vinnerljung B. Suicide, psychiatric illness, and social maladjustment in intercountry adoptees in Sweden: a cohort study. Lancet 2002;360:443–448
21. Grann M, Fazel S. Substance misuse and violent crime: Swedish population study. BMJ 2004;328:1233–1234
22. Dalman CH, Broms J, Cullberg J, et al. Young cases of schizophrenia identified in a national inpatient register—are the diagnoses valid? Soc Psychiatry Psychiatr Epidemiol 2002;37:527–531
23. Bergman B, Belfrage H, Grann M. Mentally disordered offenders in Sweden: forensic and general psychiatric diagnoses. Am J Forensic Psychiatry 1999;20:27–37
24. Persons found guilty of offences. Brå (The Swedish National Council for Crime Prevention) Web site. Available at http://www.bra.se/extra/pod/?action=pod_show&id=17&module_instance=11. Accessibility verified Jan 9, 2007
25. Dolmén L. Brottsligheten i olika länder [Criminality in different countries]. Stockholm, Sweden: National Council for Crime Prevention; 2001
26. Mortensen P, Agerbo E, Erikson T, et al. Psychiatric illness and risk factors for suicide in Denmark. Lancet 2000;355:9–12
27. Rothman KJ, Greenland S. Modern epidemiology. 2nd ed. Philadelphia, Pa: Lippincott-Raven; 1998
28. Walsh E, Fahy T. Violence in society. BMJ 2002;325:507–508
29. Fazel S, Grann M. The population impact of severe mental illness on violent crime. Am J Psychiatry 2006;163:1397–1403
30. Prentky R, Janus E, Seto M, eds. Sexually Coercive Behavior: Understanding and Management. New York, NY: Annals of the New York Academy of Sciences; 2003
31. Wallace C, Mullen P, Burgess P, et al. Serious criminal offending and mental disorder. Br J Psychiatry 1998;172:477–484
32. Hodgins S. Mental disorder, intellectual deficiency, and crime. Arch Gen Psychiatry 1992;49:476–483
33. Tiihonen J, Isohanni M, Räsänen P, et al. Specific major mental disorders and criminality: a 26-year prospective study of the 1966 Northern Finland birth cohort. Am J Psychiatry 1997;154:840–845
34. Walsh E, Buchanan A, Fahy T. Violence and schizophrenia: examining the evidence. Br J Psychiatry 2002;180:490–495
35. Phillips SL, Heads TC, Taylor PJ, et al. Sexual offending and antisocial sexual behavior among patients with schizophrenia. J Clin Psychiatry 1999;60:170–175
36. Cohen LJ, McGeoch PG, Watras-Gans S, et al. Personality impairment in male pedophiles. J Clin Psychiatry 2002;63:912–919
37. Sahota K, Chesterman P. Sexual offending in the context of mental illness. J Forensic Psychiatry 1998;9:267–280
38. Dunsieth NW Jr, Nelson EB, Brusman-Lovins LA, et al. Psychiatric and legal features of 113 men convicted of sexual offenses. J Clin Psychiatry 2004;65:293–300
39. Kafka M, Hennen J. A DSM-IV Axis I comorbidity study of males with comorbidity and paraphilia-related disorders. Sex Abuse 2002;14: 349–366

40. Kafka M, Prentky R. Attention-deficit/hyperactivity disorder in males with paraphilias and paraphilia-related disorders: a comorbidity study. J Clin Psychiatry 1998;59:388–396
41. Henn F, Herjanic M, Vanderpearl R. Forensic psychiatry: profiles of two types of sex offenders. Am J Psychiatry 1976;133:694–696
42. Hanson RK. Age and sexual recidivism: a comparison of rapists and child molesters. Ottawa, Canada: Dept of the Solicitor General of Canada; 2001. User Report No. 2001-01
43. Grubin D, Kennedy H. The classification of sexual offenders. Crim Behav Ment Health 1991;1:123–129
44. Grant JE. Clinical characteristics and psychiatric comorbidity in males with exhibitionism. J Clin Psychiatry 2005;66:1367–1371
45. Hansson LR, Vinding H, Mackeprang T, et al. Comparison of key worker and patient assessment of needs in schizophrenic patients living in the community: a Nordic multicentre study. Acta Psychiatr Scand 2001; 103:45–51
46. Jansson L, Sonnander K, Wiesel F-A. Clients with long-term mental disabilities in a Swedish county: conditions of life, needs of support and unmet needs of service provided by the public health and social service sectors. Eur Psychiatry 2003;18:296–305
47. Steadman H, Mulvey E, Monahan J, et al. Violence by people discharged from acute psychiatric inpatient facilities and by others in the same neighborhoods. Arch Gen Psychiatry 1998;55:393–401
48. Arseneault L, Moffitt T, Caspi A, et al. Mental disorders and violence in a total birth cohort: results from the Dunedin study. Arch Gen Psychiatry 2000;57:979–986
49. Fazel S, Grann M. Reply to Pinta ER. Limitations of study on violent crime and mental illness [letter]. Am J Psychiatry 2006;163:2194
50. Zonana H. The civil commitment of sex offenders. Science 1997; 278:1248–1249
51. Janus ES. Sexually violent predator laws: psychiatry in service to a morally dubious enterprise. Lancet 2004;364(suppl 1):S50–S51