SCHIZOPHRENIA AND VIOLENCE

A study of a one-year resident cohort of Scottish high security hospital patients with schizophrenia and their outcomes after ten years

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Declaration

I hereby declare that this thesis has been composed by me. The research presented was conducted with others, but I made a substantial contribution to the work, and my contribution has been clearly indicated. The work presented in this thesis has not been submitted for any other degree or professional qualification.

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Contents

Abstract

INTRODUCTION: People with schizophrenia who commit serious violence are detained in secure hospitals. The research presented in this thesis investigated the long-term outcomes of patients with schizophrenia detained in a high security hospital.

LITERATURE REVIEWS: Epidemiological research points to a significant but modest relationship between schizophrenia and violence. But when followed-up, offenders with schizophrenia are less violent than those with primary personality disorders or non-psychotic violent offenders. A number of factors have been found to be associated with violence in people with schizophrenia. Many of these are the same as factors associated with violence in non-psychotic populations. Seventy-two studies of the outcomes of UK security hospital studies published before 2010 were reviewed. Most included mixed diagnostic groups, and only 3 were focused on patients with schizophrenia. The most commonly reported outcome was conviction in over half of studies. Readmission, length of stay, institutional violence, the discharge process and mortality were reported in up to a quarter of studies. Very few studies reported clinical or social outcomes.

AIMS AND RESEARCH QUESTIONS: The aims were to describe the long-term administrative (including moving though services and levels of security), forensic (including violence, conviction, absconding), clinical (including course of psychosis, treatment received, mortality) and social (including employment, intimate relationships, accommodation, substance misuse) outcomes of patients with schizophrenia detained in a high security hospital in Scotland; and to ascertain the factors associated with certain of these outcomes. Research questions were formulated to address these aims.

METHOD: The sample was 169 patients with schizophrenia resident at the State Hospital, Carstairs, between August 1992 and August 1993. In 1992-4 patients and their psychiatrists were interviewed and data were collected from case records. Patients were followed up until the end of 2001. Records covering the intervening period were examined, and patients and independent informants were interviewed in 2000 and 2001. A number of structured instruments were used at interviews and to interrogate case records. Analysis involved descriptive statistics, survival analysis, bivariate approaches and logistic regression.

RESULTS: ***Baseline characteristics*:** Most patients were male, unmarried and from socially disadvantaged backgrounds. The average patient was in their mid thirties. Most had been

admitted from criminal courts after committing serious offences, half were subject to restriction orders and a quarter had killed. Most had had psychiatric treatment previously. Comorbid substance dependence and personality disorder were common. ***Administrative outcomes*:** Most patients (79%) left high security, but a minority (48% of those who left high security) reached the community, and 17% of patients who left high security were re-admitted. Clinical correlates of outcomes were: not leaving high security - psychopathy and chronic psychosis; not reaching the community – chronic psychosis, not having substance dependence and not having an index offence precipitated by psychosis; readmission to high security – psychopathy. Other associates of outcomes, in terms of baseline and follow-up variables, were in keeping with the clinical correlates. ***Forensic outcomes*:** Three-quarters committed at least one act of violence, but less than a quarter caused serious harm. There were almost 2000 violent incidents, mostly in high security. Violence in the community was rare. The rate of criminal conviction was 13%, 10% for serious offences. Clinical correlates of forensic outcomes were: any violence – antisocial personality disorder and on going positive symptoms; serious violence – psychopathy; persistent violence – chronic positive and negative symptoms; convicted offending – psychopathy and substance dependence. Other associates were in keeping with these findings. ***Clinical and social outcomes*:** A third had episodic symptoms, a quarter continuous symptoms and a fifth recovery with no recurrence. Positive symptoms tended to improve whilst negative symptoms persisted. Persistent positive symptoms were related to not having psychopathy or substance dependence; and to more frequent relatively minor aggression, but not serious violence. The mortality rate was 7%. Social outcomes were very poor, but few patients were misusing substances at follow-up. ***Comorbid substance dependence and personality disorder*:** Substance dependent patients were more likely to be convicted, but otherwise had better administrative, clinical and social outcomes. Antisocial personality disorder was associated with violence during follow-up. Psychopathy was associated with not leaving high security, readmission to high security, conviction, serious violence and better outcome of psychosis.

CONCLUSIONS: The outcomes and their associates are reviewed in light of the available literature. Course of psychosis and comorbid personality disorders and substance dependence are important clinical factors in determining the administrative, forensic and clinical outcomes of these patients. A typology based on these factors and course of violence is suggested as a way of synthesizing the findings with the literature and as a way of understanding the current findings. The methodological strengths and weaknesses of the study, and implications for clinical practice and research are discussed.

CHAPTER 1
Introduction

The research presented in this thesis examines the long-term outcomes of 169 patients with schizophrenia detained at the State Hospital, Carstairs, the high security hospital serving Scotland and Northern Ireland. All patients resident at the State Hospital at any point from August1992 to August 1993 were studied and described in the State Hospital Survey (Thomson et al. 1997). Similar studies were undertaken in the English Special Hospitals in the 1990s (Maden et al. 1993; Taylor et al. 1998). Researchers were interested in the outcome of patients with schizophrenia in the UK high security hospitals and a multi-site research group (The Special Hospitals Treatment Resistant Schizophrenia Group), including the State Hospital, was formed. Cohorts of patients with schizophrenia in the four high security hospitals were followed up. The Scottish cohort was followed up for up to a decade, and is examined in this thesis.

Schizophrenia is the predominant diagnosis in high security hospitals and medium secure units in the UK (Thomson et al. 1997; Taylor et al. 1998; Coid et al. 2001; Gow et al. 2010). But there have been few studies in the UK (Baxter et al. 1998; Dolan and Davies 2006) and elsewhere (Tengström 2001), of the outcomes of forensic patients with schizophrenia. Outcome studies of mixed diagnostic groups (combining patients with mental illness, personality disorders and sometimes learning disabilities) tell us something about patients with mental illness (sometimes more specifically schizophrenia) compared with other patients. But they tell us little, if anything, about the nature and course of schizophrenia in secure hospital patients, or about the forensic (i.e. offending and violence), administrative (i.e. progress through services) and social outcomes of these patients. The research presented in this thesis aims to describe in detail the characteristics and, more importantly, long-term outcomes of patients with schizophrenia detained in a high security hospital. Outcomes presented will include: forensic outcomes (conviction, actual violence whether convicted or not); administrative outcomes (leaving high security, reaching the community, readmission to high security); clinical outcomes (course of psychosis, treatment received, mortality); and, social outcomes (employment, relationships, accommodation, substance misuse). The factors associated with forensic, clinical and administrative outcomes will be examined, including the role of co-morbid substance dependence and personality disorder.

There follows a narrative review of the literature on schizophrenia and violence (Chapter 2). This is followed by a more specific, detailed and systematic review of outcome studies of UK security hospital patients (Chapter 3). Chapter 4 sets out the aims of the research and the specific research questions addressed. Chapter 5 describes the method used to undertake the research. Chapter 6 reports the baseline characteristics of the sample. Chapters 7, 8 and 9 respectively describe the administrative, forensic and clinical/social outcomes of the cohort, and examine the factors associated with outcomes. Chapter 10 looks at co-morbid substance dependence, antisocial personality disorder and psychopathy. Chapter 11 presents a conclusion, drawing together the main findings, discussing the strengths and weaknesses of the study, and setting out the implications of this research for future research and for clinical practice.

CHAPTER 2
Literature review
Schizophrenia and violence / offending

The fact that insanity can be associated with offending at an individual level has been recognised through the existence of the insanity defence with its origins in ancient times (Walker, 1968); and the apparent need for the containment of 'dangerous lunatics' is seen in the introduction of laws and asylums for the criminally insane in the 19th century (Walker and McCabe, 1973). But do such cases, recognised for centuries, represent individual aberrations, or a general over-representation of crime and violence amongst individuals with psychosis? Is there a relationship between schizophrenia and offending? What are the factors that correlate with violence in individuals with schizophrenia? Are these factors different from those related to violence and offending in the general population? What are the implications of any associations for the management of patients with schizophrenia? What are the implications for this research?

Here I will provide an overview of the literature on schizophrenia and violence. A number of reviews covering this have been published: Glancy and Regehr (1992), Marzuk (1996), Eronen et al. (1998), Modestin (1998), Angermeyer (2000), Walsh et al. (2002) and Mullen (2006).

Is there an association between schizophrenia and offending?

Until the 1980s the consensus view was that there was no greater likelihood of violence or offending in individuals with schizophrenia than in the general population. Since then, with the emergence of new epidemiological research, it has been widely accepted that there is a significantly increased risk of violence and offending associated with schizophrenia. Potential reasons for this change include a lack of properly conducted studies previously, reliance on clinical impressions, or an actual change in the rate of violence in patients perhaps associated with the move to the care of patients in the community.

Methodological issues and types of studies

When examining research looking at the association between schizophrenia and offending or violence a number of methodological issues have to be considered: the definition and ascertainment that an individual has the condition, the definition and ascertainment that the outcome of interest (i.e. offending or violence) has occurred, minimizing biases which may distort the relationship between the condition and the outcome, and properly taking into account confounding factors (Eronen et al. 1998; Modestin 1998; Angermeyer 2000; Walsh et al. 2002; Mullen 2006).

Defining and ascertaining the presence of the condition

Some studies look at mental disorder, mental illness or psychosis as broad groups rather than specific diagnostic groups. It may then be difficult to extrapolate the findings to schizophrenia and any specific effect of schizophrenia may be lost. In studies that do look at schizophrenia varying approaches to diagnosis have been applied. Diagnostic criteria may be broad or narrow, and a rigorous approach to the application of operationalised criteria may or may not be taken. Diagnoses in records may purport to be according to specific criteria, but whether the clinician has been rigorous in the application of such criteria may be unknown. However a clinical diagnosis in the records, based on multiple observations and sources, may be more valid than a diagnosis based on a one off interview, whether for research or clinical purposes. Although the application of structured diagnostic methods may increase reliability, there is a danger that this will be at the expense of validity.

The course of the illness may also have an effect. The timing of violence and offending relative to the onset and course of schizophrenia may be important. Does violence occur pre-morbidly, during a prodromal period, during the first episode, during periods of relapse or in association with chronic residual deficits? Discerning this perhaps goes beyond the question of 'is there an association?' to 'why is there an association?' and 'what are its correlates?' But the association may be missed, conflated or exaggerated depending on the phase of the illness studied.

Defining and ascertaining the outcome

Different studies look at offending and violence of various types and severity. If a study looks only at homicide, can the findings be extrapolated to less serious violence? Do the same relationships hold for offending generally as they do for violence? Do different types of aggression (e.g. non-sexual aggression, sexual offending and fire-raising) show different relationships? If one sets a high threshold for the outcome (e.g. homicide) then there will be relatively few cases where the outcome occurs. But a low threshold (e.g. verbal outbursts), whilst increasing numbers, may distort the applicability of findings to more serious violence, which may be more clinically relevant. It is rare to find two studies, except those on homicide, that define violence in the same way.

Different sources of information have their advantages and limitations. Individuals may self-report less incidents and less severity of incidents due to social acceptability or fear of adverse consequences. Informants may or may not have a vested interest in the individual studied and may be unaware of incidents. Both self-report and informant-report may be subject to recall bias or greater emphasis on incidents when unwell. Case records may be incomplete, may miss certain incidents and may vary depending on who is recording information. Official arrest or conviction records will not accurately reflect the actual incidents an individual has been involved in due to factors such as: under-reporting of crime; decisions made by the police, prosecutors and courts as to whether prosecution will be pursued; a reluctance to prosecute the mentally ill; the availability of diversion to mental health services; the effects of mental illness on the likelihood that an individual will be apprehended; a greater likelihood of prosecution for more serious offences; a focus only on offences committed in one jurisdiction; data errors; and the deletion of certain offences (e.g. juvenile offences). The problems associated with each of these sources have led to some researches using multiple sources of information. Self-report has been found to yield a much

higher rate of violence and offending than official records (Mulvey et al. 1994a; Steadman et al. 1998), with this yield being increased slightly with the addition of a collateral informant. Problems that arise with the use of multiple sources of information include how to integrate this information, rationalizing inconsistencies between sources and avoiding double counting.

Biases

Individuals who refuse to participate in, are unable to participate in or are lost from a study may show a different relationship between schizophrenia and violence than those who participate. Patients who refuse or are too unwell to consent may be more likely to be aggressive. This has implications for the ethical approval process for such studies. On the one hand patients should not be forced to take part in research that they do not consent to. On the other hand violence by individuals with mental illness is of such clinical and societal importance that it is important that any research conducted gives an accurate picture of the association.

The sampling location may distort the strength of the association. Clinical samples of hospitalized cases may exclude milder cases with less overt behavioral problems. Looking at violence prior to or during admission to hospital is likely to overestimate the relationship, as aggression is more likely at these times, and may be the reason for admission. Looking at discharged patients, on the other hand, may underestimate the association, as discharged patients may be stabilized and in receipt of treatment, support and supervision. Prison and forensic hospital samples may distort the relationship due to the processes that lead to individuals being detained and the nature of any comparison groups. Community samples including both treated and untreated cases may overcome some of these problems, but may exclude individuals in prison or detained in hospital, thus underestimating the association. The sampling location will be relevant to whether the findings generalize to other settings.

The nature of any control or comparison group needs to be considered carefully. If patients with schizophrenia are compared with other clinical groups any association will vary depending on the nature of the diagnoses in the latter. Comparison groups including high numbers of individuals with personality disorders or substance misuse will underestimate the influence of schizophrenia.

Researchers may be biased by their knowledge of the person's diagnosis or violence history. Blinding may be difficult to achieve in such studies, and whether attempts have been made to achieve this is rarely mentioned.

Confounders and mediators

A confounding variable is associated with the presence of schizophrenia and, independently of this, is associated with violence or offending. A confounder is not on the causal pathway between schizophrenia and violence; a variable on this pathway is a mediator. Confounders should be controlled for and/or taken into account statistically within the research methodology, whereas mediators need to be elucidated. Given the current knowledge of the relationship between schizophrenia and violence it may be difficult to identify confounders in advance. In addition, some variables (such as substance misuse and personality problems) may be both mediators and confounders. Mullen (2006) suggests that the appropriate approach is to ascertain associations and then look at why the associations found exist

Types of studies

Broadly, studies looking at the association between schizophrenia and violence or offending fall into the following groups:

- **Clinical samples** looking at rates of violence or offending prior to, during or after admission to hospital.

- **Offender samples** looking at the rates of schizophrenia in offenders generally (mostly through prison samples) or in particular types of offenders (e.g. homicide offenders).

- **Selected cohorts using case linkage** take a clinical cohort and link its members to a criminal records database. Patients with schizophrenia may be compared with other patient groups or with data on the general population.

- **Unselected birth cohorts using case linkage** use case registers to identify individuals in a national birth cohort who have been treated for schizophrenia and

ascertain rates of offending by linkage to a national criminal records database. Individuals with schizophrenia may be compared with those with other diagnoses, and/or with the general population.

- **Community prevalence studies** examine unselected samples of people from the community, looking cross-sectionally at the association between schizophrenia and offending or violence in comparison with other diagnoses and/or the general population.

Studies of offenders

Studies looking at the prevalence of mental disorders in offenders have largely focussed on prisoners and perpetrators of homicide. Studies on homicide are reviewed later. The findings from studies looking at schizophrenia in prisoners are summarised in table A1 (See Appendix A1). Andersen (2004) reviewed methodological issues of relevance to such studies. Rates of schizophrenia in prison samples are unlikely to give an accurate estimate of the relationship between schizophrenia and offending due to the various issues discussed above. The main reviews are those by Diamond et al. (2001) and Andersen (2004). The most important paper is the meta-analysis by Fazel and Danesh (2002), but they report the rate of psychosis rather than schizophrenia.

There are clearly higher rates of psychosis and schizophrenia in prisoners than in the general population. Rates are around three to four times as high. In general higher rates have been found in remand prisoners than in sentenced prisoners, in the USA than in other countries, and in female prisoners than in male prisoners. Remand prisoners with severe mental illness may subsequently be diverted to mental health care, and in the UK some individuals may be remanded rather than placed on bail as they have a mental illness. In the USA the high rates may reflect a lack of provision of mental health care out with the correctional system. High rates of homelessness in jail detainees in the USA are partly mediated by mental illness (Greenberg and Rosenheck 2008).

Studies of clinical samples

Forensic samples

Studies of patients in secure hospitals or subject to legal provisions for mentally disordered offenders ('forensic patients') tell us the type of patients seen in such services, but little about the association between schizophrenia and offending. This is because patients with severe conditions (such as psychosis) are overrepresented, as legal criteria, clinical selection and service provision, rather than the relationship between disorder and offending, will dictate who becomes a 'forensic patient'. So it should be no surprise that high rates of schizophrenia are found in individuals who are found insane by the courts (Chiswick 1978; Pasewark et al. 1979; Lamb et al. 1988; Grubin1991; Livingston et al. 2003) and who are detained in secure psychiatric hospitals (see Chapter 3). Studying such individuals may, however, help in understanding the factors that lead to offending in individuals with schizophrenia (see below).

Offending or violence prior to admission

Humphreys et al. (1992) found that a fifth of patients with schizophrenia committed a life-threatening act before their first admission to hospital. There was no comparison group. Tardiff et al. (1997b) found no difference in rates of schizophrenia in patients who were violent prior to admission compared to non-violent patients. Of 177 patients with schizophrenia 12% had physically attacked another person in the month prior to admission. Volavka et al. (1997) looked at history of violence (as reported by an informant) in an incidence cohort of 1017 patients with schizophrenia from 10 countries. A fifth of patients had been violent, with a higher rate in developing (31.5%) than developed (10.5%) countries. Milton et al. (2001) looked at aggression prior to illness onset, between onset and contact with services and following contact with services in 166 patients with a first psychotic episode. Schizophrenia was the most frequent diagnosis, but was present in just over a third of the cohort. A fifth of patients were aggressive pre-morbidly (9.6%) or prodromally (16.9%). About a quarter were aggressive after contact with services, but the majority of this group had not been violent pre-contact. Overall over a third of patients were aggressive at some point. Hodgins et al. (2007) found that of 120 male patients in a general psychiatry setting (83% of whom had schizophrenia or schizo-affective disorder) 42% had committed a serious assault in their lifetime, 49% had been aggressive in the last 6 months, 22% had been violent in the last 6 months, 68% had a criminal conviction and 47% had a conviction for violent offending. Amongst the 85 female patients (61% of whom had schizophrenia or

schizo-affective disorder) 21% had committed a serious assault in their lifetime, 39% had been aggressive in the last 6 months, 19% had been violent in the last 6 months, 27% had a criminal conviction and 16% had a conviction for violent offending.

Inpatient aggression

High rates of assaultive behaviour have been reported in patients with schizophrenia, although whether violence is over-represented in patients with schizophrenia compared with patients with other diagnoses is less clear (Crichton 1995). Some have found schizophrenia to be over-represented amongst violent inpatients (Smith and McKay 1965; Tardiff and Sweillam 1979; Fottrell 1980; Hodgkinson et al. 1985 Pearson et al. 1986; Karson and Bigelow 1987; Noble and Roger 1989), some have found lower rates of violence in patients with schizophrenia (Evenson et al. 1974; Walker and Seifert 1994), and others have found no relationship, either positive or negative (James et al. 1990; Torphy and Hall 1993; Tanke and Yesavage 1985). As mentioned above, studies of inpatient violence will not give a true reflection of the association between schizophrenia and violence. Aggression or potential for aggression may be the reason a patient is in hospital. In many studies there were high proportions of patients with schizophrenia, and comparison groups varied.

Violence and offending following discharge

A number of studies have been conducted looking at violence and offending of patients following discharge from hospital. Some of these have been 'general' samples (i.e. not patients detained in secure psychiatric hospitals) and some have been 'forensic' samples (i.e. patients detained in secure forensic psychiatric hospitals).

Rabkin (1979) reviewed studies of criminal behaviour by discharged psychiatric patients before 1979. She concluded that before 1960 discharged patients had lower rates of criminal behaviour than the general population, but since 1965 rates have been the same or higher and she found rates of violence following discharge had increased. Although an increase in violence and offending in the general population seemed important, this did not explain the change in relative levels of violence. Many studies were methodologically weak and a number lacked comparison groups. The review was primarily focused on psychiatric patients as a group, and not on specific diagnoses. However, for patients with schizophrenia she concluded that although rates of arrest following discharge were no higher, there was perhaps an association with violence. However findings from studies on schizophrenia were

'inconsistent' and varied depending on the proportion of patients with schizophrenia in the sample.

In a cohort of 618 patients discharged from a high security hospital in Canada, Harris et al. (1993) found a negative association between schizophrenia and violent recidivism. Similar findings have emerged from follow-up studies of high security hospital patients in the UK where lower rates of violent recidivism have been found amongst patients detained under the legal category of mental illness than for patients detained under other legal categories (Acres 1975; Black 1982; Tennent and Way 1984; Bailey and MacCulloch 1992a; Buchanan 1998). The key factor to understand in these studies is that patients with schizophrenia (or mental illness) are compared with other patients with histories of serious violence, a disproportionate number of whom are personality disordered. So these studies tell us nothing about the relationship between schizophrenia and violence in general, but that patients with schizophrenia treated in forensic hospitals are less violent on follow-up than other patients treated in forensic hospitals. This may be due to the way that forensic patients with schizophrenia are treated and managed (both in hospital and following discharge) and/or the nature of the comparison group. Similarly follow-up studies of patients in medium secure units have shown no association between schizophrenia and reoffending (Coid et al. 2007a).

The most important study of violence in patients discharged from a general psychiatry setting was the MacArthur Violence Risk Assessment Study (Steadman et al. 1998). Nine hundred and fifty-one patients discharged from inpatient facilities at 3 sites in the USA were followed-up for a year. The patients from one site (a sub-sample of 336) were compared with 519 individuals from the same neighbourhoods in Pittsburgh. Of the patients, 17% had a diagnosis of schizophrenia. Mental illness without co-morbid substance misuse was not found to be associated with violence during follow-up, and of all the diagnostic groups patients with schizophrenia had the lowest rate of violence. The rate for schizophrenia was 9% compared to 19% for depression, 15% for bipolar disorder, 17% for other psychotic disorders, 29% for substance related disorders and 25% for personality disorders (Monahan and Applebaum 2000). It has been argued that the disproportionate number of patients with schizophrenia who refused to participate, perhaps including patients who may have been more likely to be violent, led to selection bias and distorted the true picture (Torrey et al. 2008). However, the finding of lower rates of violence in patients with schizophrenia is in keeping with other discharge follow-up studies. Factors such as community treatment and supervision, and retention in hospital of more disturbed patients may have played a role. The most important point about this study in relation to any question about the relationship

between schizophrenia and violence is that the MacArthur Violence Risk Assessment Study did not seek to ascertain the relationship between mental disorder and violence or offending. It sought to ascertain the factors of relevance to violence and offending after discharge from hospital. As has been pointed out by its authors the study 'had no such epidemiological aspirations' (Torrey et al. 2008). Tardiff et al. (1997a) followed up 430 patients discharged from a private university hospital for 2 weeks, and found no association between psychosis and violence.

Retrospective cohorts using case linkage

Lindquist and Allebeck (1990) linked 790 patients discharged from hospitals in Sweden in 1971 to the Central Swedish Police Register, comparing rates of crime with those in the general population. Violent crime was about four times higher in patients with schizophrenia, although there was no significant increase in the rate of non-violent crime. Wessley et al. (1994) compared criminal convictions amongst 538 incident cases of schizophrenia with psychiatric controls without psychosis matched for age and gender. Males with schizophrenia had twice the rate of violent convictions as controls, and females with schizophrenia also had significantly higher rates of violent convictions. This was despite the control groups including disorders (such as substance related conditions) known to be associated with criminal convictions.

Modestin and Ammann (1995) compared an unselected sample of 1265 Swiss inpatients with a matched control group drawn from the general population. Controls were matched for gender, age, marital status, social class and community size. Patients and controls were linked to data held by the Swiss Central Criminal Record Department. Of the 212 male patients with schizophrenia 34% had committed a crime and 4% a crime of violence. This was not significantly different from controls. Of the 226 female patients with schizophrenia 14% had committed a crime and less than 1% a crime of violence. The crime rate was significantly higher than the 6% found in female controls. The same authors in a closer study of 282 patients with schizophrenia, with similarly matched controls, found the patients were five times as likely as the controls to have a violent conviction and two and a half times as likely to have a conviction for a property offence (Modestin and Ammann 1996).

Wallace et al. (1998) linked the higher court records of criminal convictions with a state wide psychiatric case register in Victoria, Australia. There was a significant association between schizophrenia and all types of offending studied in males (odds ratios: any conviction 3.2, violence 4.4, homicide 10.1, property 2.8, sex offences 2.7) and for females

(odds ratios: any conviction 4.2, violence 4.3, property 4.2). As might be expected, personality disorder and substance misuse showed stronger relationships with crime and violent crime.

Belfrage (1998) linked 1056 patients discharged form hospitals in Stockholm with a police database of convictions. Patients had schizophrenia, affective psychosis or paranoia and schizophrenia was not studied separately. There was no direct comparison group. Of the patients who were under 40 years old 40% had a criminal record (compared to a figure of 10% for the general population). Half of these patients had been violent.

Wallace et al. (2004) compared the criminal records of 2861 patients with schizophrenia admitted to hospital in Victoria, Australia between 1975 and 1995 with an equal number of age, gender and neighbourhood matched community controls. The patients with schizophrenia had significantly greater rates of conviction (21.6% v 7.8%) and significantly greater rates of violent offending (8.2% v 1.8%). In an overlapping study, Mullen et al. (2000) found that patients with schizophrenia admitted to hospital in Victoria in 1975 and 1985 had three times the rate of conviction as age, gender and neighbourhood matched controls.

Epidemiological cross-sectional studies

Swanson et al. (1990) analyzed data from the National Institute of Mental Health's Epidemiologic Catchment Area (ECA) study. Diagnoses were made using the Diagnostic Interview Schedule, generating DSM-III diagnoses, and self report data on violence came from five questions in the diagnostic sections for antisocial personality disorder and alcohol related disorders. Of over 10,000 participants, 368 (3.7%) reported any aggression in the last year. The rate in individuals with schizophrenia was 8.4% compared with 2.4% for anxiety disorders, 3.4% for affective disorders, 2% for those with no disorder and 21.3% for those with a substance related disorder.

Link et al. (1992), in a study in New York City of 753 individuals (386 never treated, 83 first-treatment contact, 173 repeat-treatment and in contact, 111 former patients), found no increase in convictions for non-violent offences, but significantly raised rates of violent offending (over 5% compared with 1%) in patients with previous contact. Risk of violence was significantly associated with age, gender and education, but mental illness had a significant modest independent effect.

Stueve and Link (1997) used data from a community sample of 2678 young adults in Israel. Self-report of recent violence (including fighting and weapon use) was significantly associated with psychotic disorder diagnosed using a modified version of the Schedule for Affective Disorders and Schizophrenia. Substance misuse, antisocial personality disorder and demographic variables were controlled for in the analysis.

Coid et al. (2006a and b) studied rates of self-reported violence and psychiatric morbidity in a national household survey of 8397 respondents in Britain in 2000. There was no independent association between psychosis and violence. The authors conceded this may have been due to using a screening interview, low rates of psychosis and exclusion of individuals not living in a house hold (i.e. prisoners, in-patients and the homeless). However they also pointed out that other studies that found an association failed to control for comorbid personality disorder and substance misuse, and those that did found that any association was modest.

Birth cohort studies

Hodgins (1992) studied an unselected birth cohort of all 15,117 people born in 1953 and living in Sweden 30 years later. About 1% of the men and the women suffered from a 'major mental disorder' (schizophrenia, affective disorder, paranoid states or other psychoses). There were significantly elevated rates of offending and violent offending in males (odds ratios: all offences 2.6, violent offences 4.2) and females (odds ratios: all offences 5.0, violent offences 27.4).

Hodgins et al. (1996) studied 324,401 people born in Denmark from1944 to 1947, linking data on psychiatric hospitalization and conviction from national case registers. Individuals were followed up until the age of 43. Men with 'major mental disorder' (with a similar definition to the study above) were 2 to 3 times more likely to be convicted, and for females this was 3 to 4 times. All types of offences (including violent offences) were more common in individuals with major mental disorder. However the relative risks were greater for other diagnostic groups: mental retardation, antisocial personality disorder, alcohol related disorders and drug related disorders.

Tiihonen et al. (1997) studied 12,058 people born in Northern Finland in 1966 and followed up until 1990. As well as data from national registers on psychiatric hospitalization and criminal convictions, there was also data available on family and socio-demographic characteristics. The adjusted odds ratio for any conviction was 3.0 for schizophrenia, but was

actually higher in other psychoses (schizophreniform/schizoaffective, affective, paranoid, organic). The adjusted odds ratio for violence was 7.2, higher than the other psychotic groups except affective psychosis. Males with schizophrenia and substance abuse had a particularly high rate of violence.

Brennan et al. (2000), in a further study of the cohort study reported by Hodgins et al. (1996), studied a cohort of 358,180 people in Denmark born in the mid 1940s and followed up until 1991. The unadjusted odds ratio for violence in individuals with schizophrenia was 4.6 in men and 23.2 in women. When adjusted for socio-demographic factors these were 3.2 and 10.6 respectively; further adjusted for substance misuse 2.0 and 7.5; and finally adjusted further for comorbid personality disorder 1.9 and 7.1.

Arseneault et al. (2000) reported on a total city birth cohort of 961 young adults born in 1972-3 in Dunedin, New Zealand. Individuals with schizophrenia spectrum disorders were 2.5 times more likely to be violent. The other diagnoses associated with violence were alcohol and cannabis related disorders. Amongst this group a model incorporating excessive perception of threat as adolescent and juvenile conduct disorder best explained violence.

Summing up the evidence on whether there is an association between schizophrenia and violence

The weight of evidence from different types of studies in different parts of the world indicates there is a modest positive relationship between schizophrenia and violence. Although each study has its flaws, the evidence, particularly from epidemiological birth cohort and cross sectional studies, converges on this conclusion. The correlates of violence and offending in schizophrenia will be examined below, but controlling for variables such as substance misuse, personality disorder, gender, age and other socio-demographic factors does not negate the relationship in the majority of studies, albeit that taking such factors into account reduces the strength of the association. However even though there is a statistically significant positive association between schizophrenia and violence, causality cannot be assumed. The association is a modest one and a number of complex factors play roles.

The contribution of schizophrenia to violence in society

Fazel and Grann (2006) quantified the contribution of individuals with schizophrenia to violent offending in Sweden. Relative risks or odds ratios are helpful to the scientific understanding of the relationship between schizophrenia and violence, and in informing clinical interventions, but do not give an indication of the societal impact of violence by

people with schizophrenia (e.g. the risk of a member of the public being victimised). Absolute risk is more useful in this regard (Angermeyer 2000). Fazel and Grann examined all patients discharged from hospitals in Sweden, looking at criminal convictions over a 13-year period. The crude odds ratio for violence was 3.8 for any severe mental illness and 6.3 for schizophrenia. The population attributable risk fraction for schizophrenia (i.e. the proportion of violence committed by people with schizophrenia) was 2.3%; and for all individuals with severe mental illness was 5.2%. As would be expected, the population attributable risk was less in younger males and greatest in older females.

Walsh et al. (2002) also argued that data on absolute risk should be presented by researchers to give a clearer understanding of the contribution of schizophrenia to violence in society. They gave figures of 2.7% for the ECA study (Swanson et al. 1990), 4% for the study by Tihonen et al. (1997), and 2% for males and 9% for females in the study by Brennan et al. (2000). Arsenault et al. (2000) reported that in the Dunedin cohort study 10% of past-year violence committed by young adults was attributable to schizophrenia. The annual risk of homicide in a person with schizophrenia was about 1 in 10000, while that of being convicted of a violent offence was about 1 in 150 (Wallace et al. 2004).

Such figures give an idea of how much violence could be eliminated if individuals with schizophrenia were removed from society. But they do not give a clear indication of what would be the impact of removing schizophrenia as an illness from society. The assumption of causality cannot be made. Removing co-morbid, mediating or confounding factors (e.g. substance misuse) greatly reduces the population attributable risk of violence for individuals with schizophrenia. For example removing substance misuse would reduce by over a half the population attributable risk fraction for schizophrenia calculated from some studies (Walsh et al. 2002).

Arboleda-Florez et al. (1998) cautioned researchers about the potentially stigmatizing causal inferences that may be made by others on the basis of recent reported findings of a positive association between schizophrenia and violence:

> *The authors suggest that a casual inference about mental illness and violence may yet be hasty. Because a premature statement advocating a causal relationship between mental illness and violence could increase stigma and have devastating effects on the mentally ill the authors urge researchers to consider the damage that may be produced as a result of poorly substantiated causal inferences.*

Wallace et al. (1998) conclude:

The risk of a serious crime being committed by someone with a major mental illness is small and does not justify subjecting them, as a group, to either increased institutional containment or greater coercion.

Most violence committed by people with mental illness is minor and not life threatening. However disturbed behaviour, including minor aggression, in the community may cause fear, and does little to help with the de-stigmatization and inclusion of people with severe mental illness (Link et al. 1987). The public particularly fear homicide by people with mental illness receiving 'care in the community', but Taylor and Gunn (1997) found that in England and Wales between 1957 and 1995 there was little change in the absolute number of mentally ill homicides and a 3% annual decrease in the contribution of mentally ill perpetrators to the official homicide rate. Violence and homicide perpetrated by individuals with psychosis is more likely than in non-psychotic perpetrators to be targeted towards individuals known to the perpetrator, particularly family members, rather than strangers (Gabrielsen et al. 1992, Steadman et al. 1998), and other disorders (particularly substance misuse and personality disorders) are far more strongly related to violence and offending than psychotic illness (Angermeyer 2000, Eronen et al. 1998). Despite all of this the media tend to focus on 'forensic' cases in their reporting on mental illness (Angermeyer and Schulze 2001) and this effects the attitudes of the public (Angermeyer and Matschinger 1996).

What are the correlates of offending in individuals with schizophrenia?

Identifying the correlates of offending in individuals with schizophrenia

Not all individuals with schizophrenia are violent; most are not. So what differentiates patients who are violent from patients who are not? Understanding the factors associated with violence in individuals with schizophrenia helps clarify the relationship between psychosis and violence; can point to factors to look for when assessing patients who may pose a risk of violence; and, most importantly, can inform the management of patients so as to diminish the risk of violence. The problem of confounders and mediators has been described already (Mullen 2006), but whether an associated factor is one or the other may not be clear-cut, and such factors may play a mediating role in some individuals, whilst being peripheral in others. There is likely to be an interplay between the various factors related to violence, in different individuals this complex interplay may operate in different ways, and within any individual this interplay may be different at different times (Marzuk 1996).

Substances misuse

Numerous studies of different types and severity of violence and offending in different settings have found an association with alcohol and/or substance misuse in individuals with schizophrenia (Lindquist and Allbeck 1989; Swanson et al. 1990; Hodgins 1992; Swanson 1993; Soyka et al. 1993; Soyka 1994; Cuffel et al. 1994; Swanson 1994; Rice and Harris 1995; Eronen et al. 1996a; Hodgins et al. 1996; Stueve and Link 1997; Tiihonen et al. 1997; Volavka et al. 1997; Räsänen et al. 1998; Scott et al. 1998; Steadman et al. 1998; Swartz et al. 1998; Wallace et al. 1998; Brennan et al. 2000; Soyka 2000; Milton et al. 2001; Monahan et al. 2001; Wallace et al. 2004; Vevera et al. 2005; Coid et al. 2006a; Swartz and Lurigio 2007) .

But what mediates this association? Rates of substance misuse are higher in individuals with schizophrenia than in the general population (Regier et al. 1990, Soyka 2000). A number of factors have been suggested to explain this: genetic factors, shared vulnerability to both conditions, personality disorder, socio-economic status, cognitive functioning, psycho-social

risk factors and self-medication (Mueser et al. 1998). Most have not been proved, but Mueser et al. (1998) proposed two aetiological models. One based on underlying antisocial personality, and the other on supersensitivity where a biological vulnerability make individuals with schizophrenia sensitive to small amounts of substances.

There is a strong relationship between alcohol/substance misuse and offending/violence when there is no additional mental disorder (Hodgins 1992; Hodgins et al. 1996; Coid et al. 2006b). A number of factors underlie this relationship: personality traits predisposing individuals to offending/violence and substance misuse (e.g. impulsivity, sensation seeking, emotional dysregulation), social disadvantage, the direct effects of alcohol and drugs (e.g. disinhibition), the indirect effects of substances (e.g. the need to fund a drug habit), and the impact of acute and chronic substance misuse on relationships, employment, accommodation and other aspects of social functioning. There appears to be a stronger relationship between alcohol misuse and violence than drug misuse. All these factors may be of relevance to offending and violence where substance misuse co-exists with schizophrenia. But in addition substance misuse may have a direct impact on mental state (worsening symptoms and precipitating relapse), and may impact on the ability of patients to engage with and be maintained in treatment.

Some have argued that the effect of comorbid substance misuse is synergistic rather than additive, although most of the evidence points to an additive effect. Individuals who misuse alcohol or drugs account for most violence and offending amongst people with schizophrenia. Some authors have gone so far as suggesting that without comorbid substance misuse violence and offending is no more common in people with schizophrenia than in the general population (Steadman et al. 1998; Monahan et al. 2001). However a number of studies have shown significantly raised levels of violence and offending amongst individuals with schizophrenia without substance misuse (e.g. Vevera et al. 2005; Wallace et al. 1998), and Mullen (2006) points to evidence that rather than violence increasing in line with increased substance misuse over the last 30 years, it seems that people with schizophrenia and a propensity for violence have moved towards more substance misuse. Although there was a bivariate association between substance misuse and violence in Swanson et al's (2006) national community study of schizophrenia and violence in the USA, this association disappeared after controlling for age, positive symptoms, conduct problems, and recent victimization. This suggested that the effect of substance abuse on serious violence might be mediated by these other covariates.

'Care in the community'

There is a popular perception that the move from institutional care to care in the community has been a major determinant of offending and violence in people with mental illness. Rabkin (1979) reviewing studies from the 1920s to the 1970s in the USA, concluded that the rate of offending in people with mental illness had increased at a higher rate than in the general population, attributing this in part to the reduced retention of patients in hospital. Taylor and Gunn (1999) examining the legal outcome of homicide cases in England and Wales between 1957 and 1995, found that although the homicide rate went up, the absolute number of 'mentally abnormal homicides' remained constant, so the proportion of homicides accounted for by the 'mentally abnormal decreased' by about 3% per annum. They concluded that 'community care' had not failed in relation to homicides by the mentally ill. Mullen et al. (2000), in Victoria, compared two cohorts of patients with schizophrenia, one admitted to hospital in 1975 before de-institutionalisation and the other admitted in 1985 after de-institutionalisation. Offending was examined over the subjects' lifetimes and 10 years after admission. Criminal offending was associated with schizophrenia and there was an increase in offending in the 1985 cohort compared with the 1975 cohort, but this increase was in line with the increase in offending in the general population. A move towards community care did not appear to have led to an increased risk of offending. Similarly, Wallace et al. (2004) found an increased rate of offending in patients with schizophrenia admitted to hospital in 1995 (25.0%) compared with 1975 (14.8%), but this was in line with similar increases in the general population (9.6% in 1995, 5.1% in 1975).

In Denmark, Munk-Jørgensen (1999) reported a 6.7% increase in forensic patients although there was no increase in crime in the general population. They concluded that deinstitutionalisation had contributed to more crime being committed by the mentally ill. Across Europe forensic beds have increased in number with the closure of psychiatric beds in general services, perhaps leading to the 'reinstitutionalisation' of mentally ill patients with behavioural problems (Priebe et al. 2004). However whether this expansion in the use of forensic beds reflects an increase in crime or violence in the mentally ill in Europe is unknown.

The outcome of moving towards community care in any country will depend on the quality and quantity of resources put in place, but there is no research evidence to support the contention that community care has led to an increase in crime or violence by the mentally ill.

Psychotic symptoms

Psychiatrists with experience of treating patients with schizophrenia meet patients who appear to act on their hallucinations and delusions, sometimes in a threatening or violent manner. In forensic settings there are individuals who have committed extreme acts of violence in response to delusions or hallucinations. But to what extent is the relationship between schizophrenia and violence mediated by the symptoms of the disorder? Are particular symptoms more important than others? Why do some patients act on their symptoms violently while others do not?

Hafner and Böker (1982) described an association between certain delusions, particularly those of persecution, and homicidal violence.. Taylor (1985) found that about 50% of psychotic remand prisoners had active symptoms at the time of the offence, 20% were definitely driven by positive symptoms and 26% were probably driven by such symptoms; 82% of the offences were probably attributable to illness. Those driven to offend by delusions displayed the most serious violence. Amongst English special hospital patients with psychosis (Taylor et al. 1998; Taylor 1998), 86% of those without additional personality disorder were deluded at the time of the offence and 77% were 'driven' by delusions. Amongst patients with comorbid psychosis and personality disorder 52% were deluded, and 14% were driven by delusions. Other symptoms, such as hallucinations and affective symptoms, exerted their effect in conjunction with delusional drive.

Link et al. (1992) found that psychotic symptoms accounted for violence committed by individuals with psychosis in the community. Three symptoms accounted for the relationship: delusions of control, thought interference or persecution (Link and Stueve 1994). These were termed 'threat control/override' symptoms, and violent acting on these was termed 'rationality within irrationality'. Swanson et al. (1996) found threat control/override symptoms were more strongly related to violence than other psychotic symptoms (Swanson et al. 1990). Link et al. (1998) used data from a two-stage epidemiological study. Both a measure of threat and a measure of control-override were independently associated with violence. Ten years ago it was generally accepted that threat control/override symptoms were important in the association between psychosis and violence (Swanson et al. 1997; Link et al. 1999). Link et al. (1999) proposed a sociologically inspired explanation for this by referring to the Thomas Theorem - if situations are defined as real, they are real in their consequences.

In a study of deluded general psychiatry patients (Wessley et al. 1993) acting on delusions was common, but violence in response to delusions was uncommon. Correlates of acting on delusions were identified (Buchanan et al. 1993), but whether these findings are relevant to violence is unknown. The Maudsley Assessment of Delusions Schedule (MADS) developed in these studies, was modified to the MacArthur-Maudsley Delusions Assessment Scale for use in the MacArthur Violence Risk Assessment Study (Appelbaum et al. 1999). Patients with schizophrenia had more intense delusions, persecutory delusions were associated with negative affect and the propensity to act, suggesting a potential route to aggression. But body/mind control delusions were associated with abstention from action.

Juninger (1996) suggested that studying the content, themes and meanings of psychotic symptoms associated with violence might yield useful data. Juninger et al. (1998) found most violent incidents were probably not related to delusions, although 40% of the violent subgroup reported at least one incident probably or definitely driven by delusions and 17.5% of this subgroup reported a very serious violent incident driven by delusions. They concluded delusionally driven violence was rare, but there was a moderate risk delusions would lead to aggression at some point in the course of a violent patient's illness.

In the MacArthur Study delusions of any type, including threat control/override delusions, were not found to be associated with violence (Appelbaum et al. 2000). Non-content aspects of delusions assessed with the MacArthur-Maudsley Delusions Assessment Scale and duration of delusions were also unrelated to violence. The lack of association, considering the findings from Link and colleagues and Swanson and colleagues described above, was not due to a difference in method of ascertaining symptoms and was not due to the higher threshold for violence in the MacArthur study. The retrospective nature of previous studies was highlighted by Appelbaum et al. (2000), as was the use of answers to screening questions that may not have determined accurately whether subjects were actually deluded. If this lower threshold had been used, then there was a positive association between these 'symptoms' and violence. These 'non-delusional' symptoms were significantly associated with anger and impulsiveness, and when these were controlled the association disappeared. Appelbaum et al. (2000) suggested that the findings for threat control/override symptoms in previous studies may have been due to an association between a generally suspicious attitude towards others, with associated anger and impulsiveness, and violence. Sensibly, they do not suggest that delusions are irrelevant to violence in patients with psychosis, and clearly those who have acted violently on the basis of delusions or those presenting in an acutely disturbed state associated with delusions need to be managed appropriately. However the presence of

delusions per se, without other indicators of risk did not seem to justify concerns about risk or coercive measures.

In a 128 men with schizophrenia discharged from psychiatric hospitals in four countries, Hodgins et al. (2003) found severe positive symptoms and threat control/override symptoms were associated with violence, even after controlling for psychopathy and substance misuse. In a national study of 1410 patients in the USA violence over a 6-month period was associated with positive symptoms (Swanson et al. 2006). But other variables were also associated with violence. For minor violence: co-occurring substance abuse and interpersonal and social factors; for serious violence: lack of negative symptoms, history of conduct disorder and victimization. The data supported a hypothesis that the negative association between delusions and violence is mediated by social withdrawal and smaller social networks in chronically ill patients, with less desire and opportunity for interpersonal interaction (Appelbaum et al. 2000).

Delusional jealousy, may develop as a symptom of schizophrenia. Morbid jealousy (including delusional and non-delusional psychopathology) and 'normal' jealousy may lead to violence. Violence may occur towards an allegedly unfaithful partner or the alleged paramour (Shepherd 1961; Mullen and Maack 1985; Mullen 1990; Mullen 1991; Mullen 1996; Silva et al. 1998; Kingham and Gordon 2004). Erotomanic delusions may be associated with harassment and violence (Mullen and Pathé 1994), and in men with erotomania violence was associated with multiple objects and previous antisocial behaviour (Menzies et al. 1995). There have been reports of cases where misidentification delusions, particularly Capgras syndrome, have been associated with violence (De Pauw et al. 1988; Silva et al. 1989; Silva et al. 1992 a and b; Thompson and Swan 1993; Silva et al. 1994 Silva et al. 1995; Silva et al. 1996), but due to biased case ascertainment and reporting the actual relationship is unclear (Dinwiddie and Yutzy 1993).

Psychiatrists become concerned when patients report voices telling them to kill or harm others (Braham et al. 2004). But are hallucinations, and in particular command hallucinations, associated with violence? Some studies have shown a modest relationship (McNeil 1994; Volavka et al. 1997; McNeil et al. 2000), and an association has been reported in forensic settings (Rogers et al. 1988; Rogers et al. 1990; Thompson et al. 1992), but a number of studies have found no association (Goodwin et al. 1971; Cheung et al. 1997b, Hellerstein et al. 1987; Zisook et al. 1995). Juninger et al. (1995) found subjects who experienced less dangerous commands or could identify the voice reported more compliance,

although compliance with dangerous commands was not uncommon. Subjects were less likely to comply with commands in hospital. McNeil et al. (2000) found 30% of inpatients reported command hallucinations to harm others during the last year, and 22% reported compliance with them. Patients with such symptoms were more than twice as likely to be violent, even after controlling for demographic variables, substance abuse and social desirability response biases. Contrasting these findings with older negative studies, they commented that the definition in other studies was vague with inclusion of all command hallucinations not just those commanding violence. In a medium secure unit Rogers et al. (2002) found command hallucinations to be violent were not associated with violence, but commands to self-harm were associated with self-harm. In the MacArthur Violence Risk Assessment Study although command hallucinations per se did not elevate violence risk, if the voices commanded violent acts, the likelihood of their occurrence over the subsequent year was significantly increased (Monahan 2002).

Swanson et al. (2006) found negative symptoms were inversely associated with serious violence in a large study, whereas in their small in-patient study Cheung et al. (1997a) found violent patients to have more negative symptoms, and Arango et al. (1999) found no association in either direction. Differences may reflect the settings and the seriousness of violence ascertained.

Recently research has emerged on the most common symptom of schizophrenia, lack of insight. Violent patients were significantly less insightful (Buckley et al. 2004), but Lincoln and Hodges (2008) found that although there was a bivariate association between insight and aggression, this disappeared after controlling for psychopathic traits and positive symptoms.

Overall the findings on symptoms and violence are far from clear-cut. The following factors may be of relevance to the different findings: the setting (community, in-patient, forensic hospital, prison), timing (pre-treatment, during treatment, follow-up), the diagnoses in the sample (schizophrenia, any psychosis, major mental disorder, any psychiatric disorder), the method for determining the presence of symptoms, the definition of violence (minor or severe, associated with conviction or not), the method of ascertaining violence, whether the study was prospective or retrospective, and the extent to which mediators or confounders were taken into account. Delusions may lead to violence, but whether threat control/override delusions are important is unclear, and command hallucinations may lead to violence (particularly where they command harm to others). Pathological jealousy, whether delusional or not, should always be taken seriously. Lack of insight may or may not play a role, and

negative symptoms may be protective. Acute symptoms are clearly important in the violence that leads to admission (Foley et al. 2005) to hospital and the violence that occurs soon after admission (Krakowski and Czobor 2004; Hodgins 2008). Mullen (2006) stated that the role of symptoms had been overestimated, but they undoubtedly played a role in some individuals. When symptoms play a role in violence other associated factors may also be correlates of violence or offending: variables that precipitate and exacerbate symptoms (e.g. substance misuse, stress, noncompliance with treatment), the reaction to symptoms (e.g. interpersonal conflict, coercion and the reaction to this), the consequences of symptoms (e.g. hospitalization and being in close proximity to others). Almost all individuals with schizophrenia suffer positive symptoms at some time, but most are not violent, so other factors are clearly important (Taylor 1998). The impact of symptoms per se appears to be less important than the co-occurrence of other factors that facilitate violent expression (e.g. substance misuse, personality problems and interpersonal conflict). Not all crime and violence committed by individuals with schizophrenia is related to symptoms. When symptoms are present they may play no role, a direct role or an indirect role. There is growing support for a model whereby the importance of symptoms in leading to violence or offending depends on whether there is antecedent conduct disorder (Taylor et al. 1998; Steinhert et al. 1998; Ge et al. 2003; Hodgins 2008; Taylor et al. 2008).

Childhood factors

Schanda et al. (1992) found premorbid adjustment was better in offenders with schizophrenia who offended pre-morbidly than in those who offended after the onset of psychosis, but no differences between offending and non-offending patients. Fresan et al. (2004) found violent patients had worse premorbid adjustment during childhood. In particular, peer relationships were particularly poor in childhood, and adolescence. Heads and Taylor (1997) found experiences of a disordered family were common in patients with schizophrenia in a secure hospital. There were four subgroups. Three, accounting for two-thirds of patients, had experienced a range of problems in childhood before the onset of schizophrenia. The first had conduct disorder without environmental disadvantage (primary delinquency), second multiple early environmental problems associated with a variety conduct problems (secondary delinquency), and third predominantly childhood neurotic problems without obvious family or environmental disturbance. About a third developed schizophrenia after an unremarkable childhood. Membership of one of the delinquency groups was associated with frequent, repeated violence. Group membership had no bearing on seriousness of violence, but patients with 'pure schizophrenia' tended to commit serious index offences because of psychotic symptoms. Stompe et al. (2006) found lower social class, offending in parents ,

loss of father, a step-parent, growing up in blended families, larger sibships, and foster care during childhood were associated with offending. Familial schizophrenia was more prevalent in offenders than non-offenders.

In the literature on adolescent offenders two groups are described: adolescence-limited and life-course-persistent (Kratzer and Hodgins 1997; Moffitt and Caspi 2001; Farrington 2002; Moffitt et al. 2002). Adolescence-limited offenders, the largest group, have an equal gender distribution, show no distinguishing characteristics before offending that starts at puberty, offend to gain peer approval or to demonstrate autonomy, and desist in adulthood. Life-course-persistent offenders display antisocial behaviour from childhood escalating in frequency and severity, leading to convictions in adolescence and persistent offending as adults. They have conduct problems from a very early age, specific personality traits, motor and cognitive deficits, and lowered reactivity to stress. In adulthood almost all of them meet criteria for antisocial personality disorder (Moffit et al. 2002) and a sub-group develop psychopathy (Hare 1991). Although life-course-persistent individuals constitute 5% of the male population, they are responsible for 70% of crimes (Kratzer and Hodgins 1991). The life-course-persistent group are over-represented amongst individuals who go on to develop schizophrenia (Robins et al. 1991; Schanda et al. 1992; Kim-Cohen et al. 2003; Moran and Hodgins 2004; Hodgins et al. 2005). Gosden et al. (2005) found a violent conviction in adolescence was associated with the development schizophrenia later. About 20% of people with schizophrenia meet criteria for anti-social personality disorder. This invokes Bender's (1958) concept of pseudo-psychopathic schizophrenia in adolescence.

A number of studies have examined the relationship between conduct disorder and offending in schizophrenia. Hodgins et al. (2005) found conduct disorder was associated with criminality and substance misuse among male relatives and substance misuse among female relatives. In childhood and adolescence, conduct disorder was associated with poor academic performance, substance abuse, and physical abuse. In adulthood, conduct disorder was associated with non-violent and violent offending, after adjusting for substance misuse. Conduct disorder was not associated with homicide. Conduct disorder was associated with alcohol and drug abuse. During follow-up, conduct disorder was associated with aggressive behaviour, controlling for substance use, compliance, and compulsory care. Conduct disorder was associated with earlier onset of schizophrenia and with time spent in hospital. Conduct disorder was not associated with follow-up positive or negative symptoms, compliance with medication, substance use, or readmission. Other studies have found boys with childhood conduct disorder who develop schizophrenia commit more offences than

other men with schizophrenia (Arsenault et al. 2000; Hodgins et al. 1998; Tengström et al. 2001) and commit offences prior to contact with mental health services (Moran and Hodgins 2004; Hodgins and Müller-Isberner 2004). Swanson et al. (2008) found violence was more common in patients with premorbid childhood conduct problems than those without. In the conduct-problems group, violence was associated with substance use. Positive psychotic symptoms were linked to violence only in patients without conduct problems. Findings suggest violence in adults with schizophrenia follows at least two pathways: one associated with premorbid antisocial conduct, and another associated with acute psychopathology.

Social problems and social networks

Schizophrenia has a marked impact on social functioning in most individuals. Problems with employment, relationships, adult social roles, finance, homelessness and poverty are common (Faris and Durnham 1939; Eaton, 1974; Mueser and Tarrier 1998; Bryson and Bell 2003; Burns and Patrick 2007). All of these factors are associated with offending, and may therefore increase the risk of offending in schizophrenia. However, there has been a dearth of research on this. Modestin and Ammann (1996) found unemployment and homelessness were more common in individuals with schizophrenia with a criminal record (Modestin 1998). Swanson et al. (1998) found an interaction between severity of functional impairment and frequency of social contact in association with risk of violence. Lower social functioning individuals with more frequent contact with family and friends had a higher probability of violence. However, among better functioning respondents, frequent social contact was associated with lower risk of violence and greater satisfaction with relationships. These findings suggest the ways mental illness impair ability to relate meaningfully, to resolve conflict and derive support from family and friends, are important. So, social contact may be a mixed blessing. For some, it signals a positive quality of life, but for others - particularly those with extreme impairment - frequent contact may cause conflict, stress, and increased potential and opportunity for violence.

Logdberg et al. (2004) found patients lived predominantly in socially disorganized areas with high levels of disorder, fear of crime and victimization. Silver (2000) found that living in a socially disorganized neighbourhood increased the probability of violence, an effect that was not mediated by self-reported social supports. Swanson et al. (2002) found past violent victimization, violence in the surrounding environment, and substance abuse showed a cumulative association with risk of violence.

Estroff and colleagues studied the influence of social networks and supports on violence (Estroff et al. 1994; Estroff and Zimmer 1994). Individuals in larger networks, with networks composed primarily of relatives, and who lived with unrelated persons were more likely to threaten violence. Financial dependence on family was associated with more violence. Respondents who perceived hostility were more likely to be violent, and those with confused thinking were less likely to be so. Over half the targets of violence were relatives, particularly mothers living with them. Violent individuals perceived significant others as threatening but did not perceive themselves as threatening.

Personality and personality disorder

Personality disorder is associated with schizophrenia. Conduct disorder in childhood is associated with the later development of schizophrenia (see above), and its adult extension, antisocial personality disorder, is also associated with schizophrenia (Moran and Hodgins 2004). Other aspects of pre-morbid personality pathology have also been reported in people with schizophrenia (Hogg et al. 1990; Jackson et al. 1991; Dalkin et al. 1994; Solano and De Chavez 2000; Keshavan et al. 2005; Ekstrøm et al. 2006;). The manifest personality problems of an individual with schizophrenia will be a combination of premorbid functioning and the effects of the illness (Mullen 2006). Pre-morbid personality problems associated with schizophrenia are partly a manifestation of the neuro-developmental vulnerability leading to psychosis. Whether personality traits are related to schizophrenia or not, they will interact with illness and other factors in determining interpersonal behaviour, which may include aggression.

Studies on the association of personality factors and violence in schizophrenia have largely focused on conduct disorder (reviewed above), antisocial personality disorder and psychopathy. Given the association between these and offending/violence in non-mentally ill individuals (Dowsett and Craissati 2008), it comes as no surprise that all have been shown to be associated with offending and violence in individuals with schizophrenia (Mueser et al. 1997; Nolan et al. 1999; Tengström et al. 2000; Gandhi et al. 2001; Skeem et al. 2002, Moran et al. 2003; Moran and Hodgins 2004; Tengström and Hodgins 2002; Putkonen et al. 2004; Tengströn et al. 2004; Crocker et al. 2005; Dolan and Davies 2006; Fullam and Dolan 2006; Abushua'leh and Abu-Akel 2006; Fresnan et al. 2007).

Gender and age

Male gender is associated with offending and violence in the general population, and this is the case in mental illness. Comparing high security hospital and general patients with psychosis, Miller et al. (2000), in Scotland, and Walsh et al. (2002), in England, found male patients overrepresented in the forensic samples. But amongst females the relationship between mental illness and violence is stronger than in males (Hodgins 1992; Hodgins et al. 1996; Brennan et al. 2000), and a number of studies have reported higher rates of in-patient violence in females than in males (Crichton, 1995). Younger age is associated with offending and violence in general (Steffensmeier et al. 1989; Budd et al. 2005), and in schizophrenia this is also the case (e.g. Modestin and Ammann, 1996).

Victims

Although there are reports of violence, sometimes homicide, towards strangers by people with schizophrenia, victims of violence are usually known to the perpetrator, and are particularly likely to be family members or others living with the person (Böker and Häfner 1973; Lindquist 1986; Gottlieb et al.1987; Steadman et al. 1998; Estroff and Zimmer, 1994; Milton et al. 2001; Arsenealt et al.2002). Ten to 40% of families living with a family member with severe mental illness experience violence (Solomon et al. 2005). When those with schizophrenia are in hospital, those in close proximity are other patients and nurses (Crichton, 1995). Violence against strangers is more common in perpetrators without psychosis than with. Victims totally unknown to psychotic assaulters account for 12 % to 16 % of cases (Joyal et al. 2004).The risk for assault of a non-relative increase when the mentally ill offender is male, abuses substance and lives outside the family household (Binder and McNeil, 1986; Gondolf et al. 1990; Swanson et al. 1999).

Victimisation

Hiday et al. (1999) found the rate of nonviolent criminal victimization was similar to that in the general population; about 1 in 5. The rate of violent victimization was greater than in the general population. Being an urban resident, using alcohol or drugs, having a secondary diagnosis of a personality disorder, and experiencing transient living conditions were significantly associated with being victimised. In the multivariate analysis, substance use and transient living conditions were strong predictors of criminal victimization; no demographic or clinical variable was a significant predictor. Hidday et al. (2001) pointed to a link between victimization and being a perpetrator of violence. They suggested a theoretical model whereby social disorganization and poverty, increase vulnerability to victimization and the

propensity to perpetrate violence. Repeated victimizations may lead to suspicion and mistrust, which may lead to conflict and stress, leading to a cycle of victimization and perpetration. Choe et al. (2008) pointed out that rates of victimization are higher than rates of violence in people with mental illness, but few studies had looked at both phenomena in a single sample, and no studies had examined the link between the two. Swanson et al. (2006) found victimization was associated with serious violence. Hodgins et al. (2007) found victimisation was associated with aggression.

Neurobiology

Naudts and Hodgins (2006 a and b) reviewed the studies, up to 2005, of neuropsychological test performance, neurological soft signs, structural brain imaging and functional brain imaging in violent people with schizophrenia. There were 17 studies identified looking at schizophrenia and violence. A number of methodological problems were highlighted. Studies of neuropsychological test performance in schizophrenia were inconsistent. Naudts and Hodgins (2006a) concluded that these studies suggested fewer abnormalities of the dorsolateral and mesial prefrontal cortex in people with schizophrenia and a history of violence, reflecting better executive functioning and verbal skills, despite greater impulsivity perhaps related to orbitomedial frontal dysfunction. Of the studies of neurological soft signs, 2 reported more in violent groups, 1 reported less and 1 reported no difference. Four studies had used structural imaging. Violent patients were distinguished by volume reductions of the amygdala, altered frontal white matter in the orbitofrontal-amygdala, reductions in whole brain volume and hippocampus, and increased volume of putamen. Two studies had used functional imaging. Wong et al. (1997) found one-off violent offenders with schizophrenia showed reduced functioning of the inferior anterior temporal cortex of both hemispheres, while the repetitive group had reduced function in the left anterior inferior temporal cortex. Spalletta et al. found no differences in prefrontal regional blood flow at rest, but during completion of a card sort test there was significantly reduced prefrontal blood flow in the violent group. This suggested loss of inhibition that might lead to aggression.

Putting these findings together, Naudts and Hodgins (2006b) hypothesized that the lower stress reactivity and cortisol levels, described generally in those with a stable pattern of antisocial behaviour, might protect neural structures in such individuals who develop schizophrenia, perhaps explaining the finding that men with schizophrenia and a history of aggressive behaviour present less reduction in volume of critical neural structures, despite abusing alcohol and drugs. Further they hypothesized that mild impairment of the dorsolateral prefrontal cortex and the amygdala-orbitofrontal system is associated with early-

onset persitent antisocial behaviour among people with and without schizophrenia. Individuals with schizophrenia have more severe impairment of the dorsolateral prefrontal cortex and orbitofrontal cortex than healthy individuals. In order to engage in goal-directed or planned antisocial and violent behaviour, a reasonably well preserved dorsolateral prefrontal cortex is required, so individuals with early schizophrenia and a history of offending will evidence better neourocognitive functioning and less dorsolateral prefrontal impairment than nonoffenders with schizophrenia. Since these reviews there have been further studies of neropsychological function, and structural and functional imaging (Barkataki et al. 2006; Joyal et al. 2006; Kumari et al. 2006; Hoptman et al. 2006; Narayan et al. 2007; Barkataki et al. 2008) implicating abnormalities of frontal regions, inferior parietal areas, the caudate, sensorimotor cortex and thalamic function. Specific differences in individuals with comorbid antisocial personality disorder have been found and the potential effects of medication on certain brain areas have been highlighted.

Treatment

Anti-psychotic medication

A number of studies have reported atypical antipsychotics might be more effective at reducing aggression than other antipsychotics (Taylor et al. 1996; Glazer and Dickson 1998; Senninger and Laxenaire 1998; Buckley 1999; Citrome et al. 2001; Volavka et al. 2002; Krakowski et al. 2006). High potency typical antipsychotics have been found to make aggression worse (Herrera et al. 1988), perhaps due to akathisia or drug-induced behavioral toxicity. Clozapine (Ratey et al. 1993;Volavka et al. 1993; Buckley et al. 1995; Menditto et al. 1996; Rabinowitz et al. 1996; Spivak et al. 1997, 1999; Chengappa et al. 1999; Volavka, 1999; Chengappa et al. 2001; Citrome et al. 2001), risperidone (Czobor et al. 1995; Buckley et al. 1997; Marder et al. 1997; Currier and Simpson 2001; Bitter et al. 2005) and olanzapine (Swanson et al. 2004a; Bitter et al. 2005) have all been reported to reduce aggression in patients with psychosis, but most studies have been short-term inpatient studies. Steinhert et al. (2000) found a highly significant day-by-day decline of aggressive incidents after the start of neuroleptic treatment, suggesting violence by people with schizophrenia may partly be due to lack of adequate treatment.

Swanson et al. (2004b) prospectively compared the effectiveness of atypical antipsychotic medications to that of conventional neuroleptics in reducing violent behaviour. Treatment with atypical antipsychotic medications (clozapine, risperidone, or olanzapine) reduced the risk of violent behaviour, but treatment with conventional neuroleptics did not. A cumulative

effect on reduced violence was attributable to consistent compliance with atypical antipsychotic medications over a 2-year period. Concurrent reductions in psychotic symptoms, substance abuse, and adverse medication side effects were found to mediate the association between adherence with atypicals and lower violence risk.

Swanson et al. (2008b) studied 1445 participants randomly assigned to double-blinded treatment with one of five antipsychotic medications. Violence declined from 16% to 9% in the retained sample and from 19% to 14% in the intention-to-treat sample. No difference by medication group was found, except that perphenazine showed greater violence reduction than quetiapine in the retained sample. Medication adherence reduced violence, but not in patients with a history of childhood antisocial conduct. Medication effects on aggression may be due to direct effects, such as a reduction in positive symptoms or a reduction in hostility and aggressiveness without a direct effect on positive symptoms. They may be due to indirect effects, such as a reduction in side-effects like akathisia (Leong and Silva 2003), improved adherence to treatment and better engagement, or reduced substance misuse. Due to the complex interaction of factors leading to violence, the apparent effect of some atypical antipsychotic medications may be mediated by multiple factors (Swanson et al. 2004).

Adherence with treatment

Adherence to treatment (particularly medication) and attendance at treatment services has been found to be associated with reduced violence (Swanson et al. 1998a; Swartz et al. 1998 a and b; Monahan et al. 2001, Torrey et al. 2008; Elbogen et al. 2006; Economou et al. 2005) Although it could be argued that patient's who adhere to treatment are less likely to be violent for reasons other than treatment adherence (e.g. lack of substance misuse, lack of personality disorder, better insight, lack of social disadvantage), in the two main studies (Swanson et al. 1998a; Elbogen et al. 2006) when adjustments were made controlling for these potential confounders, the association remained.

Compulsory treatment

Swanson et al. (2000) carried out a one-year randomised trial of the effectiveness of involuntary out-patient commitment in 262 subjects with severe mental illness and a history of hospital recidivism. Those with a recent history of serious assault were not randomised and remained under out-patient commitment until expiry of the court order (up to 90 days); then orders were renewed at clinical/court discretion. Control subjects had no out-patient commitment. A significantly lower incidence of violent behaviour occurred in subjects with 6 months or more out-patient commitment. Lowest risk of violence was associated with

extended out-patient commitment combined with regular out-patient services, adherence to prescribed medications and no substance misuse.

Swanson et al. (2006) studied 1,011 persons with psychiatric disorders receiving treatment in public mental health service systems in five cities in the USA. Three-quarters of subjects who reported serious violence in the last 6 months also reported having experienced some form of 'leveraged' treatment, compared with about one-half of subjects who did not report serious violence. Demographic and clinical factors that were independently associated with the likelihood of experiencing compulsion included younger age, male gender, poorer clinical functioning, more years in treatment, more frequent hospitalizations, higher frequency of outpatient visits, and negative attitudes toward medication adherence. So those likely to be violent are more likely to be compelled.

Models of care

Following several homicides by people with severe mental illness the care programme approach was introduced in England and Wales in an attempt to bring co-ordination, integration and decreased fragmentation to the care of patients with severe mental illness in the community. It has been argued that patients who are difficult to engage or support in the community require more intensive input, termed intensive case management or assertive community treatment. Walsh et al. (2001) conducted a randomised controlled trial of intensive case management versus standard case management for two years in four inner city community mental health services in London and Manchester. About a fifth of patients were physically assaultive during follow-up, and there was no difference in the rate of violence in the control and intervention groups. The predictors of violence were younger age, learning difficulties, history of violence, drug misuse and victimisation. No other similar trial had looked directly at violence as an outcome, although the authors cited similar studies in the USA that looked at arrest and imprisonment amongst other outcomes. Only two of these studies found reductions in these outcomes with assertive community treatment. The negative findings may have been due to standard care and intensive care both either addressing or not addressing the specific factors of relevance to violence (e.g. substance abuse, treatment engagement, comorbid personality disorder). It maybe that standard case management already provided a significant degree of co-ordination of care that was not added to by the more frequent contact available with the intensive approach.

Putting it all together: heterogeneity, pathways, models and types

A number of factors are therefore of relevance to violence and offending in individuals with schizophrenia. Some are more directly related to the illness, for example symptoms, neurobiology and treatment. Others reflect other background and developmental factors, for example childhood problems, personality disorder and substance misuse. Other reflect the circumstances of the individual, for example social networks, social problems, victimisation and access to victims. These factors interact in complex ways (Hiday 1997; Hiday 2006;Appelbaum 2006; Mullen 2006). For example psychotic symptoms may lead to violence as a person feels persecuted and angry, and is disinhibited by alcohol; or symptoms may lead to violence as relatives try to get help, the person resents this, this leads to arguments and tension, which leads to aggression. All the factors highlighted in this section interact with each other with, cause and effect potentially going in both directions.

Individuals with schizophrenia who are violent or commit offences are a heterogeneous group (Volavka and Citrome 2008). Different of the factors highlighted will combine in different ways in different individuals. So in clinical practice an individual formulation will always be necessary to assess and manage risk. However within that heterogeneity there may be some common themes or pathways. It has been suggested that there may be two types of violent individual with schizophrenia: those who are pre-morbidly aggressive who have comorbid personality disorders, and those who are aggressive after the onset of psychosis (Steinert et al. 1998; Ge et al. 2003). Hodgins (2008) has suggested that the group who are aggressive after the onset of psychosis further divide into a group who are repeatedly aggressive from the onset of psychosis and a group who commit very serious homicidal acts at an older age. Such typologies and models of the pathways to violence may help to understand the heterogeneity and to elucidate the interactions between factors in different types of cases.

Schizophrenia and specific types of offending

Homicide

Schizophrenia is overrepresented in those who commit homicide, with rates reported in the literature of around 5 – 10%. Specific percentages reported, from studies of schizophrenia and homicide conducted in the UK, Germany, USA, Iceland, Sweden, Finland, Canada, Australia, New Zealand, Austria and Singapore, are: 17 (Gillies 1965), 8 (Böker and Häfner 1973; Häfner and Böker 1982), 3 (Gillies 1976), 15 (Pétursson et al. 1981), 11 (Taylor and Gunn 1984), 5 (Kua 1985) 10 (Willox 1985), 12 (Lindqvist 1986), 6 (Gottlieb et al. 1987), 13 (Côté and Hodgins 1992), 6 (Tihonen et al. 1993), 6 (Tihonen et al. 1995b), 6 (Eronen et al. 1996 a and b), 7 (Wallace et al. 1998), 5 (Shaw 1999), 10 (Erb et al. 2001), 9 (Fazel and Grann 2004), 4 (Simpson et al. 2004), 6 (Koh et al. 2005 and 2006), 5 (Meehan et al. 2006), and 5 (Matejkowski et al.2008). Some studies have reported rates of psychosis rather than schizophrenia finding rates ranging from about 5 – 20%: 23 (Gottlieb et al. 1987), 15 (Taylor and Gunn 1999 – 1960s rate), 6 (Taylor and Gunn 1999 – 1990s rate), 20 (Fazel and Grann 2004), 5 (Simpson et al. 2004), and 16 (Matejkowski et al.2008). Some studies have reported separate rates for female and male perpetrators of homicide. Particularly high rates of schizophrenia and psychosis have been reported for female perpetrators: 18 (Cole et al. 1968), 6 (Gillies 1976), 27 (d'Orban 1979), 35 (d'Orban and O'Connor 1989), 10 (Eronen 1995), 12 (Putkonen et al.2001) and 14 (Schanda et al. 2004). Rates of schizophrenia in male perpetrators have been 3 (Gillies 1976), 6 (Tihonen et al. 1995b) and 4 (Schanda et al. 2004); similar to rates in mixed gender studies given the disproportionate number of males who kill. In samples of mentally disordered homicide perpetrators schizophrenia has been the predominant diagnosis in most samples: 67 (Gibbens 1958), 50 (Kraya and Pillai 2001), 78 (Putkonen et al. 2004) and 28 (Matejkowski et al.2008). A significant minority of the small number of individuals who commit multiple homicides have schizophrenia (Gibbens 1958, Lunde and Morgan 1980, Arieti and Schreiber 1981, Cross 1981, Biondi and Hecox 1990, Bjorkly and Waage 2005); specific percentages reported are 27 (Lunde and Sigal 1990), 15 (Tiihonen and Hakola 1994), 5 (Adler and Lidberg 1995), 11 (Eronen et al. 1996c) and 3 (Hills et al. 2007). Eronen et al. (1996c) found that schizophrenia increased the odds ratio of additional homicidal behavior in male homicide offenders more than 25 times.

Alcohol (Gibbens 1958; Pétursson et al. 1981; Eronen et al. 1996a; Valevski et al. 1999; Erb

et al. 2001) and/or drug misuse (Schanda et al. 2004; Nielsen et al. 2007; Matejkowski et al. 2008), both at the time of offences (particularly for alcohol) and over the lifetime, have been found to be associated with homicide in individuals with schizophrenia. However several studies have found less substance misuse in killers with schizophrenia than in those without (Gottlieb et al. 1987; Beaudoin et al. 1993; Nestor and Haycock 1997; Meehan et al. 2006; Nordstrom et al. 2006). High rates of comorbid personality disorder have been reported (Joyal et al. 2004; Schanda et al. 2004). Compared with schizophrenic homicide perpetrators without comorbid antisocial personality disorders, those with this comorbidity had higher rates of childhood problems, offending and substance misuse; were more likely to have unrelated victims; and were less likely to have delusionally driven homicides (Joyal et al. 2004; Putkonen et al. 2004; Laajasalo and Häkkänen 2005). Post-traumatic stress disorder as a result of being traumatised by the homicide itself has been reported, particularly where victims were relatives and the person had no history of childhood adversity (Papanastassiou et al. 2004).

Studies have described the apparent role of psychotic symptoms (particularly delusions) in homicides perpetrated by people with schizophrenia (Böker and Häfner 1973; Häfner and Böker 1982; Taylor and Gunn 1984; Taylor et al. 1998; Erb et al. 2001; Nordstrom et al. 2006; Nielsen et al. 2007), although other 'sane' motives have also been described (Gibbens 1958), and Shaw et al. (2006) found that 90% of mentally ill killers were not acutely ill at the time of the homicide. A study comparing patients with schizophrenia who killed with those who did not found the former had less sever psychopathology, better pre-morbid adjustment, later onset of psychosis, but more hostility and suspiciousness (Fioritti et al. 2006). An over-representation of the paranoid type of the illness has been reported (Eronen et al. 1996a; Joyal et al. 2004; Schanda et al. 2004).

The majority of people with schizophrenia who kill have had previous contact with psychiatric services (Shaw et al. 2006; Nordstrom et al. 2006; Matejkowski et al. 2008), but at the time of killing high rates of lack of contact with services (Nordstrom et al. 2006) and non-compliance with treatment (Mikhail and Kennedy 2000; Nordstrom et al. 2006) have been described. Nielssen et al. (2007) and Nielssen and Large (2008) have reported a disproportionate number of homicides during the first episode of psychosis, and an association between duration of untreated psychosis and homicide (Large and Nielssen 2008). De-institutionalization was considered a significant factor in homicides by people with schizophrenia by Grunberg et al. (1977), but a decrease in the proportion of homicides committed by those with psychosis with a move from institutional to community care was

reported by Taylor and Gunn (1999) and Simpson et al. (2004). Good quality treatment of patients with schizophrenia in the community may decrease the risk of homicide (Large et al. 2008). In patients who had previous contact with psychiatric services Munro and Rumgay (2000) reported that two thirds of homicides were preventable.

Tihonen et al. (1996) found patients with schizophrenia released from forensic psychiatric care had higher rates of homicide than non-forensic patients, and Valevski et al. (1999) found higher rates of previous aggression and offending in patients who killed. A few studies have reported higher rates of ethnic minority or immigrant status in individuals with schizophrenia who kill (Valevski et al. 1999; Erb et al. 2001; Meehan et al. 2006). Compared to others who kill, those with schizophrenia have been found to have more normal childhoods, but evidence of isolation and withdrawal in adolescence and adulthood (Laajasolo and Häkkänen 2004), and are less likely to have been married, working or living independently (Meehan et al. 2006).

Most studies have found that when people with schizophrenia kill victims are more likely to be family members and less likely to be strangers than in perpetrators without schizophrenia (Lindqvist 1986; Gabrielsen et al. 1992; Nestor and Haycock 1997; Taylor and Gunn 1999; Erb et al. 2001; Simpson et al. 2004; Meehan et al. 2006; Nielsen et al. 2007). A particular relationship between schizophrenia and parricide, especially matricide, has been reported (Gillies 1965; Gillies 1976; Green 1981; d'Orban and O'Connor 1989; Clark 1993; Wick et al. 2008). Child victims pre-dominate amongst the victims of women with schizophrenia who kill (Lanzkron 1963; d'Orban 1979; Putkonen et al. 2001). Extreme levels of violence during the killing have not been found to be associated with the nature or degree of psychotic symptoms (Laajasalo and Häkkänen 2006), and the use of sharp weapons and injury to victims' faces were associated with schizophrenia in one study (Häkkänen and Laajasolo 2006).

Sexual offending

Recent epidemiological research (Wallace et al. 1998; Alden et al. 2007; Fazel et al. 2007) has demonstrated a significant association between sexual offending and psychosis generally, and schizophrenia specifically. This calls into question the traditional view that there is no such relationship (Chiswick 1983). Odds ratios for schizophrenia and sexual offending were 2.7 (Wallace et al. 1998), 4.2 (Alden et al. 2007) and 4.8 (Fazel et al. 2007). Alden et al. (2007) also examined the seriousness of sexual offending, and comorbid personality disorder and substance misuse. Odds ratios for violent and minor sexual

offending were 2.6 and 5.8 respectively. For comorbid schizophrenia and personality disorder odds ratios were 5.8 for any sexual offence, 4.9 for violent sexual offending and 6.4 for minor sexual offending; the respective odds ratios for schizophrenia and comorbid substance misuse were 5.6, 5.2 and 5.8. Thus either comorbid condition increased the risk of sexual offending, particularly violent sexual offending.

Studies of samples from secure psychiatric hospitals find that the majority of mentally ill sexual offenders have schizophrenia (Craissati and Hodes 1992; Novak et al. 2007). Developing (Craissati and Hodes 1992) or frank (Chesterman and Sahota 1998; Phillips et al. 1999; Smith and Taylor 1999a) psychotic symptoms are common when they sexually offend. But some do not have positive symptoms and when they do there is not usually a direct link between hallucinations or delusions and the sexual offence (Craissati and Hodes 1992; Chesterman and Sahota 1998; Smith and Taylor 1999a; Baker and White 2002). Factors identified in non-mentally ill sexual offenders (such as distorted sexual attitudes, deviant sexual interests, problems with intimate relationships, and poor interpersonal and emotional functioning) have been identified in those with schizophrenia (Craissati and Hodes 1992; Sahota and Chesterman 1998 a and b; Smith 1999a; Smith and Taylor 1999b; Baker and White 2002; Drake and Pathé 2004). Sadistic and angry violence seems relatively uncommon in sex offenders with schizophrenia, as opposed to opportunistic and non-sadistic sexual behaviour (Craissati and Hodes 1992; Smith 1999a; Smith 2000a), particularly in those where psychosis plays a role in the offence (Smith 2000a). Exceptionally violent or bizarre behaviour at the time of the offence is uncommon (Craissati and Hodes 1992; Smith 2000b). Contact sex offending pre-dating the onset of psychosis has been reported to be associated with deviant sexual interests and poor pre-morbid interpersonal functioning (Smith 1999a; Smith and Taylor 1999b). Smith (1999b) found that, despite the relevance of non-mental illness factors, few patients received appropriate psychosocial treatments to address their sexual and interpersonal problems. Comorbid personality disorder is associated with pre-morbid offending, offending unrelated to psychotic symptoms and offending related to deviant sexual interests (Baker and White 2002). Comparisons between sex offenders with schizophrenia and non-sexual offenders with schizophrenia, have found the former were: more likely to be married, employed and non-heterosexual and had less hospitalizations, antisocial personality, substance abuse, negative symptoms and overall illness severity (Alish et al. 2007); they were more likely to have unimpaired sexual interests and problems in intimate relationships (Phillips et al. 1999).

Higher than expected rates of schizophrenia have been described in small samples of perpetrators of sexually motivated homicide: 3% (Hill et al. 2007), 5% (Stone 2001), 6% (Proulx and Sauvetre 2007), 10% (Ressler et al. 1993) and 15% (Firestone et al. 1998) and 13% Langevin et al. (2003).

Arson

High rates of schizophrenia and other psychoses have been reported in individuals who commit arson (Taylor and Gunn 1984; Ritchie and Huff 1999) although there have been relatively few studies. Wallace et al. (1998) found that there was only an association when there was comorbid substance misuse. Virkkunen (1974) compared 30 individuals with schizophrenia who had committed arson to 30 other arsonists. Expressions of hate, found in about half of cases, were the principle motive in both groups. For the arsonists without schizophrenia expressions of hate were more often against family, relations and acquaintances, whereas for those with schizophrenia they were directed against outsiders or the community as a whole. Alcohol played a role in those without schizophrenia. Hallucinations or delusions were the primary motives in 30% of those with schizophrenia. Hate was combined with a psychotic motive in some cases. The objects of arson in those with schizophrenia were often places where nobody lived. For the non-schizophrenia group the objects were more often residential houses. Cases of insurance fraud as a motive for arson only occurred in those without schizophrenia.

Repo and Virkkunen (1997) compared psychotic and non-psychotic arsonists. Life-time criminal histories of both groups were not significantly different with respect to multiple fire setting and violent offenses. Non-psychotic and alcoholic psychotic fire setters had, in general, a high rate of criminal offenses. The family history of psychotic fire setters was often characterized by father's alcoholism and mother's psychosis. Comorbid familial alcoholism increased life-time criminal recidivism among psychotic fire setters. Lindberg et al. (2005) studied recidivist arson offenders in Finland. Twenty percent were psychotic, although the specific proportion with schizophrenia was not reported. In this recidivist group, those with psychosis did not tend to commit other types of offenses, and it was felt by the authors that mental state abnormalities led to an intrinsic interest in setting fires in this group.

Implications

Clinical implications for the management of patients with schizophrenia who offend

The literature on the relationship between schizophrenia and violence or offending has a number of implications for the way patients with schizophrenia are managed generally, and how patients who have committed violent or anti-social acts are managed.

An attitude that clinical services just 'treat the illness' and other factors are peripheral cannot be sustained. Difficult and aggressive patients should not be rejected by services and prevention of violence by patients with mental illness is something that psychiatric services should aim to do. To do this there has to be an understanding of the various factors highlighted above, and a willingness and ability to address them.

In assessing the risk posed by people with schizophrenia illness factors interact with factors associated with violence in the non-mentally ill. In long-term studies of large groups of patients clinical factors disappear compared to 'criminogenic' variables (Bonta et al. 1998). Therefore in assessing risk in patients with schizophrenia these other factors have to be taken into account. Assessing risk of violence in people with psychosis is no different from assessing risk of violence in the non-psychotic: background historical and proximal dynamic factors need to be assessed (Scott and Resnick 2006).

Despite the prominence of these 'non-illness' factors, it is important to treat illness and rehabilitate patients using modern evidence based approaches. Good treatment will have a direct and in-direct effect (via other factors) in diminishing the risk of violence. Measures need to be put in place to reduce the chances of non-adherence to treatment, and in some cases legal compulsion should be used.

Substance misuse needs to be addressed (Stanton and Shandish, 1997; Sheils and Rolfe 2000; Mueser et al. 2003), and treatment of substance misuse should be integrated with other aspects of treatment. The other important comorbidity, personality disorder, must also be taken into account and appropriate treatment approaches used (Dowsett and Craissati 2008).

'Criminogenic' factors should be addressed using evidence-based approaches developed in criminal justice settings. If properly delivered various treatment programmes can significantly reduce the risk of further offending and violence (Novaco, 1997; Renwick et al. 1997; Hollin, 2003; McGuire et al. 2003). But these need to be integrated with other aspects

of treatment and delivered in such a way as to take into account the interpersonal, emotional, cognitive and behavioural problems that may affect people with schizophrenia.

Patients also need meaningful activities, work where possible, suitable accommodation (preferably away from anti-social peers, drug dealers and violence), and an appropriate level of social interaction given their level of functioning.

Mullen (2006) argued these approaches need to be available not just in forensic services, but also in general services where there were indicators of risk. Easily available information, such as age, gender, history of violence and substance misuse history, has been shown to be useful in screening general patients with psychosis for violence risk (Wooton et al. 2006). Many may shrug their shoulders and see the prevention of violence by psychiatric services as unfeasible, and the prevention of all aggression is unfeasible. However, we know the main factors associated with anti-social behaviour and violence in people with schizophrenia. We should do something about it (Hodgins and Müller-Isberner 2004). A properly integrated approach including symptom control, addressing social needs, substance misuse treatment and addressing criminogenic needs should be prioritized. Such an approach would not prevent all offending and violence in people with schizophrenia, but would give every patient the opportunity to have the risk of aggression addressed. Violence is not just a bad outcome for society, it is a bad outcome for patients, many of whom are distressed and disadvantaged by the violence they cause.

Implications for this study

The literature reviewed above has several implications for the research reported in this thesis. Firstly it will be important to take into account the various methodological issues highlighted on pages 9-12. It will be important to have clearly defined, reliable and valid methods to make diagnoses of schizophrenia and co-morbid conditions, such as personality disorders (e.g. antisocial personality disorder and psychopathy) and substance dependence. In addition outcomes (such as violence/offending) will need to be clearly defined, and ascertained in a way that is reliable and valid, with consideration given to the sources of information used. Different types of violence/offending outcomes may have different rates and associates, so separate consideration will need to be given to actual violence versus convicted offending, persistent violence and violence which leads to serious harm to victims. Biases will need to be minimised through minimising non-participation and where patients are not included ascertaining whether excluded patients differ from included patients; in addition biases in ascertaining outcomes and their associates will need to be minimised by,

where possible, independent and blind ascertainment of outcomes and associates, having meaningful and objective outcomes (e.g. left high security, caused injury to a victim requiring hospital treatment, received a criminal conviction) and ascertaining the reliability of more subjective measures (e.g. rating scales of symptoms from interview, ascertainment of symptoms from case records).

Secondly the types of studies that will be most relevant when comparing the findings of this research to other research will be long-term follow-up studies of forensic patients. Follow-up studies of other samples (e.g. non-forensic samples and prison samples) will be of some relevance. There are few specific long-term follow-up studies of forensic patients with schizophrenia (see Chapter 3), but findings from other long-term follow-up samples of secure hospital patients will be of relevance to this research, and the UK studies will be reviewed in detail in the next Chapter.

The various associates of violence and offending that have been ascertained in the literature will need to be ascertained, their associations with violence and offending outcomes will need to be quantified, and the interaction between these associates will need to be considered. The specific associates of relevance will include substance misuse, symptoms of psychosis, conduct disorder/personality disorder, treatment, compliance with treatment, compulsory treatment, age, gender, previous violence/offending, living circumstances and nature of victims.

CHAPTER 3
Literature Review
The outcomes of patients in UK security hospitals

Introduction

This review summarizes studies of the outcomes of patients in UK security hospitals. Although this is not a systematic review in the strict sense, I have been systematic in my approach by setting criteria for the selection of studies; searching data bases, journals, book chapters and reference lists for all relevant studies; collecting data on the characteristics of samples studied, the methodology followed, the follow-up period, and the outcomes reported; summarising the data on different outcomes; and summarising the factors reported to be associated with outcomes. I have limited this review to UK studies, as these will be of most direct relevance to the research presented in this thesis. In relation to the research presented in subsequent chapters, this review aims to: inform the research questions; provide comparative data on methodology, samples, outcomes and associates reported; and, direct the choice of variables for analysis.

A number of European, North American and Antipodean studies have been reported in the literature, but a systematic and comprehensive review of these studies was not undertaken. Some of this literature will be referred to when discussing the findings of this review and when discussing the research findings presented in subsequent chapters.

Method of review

Studies of the outcome of patients in high and medium secure hospitals and units in the UK published by the end of 2009 were identified using literature databases (MedLine, PsychInfo, Google Scholar); by hand searching specialist journals (e.g. *Journal of Forensic Psychiatry and Psychology*, *Criminal Behaviour and Mental Health*); by searching references in text books (Bluglass and Bowden 1990; Gunn and Taylor 1993; Chiswick and Cope 1995); and by searching references in, and following citations for, relevant journal articles. Search terms used in databases included: *high security hospital, special hospital, maximum security hospital, medium secure unit, regional secure unit* and *forensic psychiatric hospital*; *outcome, follow-up, discharge,* and *transfer*; *recidivism, readmission, reoffending, reconviction, mortality, failure, violence,* and *aggression.*

Studies were included if they presented data on at least one of the following outcomes:

1. *Administrative outcomes*: length of stay in secure hospital; whether patients were discharged; discharge process (readiness for discharge, delayed discharge, decision to discharge); immediate destination at discharge; readmission to secure hospital; placement during time following discharge (in less secure hospitals, in community, in prison, in medium secure units, in high security hospitals); changes in legal status.

2. *Forensic outcomes:* re-conviction; unconvicted violent or offending behaviour (in institutions or the community); absconding; other uncooperative behaviour; deliberate self-harm.

3. *Clinical outcomes*: course of psychopathology; treatment received; non-compliance with treatment; side-effects of treatment; physical morbidity; mortality.

4. *Social outcomes*: employment; intimate relationships; contact with family and friends; accommodation; substance use; needs/satisfaction.

Some of these outcomes only required data about patients whilst they were in secure hospitals (e.g. length of stay, institutional violence, readiness for discharge, delayed discharge), whilst most required data to be collected on patients following discharge from secure hospitals.

For each study the following information was extracted, as set out in table A2 (See Appendix A2):

1. Reference
2. Setting
3. Sample characteristics (size, gender, diagnosis, date of ascertainment, nature [admission, discharge or cross-sectional])
4. Types of outcomes described
5. Length of follow-up (where relevant)
6. Number or proportion of patients with each outcome
7. Factors found to be associated with outcomes

Findings from UK studies of the outcomes of secure hospital patients

Eighty-six publications on the outcome of patients in secure hospitals in the UK were found (table A2). Seven were articles presenting a clinical view or a review with some statistics, rather than studies of specific samples, and were excluded from consideration. Some samples were described in more than one published paper (in one case a sample was described in three papers, in five cases a sample was described in two papers); these were amalgamated and considered as one sample (i.e. one row in table A2). This gave 72 study samples summarised in table A2. Five of these samples each led to two reported studies (i.e. ten published studies), but were retained as separate study samples (rows in table A2) as different specific outcomes were examined in each study. There was some overlap between other samples; this was clearly the case with six published studies but may have been the case with other studies too. So this review reports data from 72 studies described in 79 publications.

Where have studies been conducted?

Thirty-nine (54%) studies were in high security hospitals, 29 (40%) were in medium secure units, and 4 studies (6%) were in mixed settings (1 high, medium and less secure; 2 high and less secure; 1 medium and general). Only one study directly compared the outcomes of patients in different levels of security (medium vs. general). Of the 39 high security studies 19 (49%) were of one hospital and 20 (51%) were of more than one. Of the 29 medium secure studies 21 (72%) were of one unit and 8 (28%) were of more than one.

What are the characteristics of the samples studied?

Most studies (63; 88%) were of mixed diagnostic groups, mainly mental illness and personality disorder. There were 4 (6%) studies of learning disability patients only, 2 (3%) of personality disorder and 3 (4%) of schizophrenia. In mixed samples schizophrenia has been the predominant diagnosis; the rates of schizophrenia in the 19 mixed studies reporting this ranged from 30% to 79% (median 56%). Six (8%) studies were of male patients only, the rest were of mixed gender samples. In mixed gender samples males have predominated. Samples have ranged from 20 to 2781 patients as set out in Table 3.1.

The time frame defining the sample was admission to a secure hospital in 6 (8%) studies, an admission cohort further defined by a time of discharge for 7 (10%) studies, a discharge cohort in 37 (51%) studies, time of referral or acceptance for discharge in 5 (7%) studies, or

cross-sectional resident cohort (not defined by admission or discharge dates) in 16 (22%) studies.

Forty-four (61%) studies involved 'convenience' samples of all cases from one unit or hospital defined by a particular time frame; 3 (4%) involved a sub-sample of cases in one unit or hospital defined by a particular time frame; 17 (24%) involved national samples of all patients in a particular setting (invariably high security) or on a particular legal order at a particular time; 7 (10%) involved a methodologically determined representative sample of patients from units across the country; and one (1%) involved patients sampled from different sites at different security levels.

In 59 (82%) studies there was no within sample or outside sample comparison group put in place at the start of the study; 12 (17%) studies started with two comparison groups (e.g. males and females, psychopathic disorder and mental illness, or 1984 and 1996 discharge cohorts); one (1%) study had a comparison group of patients from out with a secure setting.

What type and length of follow-up has been used?

Forty-five (63%) studies had a pseudo-prospective design, 8 (11%) were cross-sectional, 16 (22%) were retrospective and 4 (6%) were truly prospective.

Seventeen (24%) studies had no follow-up period. These were studies that looked only at outcomes such as whether patients were ready for discharge or where patients were discharged to. For some studies follow-up commenced at admission or at some point whilst patients were in secure hospital, for example studies of inpatient violence. For most studies follow-up commenced at discharge from secure hospital.

Length of follow-up ranged from 12 weeks to 17 years (table 3.1). Shorter follow-up was associated with studies of institutional behaviour and truly prospective designs. Longer follow-up was associated with studies of discharge cohorts and pseudo-prospective designs, most often studies of conviction following discharge.

Only 5 (7%) studies used survival analysis to statistically analyse outcomes and time to outcomes. Four of these were studies of offending and one was a study of discharge from high security.

What outcomes have been examined?

The outcomes that have been examined are set out in table 3.2. The outcome most

commonly reported was conviction following discharge (57%). Other outcomes reported in at least 10 studies were: readmission (25%); length of stay in secure hospital (22%); violent and offensive behaviour (22%), particularly institutional violence; discharge process (19%); destination on discharge (19%); mortality (17%); and, placement in prison (15%) or community (15%) during follow-up. Placement in secure (13%) or other (11%) hospitals after discharge was reported in less than 10 studies. Whether patients were discharged or not, employment, treatment/services received and absconding were each reported in six studies (8%). Less than 5 studies reported on the following: change in legal status (4%); self-harm (5%); relationships with partners and family (5%); accommodation (4%); course of psychopathology (3%); lack of co-operation (3%); patients' needs/satisfaction (3%); and substance misuse (3%). One study reported mental state at follow-up and non-compliance with medication. No studies reported on side-effects or physical morbidity.

Table 3.1 Description of UK studies of the outcome of secure hospital patients.

	Number	Percentage
TOTAL	72	100
SETTING		
High security only	39	54
One site	19	26
Multiple sites	20	28
Medium security only	29	40
One site	21	29
Multiple sites	8	11
Mixed	4	6
High security and less secure	3	4
Medium security and less secure	1	1
GENDER		
Mixed	66	92
Male only	6	8
Female only	0	0
DIAGNOSIS		
Mixed	63	88
Learning disability/mental handicap/mental impairment/mental deficiency	4	6
Schizophrenia	3	4
Personality disorder/psychopathic disorder	2	3
STUDY SIZE		
0 - 50	12	17
51 - 100	13	18
101 - 200	14	19
201 - 300	10	14
301 - 400	4	6
401 - 500	3	4
501 - 1000	8	11
> 1000	7	10

Table 3.1 *continued.*

LENGTH OF FOLLOW-UP		
No follow-up period	17	24
Up to 6 months	6	8
6 months - 1 year	4	6
1 – 2 years	5	7
2 – 5 years	19	26
5 – 10 years	13	18
10 – 20 years	7	10
Unknown	1	1

Table 3.2 Outcomes described in UK studies of secure hospitals

Outcomes	Number	Percentage
ADMINISTRATIVE OUTCOMES		
Length of stay in secure hospital	16	22
Whether discharged or not from secure hospital	6	8
Discharge process (e.g. readiness for discharge, delays in discharge, decisions regarding discharge, use of trial leave)	14	19
Destination on discharge from secure hospital	14	19
Readmission to secure hospital	18	25
Any time during follow-up or length of time during follow-up in:		
Less secure hospital	8	11
Community	11	15
Prison	11	15
Medium or high security hospital	9	13
Changes in legal status	3	4
FORENSIC OUTCOMES		
Convictions	41	57
Violent/offensive behaviour (not necessarily leading to conviction)	16	22
Institution only	9	13
community only	2	3
Institution and community	6	8
Absconding	6	8
Other lack of co-operation	2	3
CLINICAL OUTCOMES		
Course of psychopathology	2	3
Mental state at follow-up	1	1
Treatment and/or services received	6	8
Non-compliance with treatment	1	1
Side-effects of medication	0	0
Self-harm	4	5
Physical morbidity	0	0
Mortality	12	17
Needs/satisfaction	2	3
SOCIAL OUTCOMES		
Employment	6	8
Relationships	4	5
Accommodation	4	5
Substance use	3	4

Administrative outcomes

Length of stay

High security

The average length of stay reported in high security was long. Gathercole (1968) reported a mean stay of 7 years. Walker and McCabe (1973) reported that 58% of non-restricted men, 78% of restricted men and 33% of women stayed over 5 years. Dell et al. (1987) found 77% of psychopathic disorder and 61% of mental illness patients admitted in the early 1970s stayed more than 4 years, with 53% and 42% respectively staying more than 8 years. Cope and Ward (1993) reported a mean stay of 9.6 years. Reiss et al. (1996) reported an average length of stay of 8 years for psychopathic disorder patients. Butwell et al. (2000) found a median of 6.3 years and a mean of 8.2 years. Quinn and Ward (2000) reported a mean of 8.1 years. Jamieson and Taylor (2005) found a median of 7.2 years for patients discharged in 1984 and 6.5 yeas for patients discharged in 1996. Blattner and Dolan (2009) reported a mean stay of 7.4 years.

The nature of the index offence was associated with length of stay for psychopathic but not mentally ill patients, but the type of legal detention was associated for the mentally ill (Dell et al. 1987). Butwell et al. (2000) found length of stay was longest for severe mental impairment, then mental impairment, then mental illness, and shortest for psychopathic disorder.

Medium security

The average length of stay in medium security has been shorter. A mean stay of 9.6 months (Cope and Ward 1993); a mean stay of 10 months (Maden et al. 1999 a and b); a mean stay of 22 months (Quinn and Ward (2000); 69% staying less than 6 months and 9% staying more than 12 months (Castro et al. 2002); 50% staying longer than 24 months, with a mean stay of 26 months (Edwards et al. 2002); a median stay of 6.9 months for men and 8.6 months for women (Maden et al. 2006); a median stay of 9.6 months (Coid et al. 2008); a mean stay of 11.5 months (Davies et al. 2007); a mean stay of 14.4 months (Blattner and Dolan 2009); and a mean stay of 9.6 months in all patients and 7.2 months in discharged patients (Gow et al. 2010). No associate of length of stay in medium security, except gender, has been reported except in the Castro et al. (2002) study which found longer length of stay was associated with number of therapies, behavioural problems and number of previous detentions.

Whether discharged

Of hospital order patients admitted to high security hospitals in 1963-4 a third of unrestricted males, two thirds of restricted males and a quarter of females were still there in 1971 (Walker and McCabe 1973). Seventy-six percent of psychopathic disorder patients admitted to a specialist unit at Broadmoor Hospital in the 1970s and 1980s were discharged from the hospital by the mid 1990s (Reiss et al. 1996). Ninety-nine percent of patients admitted to an independent sector medium secure unit in the 1990s were discharged (Castro et al. 2002). Eighty-four percent of patients admitted to a medium secure unit over a five-year period had been discharged by the end of that period (Gow et al. 2010). Treatment with clozapine was associated with discharge from a high security hospital (Swinton and Haddock 2000).

Discharge process

Studies of the discharge process were all concerned with high security. Studies looked at readiness for discharge (i.e. whether patients required high security), refused and delayed discharge, discharge by tribunals and use of trial leave.

A number of studies from 1991 – 6 found at least half, and up to two thirds, of patients did not require high security (Smith et al. 1991; Taylor et al. 1991; Maden et al. 1993; Murray et al. 1994; Shaw et al. 1994 a and b; Bartlett et al. 1996). Almost a decade later 40% did not need high security (Harty et al. 2004). Time waiting to be discharged from high security was over a year for 30% of patients in 1976 and over a year for 60% in 1979 (Dell 1980); over a year for 13% (Smith et al. 1991); over a year for 40% (Brown et al. 1992), and over 2 years for 35% (Dolan and Shetty 1995). Rejection following referral to local services was 42% (Brown et al. 1992) and 23% (Dolan and Shetty 1995). Factors associated with lack of progress included lack of appropriate local facilities, not being seen by local clinicians, inpatient violence (before and since admission to high security), poor response to or non-compliance with treatment, patient unchanged, deliberate self-harm, abscond risk, lack of understanding of index offence, difficulty relating to others, lack of Home Office permission and catchment area disputes. Patients requiring high security had severe personality disorders and/or treatment resistant psychosis (Murray et al. 1994).

For patients discharged directly to the community in 1971, 47% of discharges were initiated by responsible medical officers and 53% by mental health review tribunals (Acres 1975). Tribunals ordered discharge in 7% of cases and recommended transfer in 8% of cases (Taylor et al. 1999); discharge was associated with being female, psychopathic disorder and shorter time in high security. There was an increase in use of trial leave from 7% in 1984 to

71% in the early 1990s (Mohan et al. 2001).

Destination on discharge

Studies of destination on discharge from secure hospitals are summarised in Table 3.3.

High security

Most patients were discharged from high security to other hospitals, and more recently an increasing proportion have gone to medium security. Prisons and courts have become more common discharge destinations. There has been a decrease in community discharges. The first two studies (a and b in table 3.3) were of psychopathic disorder patients, and may not be representative.

Medium security

Most patients were discharged to the community and less secure hospitals. Smaller proportions went to high security hospitals and prison (or court). The three studies (f, h and n in table 3.3) of high security patients admitted to medium security found higher rates of discharge to high security.

Table 3.3 Summary of studies reporting destination on discharge from secure hospitals in the UK

Placement		**High security discharge studies**					**Medium security discharge studies**								
		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
Secure hospital	High	0	0	0	0	0	31	11	22	10	25	28	7	8	46	7
	Medium	46	62	63	11	31	0	8	0	6			3	0	0	2
	Low				43	23	20	11	17	12			34	12	0	10
Open hospital								32		7	20	22		25	0	20
Community		54	38	24	34	13	49	24	61	55	42	43	27	46	54	48
Prison		0	0	12	5	18	0	9	0	9	14	7	27	12	0	8
Court		0	0	0	0	10	0	0	0		0	0		0	0	5

a. Reiss et al. (1996); b. Davison et al. (1999); c. Butwell et al. (2000); d. Jamieson and Taylor (2005) 1984 cohort; e. Jamieson and Taylor (2005) 1996 cohort; f. Cope and Ward (1993); g. Maden (1999); h. Quinn and Ward (2000); i. Edwards et al. (2002); j. Maden et al. (2006) male cohort; k. Maden et al. (2006) female cohort; l. Davies et al. (2007); m. Ho et al. (2009); n. Blattner and Dolan (2009); o. Gow et al. 2010.

Placement during follow-up after discharge

High security

Gathercole (1968) found that 49% of patients reached the community and 29% remained in less secure hospitals 4-6 years following discharge; the other 22% returned to high security. Acres (1975) reported that 2 years after direct community discharge 33% were in institutions (13% in prison, 17% in high security hospitals and 2% in other hospitals), 57% were in the community, 4% were dead and for 5% whereabouts was unknown. Reiss et al. (1996) found that 61% of young psychopathic disorder patients reached the community. At the end of the follow-up period 24% remained in high security, 51% were in the community, 10% were in other hospitals and 10% were in prison or high security hospital following a re-offence. Direct discharge to the community was associated with a high PCL-R score (Reiss et al. 1999). Steels et al. (1998) reported that the percentage of follow-up years spent in each setting for mentally ill patients after discharge was: prison 0.9, high security hospital 16.7, medium secure unit 0.7, general hospital 38.6, sheltered housing 14.5, family of origin 8.3, friends 0.9, alone 8.6, own family 9.3; for psychopathic disorder patients: prison 5.4, high security hospital 14.4, medium secure unit 2.2, general hospital 15.8, sheltered housing 13.1, family of origin 12.7, friends 2.7, alone 15.8, own family 17.9. Mentally ill patients spent more time in hospital and less in the community. Jamieson and Taylor (2002) found 83% of patients discharged in 1984 reached the community over 5 years; 16% spent time in medium security, 56% in general psychiatric wards, 22% in prison, and 19% back in high security hospitals. Not reaching community was associated with being male, older, longer stay in high security, mental illness and civil detention; but not with seriousness of offending. Jamieson and Taylor (2005) reported that 80% of patients discharged in 1984 reached the community within 5 years, whereas for 1996 discharges it was 50%. For the 1984 cohort the proportion of patient years follow-up in various settings was: high security hospital 10%, medium security 5%, other hospital 29%, prison 5%, community 52%. For the 1996 cohort the respective percentages were: 12%, 20%, 20%, 17%. Median time to reach the community in both cohorts was 1.6 years.

Medium security

Baxter et al. (1999) reported that 92% of patients with schizophrenia followed up for up to 10 years after discharge were in contact with psychiatric services. Their location at the end of the follow-up period was: high security hospital 6%, medium secure unit 8%, private hospital 8%, local hospital 11%, community 54%, prison 1%, and untraceable/miscellaneous 8%. Maden et al. (1999) found that during a mean follow-up of 6.6 years 74% reached the community, 21% spent time in high security hospital and 24% were imprisoned. Location at

the end of follow-up was: community 42%, high security 14%, general psychiatry 11%, medium security 7%, prison 4%, abroad 2%. Halstead et al. (2001) reported that 60% of learning disability patients were living in the community with support 5 years following discharge; 9% were admitted to high security hospital. Edwards et al. (2002) reported location at 2 and 5 years following admission; locations 2 years after admission were: 4% prison, 8% high security hospital, 52% remain in same medium secure unit, 4% re-admitted or in another medium secure unit, 6% local hospital, 22% community, 5% no contact; location 5 years after admission were: 3% prison, 10% high security hospital, 12% remain in same medium secure unit, 5% re-admitted or in another medium secure unit, 11% local hospital, 51% community, 9% no contact. Coid et al. (2007b) found that of patients discharged to community forensic services 8% spent time in general wards, 15% in medium security and 1% in high security during a mean follow-up of 6.2 years; for those discharged to general services respective percentages were 20%, 5% and 1%. Alexander et al. (2006) found that 28% of their learning disability cohort was in hospital at the end of follow-up after discharge. Davies et al. (2007) found that during a mean follow-up of 9.4 years 69% of patients had been re-admitted to a psychiatric hospital of any type, 38% to a secure hospital (28% medium security, 15% high security).

Readmission

High security

Reported readmission rates to high security hospitals were: 20% (Tong and McKay 1959), 22% (Gathercole 1968), 4% (McGrath 1968a), 15% (Acres 1975), 7% (Dell 1980), 19% (Black 1982), 31% (Cope and Ward 1993), 39% (Dolan et al. 1993), 22% (Quinn and Ward 2000), 22% (Duncan et al. 2002), 19% (Jamieson and Taylor 2002), 18% (Jamieson and Taylor 2005) and 46% (Blattner and Dolan 2009). Most readmissions were within a few years of discharge, all within 3 years in Duncan et al.'s (2002) Scottish study. Factors reported to be associated with readmission include: shorter admission, prison transfer, remand order, not being restricted (Duncan et al. 2002); deficient assessment, treatment and supervision in lesser security, especially of patients with alcohol or sexual problems (Dolan et al. 1993); and not reaching the community (Taylor and Jamieson 2005).

Medium security

The definition of readmission used in studies of discharge from medium security has usually been readmission to any psychiatric hospital rather than readmission to medium security only. Readmission rates have been 89% (Baxter et al. 1999), 75% (Maden et al. 1999), 30% (Alexander et al. 2006), 21% in males (Maden et al. 2006), 27% in females (Maden et al.

2006), 23% (8% to general psychiatry, 15% to medium security, 1% to high security) in those discharged to community forensic services (Coid et al. 2007b), 26% (20% to general psychiatry, 5% to medium security, 1% to high security) in those discharged to general psychiatric services (Coid et al. 2007b), 69% (38% to secure settings: 28% medium, 15% high). Readmission was associated with HCR-20 score (Dolan and Khawaja 2004), and with not having schizophrenia (Castro et al. 2002).

Mixed

Walker and McCabe (1973) reported a readmission rate of 21% for patients discharged from hospital (high secure or less secure hospital) within a year of being given a hospital order. Readmission was associated with previous admissions and shorter initial admission to hospital. Kershaw et al. (1997) reported readmission for restricted patients following discharge to the community. Where patients were discharged from or readmitted to was not described. Readmission rates were 11% at 2 years and 15% at 5 years.

Forensic outcomes

Conviction after discharge

High security

The relevant studies are summarised in Table 3.4. Studies could be divided into those reporting a follow-up of 5 years or less and those reporting a follow-up of over 5 years.

There were 9 samples, from 7 studies, with a follow-up of 5 years or less, with follow-up periods of 2 (1 study), 4 (2 studies), 4-6 (1 study) or 5 (3 studies) years. The results from these studies were combined. For any conviction, there were 6 samples with a total of 884 patients, of whom 270 (30.5%; 95% CI 27.6-33.7) were convicted. The range of rates of conviction for any offence in these samples was 20% - 46%. For violent conviction there was only one sample reporting a violent conviction rate of 10% (95% CI 6.0-16.6). For serious or grave conviction, there were 5 samples with a total of 1087 patients, of whom 169 (15.5%; 95% CI 13.5-17.8) were convicted of a serious offence. The range of rates of serious/grave convictions in these samples was 7% - 24%.

There were 8 samples, from 9 studies, with follow-up of more than 5 years, with follow-up periods of 5-9, 10, 10.5, 10-13, 11-12, 13.6 or 12-17 years. When the results from these studies were combined, for any conviction there were 8 samples with a total of 1868 patients, of whom 774 (41.4%; 95% CI 39.2-43.7) were convicted of any offence (range of rates of conviction for any offence 28% - 55%). For violent conviction, there were 4 samples with a total of 1343 patients, of whom 236 (17.6%; 95% CI 15.6-19.7) were convicted of a violent offence (range of rates 8 – 21%). For serious or grave conviction, there were 5 samples with a total of 950 patients, of whom 189 (19.9%; 95% CI 17.5-22.6) were convicted of a serious offence. The range of rates of serious/grave convictions in these samples was 15% - 32%.

Factors found to be associated with any conviction included: psychopathic disorder (7 studies), lack of legal compulsion on discharge (6 studies), young age (2 studies), lack of after-care (one study), low IQ/subnormality (2 studies), previous convictions (2 studies), male gender (one study), previous sexual offending (one study), poor social outcome (one study), and discharge by Tribunal rather than by RMO (one study). Factors reported to be associated with serious conviction included: psychopathic disorder (3 studies), discharge by Tribunal (one study), sexually motivated index offence (one study), young age (one study), direct discharge to community or prison (one study), and longer time in secure care (one study).

Medium security

The relevant studies are summarised in Table 3.5. Studies could be divided into those reporting a follow-up of up to 2 years, those reporting a follow-up of about 5 years, and one study with a follow-up of almost 10 years.

There were 6 samples, from 7 studies, with follow-up of up to 2 years, with follow-up periods of 6 months (1 study) or 2 years (6 studies). The results from these studies were combined. For any conviction, there were 5 samples with a total of 2779 patients, of whom 578 (20.8%; 95% CI 19.3-22.4) were convicted. The range of rates of conviction for any offence in these samples was 10% - 26%. For violent conviction there were only 3 samples reporting violent conviction rates of 6, 7 and 8% (combined 141/2048=6.9%; 95% CI 5.9-8.1). For serious or grave conviction, there were only 2 samples reporting serious conviction rates of 2 and 7 % (combined 41/646=6.3%; 95% CI 4.7-8.5).

There were 9 samples, from 12 studies, with follow-up of about 5 years, with follow-up periods of up to 5 years (1 study), mean of 5 years (1 study), 5 years (3 studies), mean of 6.2 years (1 sample reported in 2 studies), mean of 6.6 years (1 sample reported in 2 studies), up to 7 years (1 study), 2 to 8 years (1 study), 1 to 13 years (1 study). When the results from these studies were combined, for any conviction there were 9 samples with a total of 4083 patients, of whom 1406 (34.4%; 95% CI 33.0-35.9) were convicted of any offence (range of rates of conviction for any offence 3% - 45%). For violent conviction, there were 4 samples with a total of 3158 patients, of whom 506 (16.0%; 95% CI 14.8-17.3) were convicted of a violent offence (range of rates 6 – 18.5%). For serious or grave conviction, there were 4 samples with a total of 2448 patients, of whom 279 (11.4%; 95% CI 10.2-12.7) were convicted of a serious/grave offence. The range of rates of serious/grave convictions in these samples was 5% - 12%.

Factors found to be associated with any conviction included: psychopathic disorder, personality disorder (comorbidly or as a primary diagnosis), PCL-R score, previous convictions, scores on risk tools (VRAG, HCR-20 [particularly the H subscale], OGRS), young age, male gender, shorter admission, substance misuse, not being restricted, history of sexual abuse, loss of contact with services, non-compliance, history of sexual aggression. Factors reported to be associated with violent conviction included: young age, male gender, non-white ethnicity, previous convictions, personality disorder, shorter admission, PCL-R score, scores on risk tools (VRAG, OGRS, HCR-20 particularly H subscale), substance misuse and not being restricted. Factors associated with serious conviction have included:

young age, black ethnicity, personality disorder, previous serious offending, not being restricted, PCL-R score and OGRS score.

Mixed

The two studies reporting conviction as an outcome in mixed samples (i.e samples with patients from different levels of security) are summarised in table 3.6. Walker and McCabe (1973) reported re-conviction rates over 2 years of 47% in males and 31% in females within 2 years of discharge from a psychiatric hospital. Kerwin et al. (1997) reported rates of 13% and 27% for any new conviction over 2 and 5 years respectively; and rates of grave convictions of 2% and 5%. Both studies found psychopathic disorder and previous convictions were associated with conviction. Other factors reported in one of these studies were young age, direct discharge from high security, discharge by Tribunal, short admission, absconding, unemployment at index offence and subnormality.

Table 3.4. Summary of studies of conviction following discharge from UK high security hospitals.

Reference	Sample size (and other characteristics)	Length of follow-up (years)	Conviction rate - % (95% CI)					Factors associated with conviction
			Any	Minor	Violent	Sex	Grave or Serious	
Tong and McKay (1959)	423	1-12; 6(mn)	20 (16.6–24.2)					Young age, shorter admission, community discharge.
Gathercole (1968)	199	4-6	26 (20.5–32.7)					
Home Office and DHSS (1973)	273	4	34 (28.7–39.9)				7 (4.5-10.6)	
Acres (1975)	92	2	46 (35.9-55.8)		6 (3.0-13.5)	1 (0.2-6.3)		Psychopathic disorder, mental subnormality, not having mental illness, lack of statutory supervision, lack of aftercare, discharge by Tribunal rather than RMO
Black (1982)	128	5			10 (6.0-16.6)			Not conditionally discharged
Tennent and Way (1984)	617	12-17	55 (51.0-58.8)		21 (18.0-24.5)			Psychopathic disorder, absolute discharge
Norris (1984)	330	4	27 (22.5-32.0)				16 (12.5-20.4)	Psychopathic disorder

Bailey and MacCulloch (1992 a&b), MacCulloch et al. (1993 a&b, 1994)	112 (Direct discharge to community		10	35 (26.6-44.0)		17 (11.1-25.0)			Psychopathic disorder, absolute discharge. Serious: sexual motivation, psychopathic disorder, Tribunal discharge, court disposal
Reiss et al. (1996)	49 (Young psychopathic disorder)		5 (mn)	20 (11.5-33.6)				8 (3.2-19.2)	Previous sex offence, low IQ, poor social outcome
	40 ('Additional' psychopathic disorder cases)			25 (14.2-40.2)					
Buchanan (1998)	425		10.5	34 (29.8-38.8)		15 (12.0-18.8)	8 (5.8-11.0)	15 (12.0-18.8)	Young age, psychopathic disorder, previous convictions; not gender or discharge destination.
Steels et al. (1998)	95 psychopathic disorder		13.6 (mn)	56 (45.8-65.4)		17 (10.6-25.6)	12 (6.6-19.6)		Male, psychopathic disorder
	94 mental illness			19 (12.5-28.3)		7 (3.7-14.6)	1 (0.2-5.8)		
Davison et al. (1999)	159 (psychopathic disorder)	61 discharged to community	5-9	42 (31.0-55.1)				32 (22.3-45.3)	Young age, lack of legal compulsion, previous convictions, but not discharge to community
		98 discharged to hospital		28 (20.6-38.2)				22 (15.3-31.7)	

Thomson and Allen (2000)	171	10-13	31 (24.5-38.3)		19 (13.6-25.2)			
Jamieson and Taylor (2002)	223	11-12	36 (29.9-42.4)					22% conviction rate in patients who remained in institutions
Jamieson and Taylor (2005)	195	11-12	38 (31.4-44.9)				26 (20.5-32.7)	Multiple (>9) convictions in 5%, 14% of convictions during institutional residence. Median time to conviction 2 years. Serious conviction associated with psychopathic disorder.
Jamieson and Taylor (2005)	223 (discharged 1984)	5		12 (8.5-17.0)			19 (14.3-24.5)	Serious: direct community discharge, discharge to prison, young age, longer time in secure care, psychopathic disorder (in 1984 cohort only)
	212 (discharged 1996)			11 (7.0-15.0)			24 (17.8-28.8)	

mn = mean

Table 3.5 Summary of studies of conviction following discharge from UK medium secure units.

Reference	Sample size (and other characteristics)	Length of follow-up (years)	Conviction rate - % (95% CI)					Factors associated with conviction
			Any	Minor	Violent	Sex	Grave or Serious	
Cope and Ward (1993)	51 (Patients admitted from high security)	5 (mn)	11 (5.5-23.4)				11 (5.5-23.4)	Psychopathic disorder
Baxter et al. (1999)	63 (Patients with schizophrenia)	10 (ut)			30 (20.2-42.4)			Comorbid conduct disorder, substance misuse, not restricted.
Friendship et al. (1999)	234	6.6 (mn)	24 (18.9-29.8)				12 (8.4-16.8)	Substantial time during follow-up in hospital could decrease opportunity.
Maden et al. (1999 a&b)	234	6.6 (mn)	24 (18.9-29.8)		14 (10.2-19.1)	4 (2.0-7.2)		Male, young, previous conviction, shorter stay, not restricted.
Halstead et al. (2001)	35 (Patients with learning disability)	5 (ut)	3 (0.5-14.5)					
Castro et al. (2002)	49	0.5	19 (10.0-31.4)					Sexual aggression history, non-compliance with treatment, length of stay in institutions, not previous convictions

Edwards et al. (2002)	225		2	10 (6.9-14.9)					Previous convictions
			5	14 (10.3-19.4)					
Dolan and Khawaja (2004)	70		2 (al)						HCR-20 score not associated with conviction
Gray et al. (2004)	315		7 (ut)		31 (26.3-36.4)		18 (14.2-22.7)		Any: PCL-SV, HCR-20, OGRS. Serious: PCL-SV, OGRS. 87% convictions within 3 years.
Maden et al. (2004)	959		2	15 (12.9-17.4)		6 (4.7-7.7)			Previous convictions, substance misuse, history of sexual abuse, shorter admission, loss of contact with services.
Phillips et al. (2005)	315		2-8	36.5 (31.4-42.0)		18.5 (14.5-23.1)			Young age, previous convictions, shorter admission.
Alexander et al. (2006)	64 (Patients with learning disability)		1-13	9 (6.5-22.8)					Personality disorder, acquisitive offending, young age.
Maden et al. (2006)	959	843 men	2	16 (13.7-18.6)					Gender difference in conviction largely accounted for by deliberate self-harm, previous convictions and alcohol/drug problems).
		116 women		9 (4.8-15.1)					
Coid et al. (2007a)	1613	1403 men	6.2 (mn)	34 (31.6-36.5)		18 (16.1-20.1)	2 (1.4-2.9)	12 (10.4-13.8)	Violent conviction: young, male, non-white, previous conviction, personality disorder, shorter admission.
		210 women		15 (11.0-20.7)		6 (3.7-10.3)		5 (3.0-9.1)	Grave conviction: young, black, personality disorder, previous grave conviction, not restricted.
Coid et al. (2007b)	1066 (Followed-up in community by different types of	409 community forensic	6.2 (mn)	23 (19.2-27.3)		4 (2.4-6.3)		3 (1.7-5.1)	No association with forensic v general follow-up.
		657 general psychiatry		27 (23.7-		5 (3.6-		3 (2.0-4.7)	

	services)			30.5)		7.0)			
Davies et al. (2007)	550		9.4 (mn)	49 (44.9-53.3)				15 (12.3-18.3)	Psychopathic disorder. 15% of offences in institutions. Mean time to conviction 3.2 years.
			2	26 (22.5-29.8)				7 (5.2-9.6)	
			5	42 (37.9-46.2)				12 (9.5-15.0)	
Snowden et al. (2007)	996		2	26 (23.4-28.8)		7.5 (6.1-9.3)			VRAG, OGRS.
			5	45 (41.9-48.1)		15 (12.9-17.3)			
Gray et al. (2008)	996		0.5	5 (3.8-6.6)		2 (1.3-3.1)			HCR-20 total, H subscale, R subscale, not C subscale.
			1	11 (9.3-13.1)		3 (2.1-4.3)			
			2	20 (17.6-22.6)		5 (3.8-6.7)			
			5	34 (31.2-37.0)		11 (9.3-13.1)			
Ho et al. (2009)	96		2		9 (5.0-16.9)	8 (4.3-15.6)		2 (0.6-7.3)	PCL-SV, VRAG, H subscale of HCR-20.

al = at least, mn = mean, ut = up to

Table 3.6 Studies of conviction of mentally disordered offenders following discharge from mixed settings in the UK.

Reference	Sample size (and other characteristics)	Length of follow-up (years)	Conviction rate (%)					Factors associated with conviction
			Any	Minor	Violent	Sex	Grave or Serious	
Walker and McCabe (1973)	942 (male hospital order patients)	2	47 (43.9-50.2)					Short admission, absconding (and being discharged in absence), previous convictions, psychopathic disorder or subnormality (rather than schizophrenia), unemployed at index offence (in males)
	218 (female hospital order patients)		31 (25.4-37.6)					
Kirshaw et al. (1997)	2781 (patients on restriction orders discharged to community from any hospital)	2	13 (11.8-14.3)				2 (1.6-2.6)	Young age, previous convictions, psychopathic disorder, direct discharge to community from high security, discharge by Tribunal (rather than Home Office).
		5	27 (25.4-28.7)				5 (4.3-5.9)	

Violence or offensive behaviour

These studies examined violence (and other offensive behaviour) in hospital or following discharge, rather than convictions. Some of this behaviour may have led to prosecution and conviction, but that was not the focus of these data.

High security

All high security hospital studies have focussed on violence in high security, with no studies of actual violence (as opposed to criminal convictions) following discharge. Larkin et al. (1988) found that over a 6 month period there were 1144 violent incidents amongst 587 patients. Females (mean 6 incidents each) committed more violence than males (mean 0.7 incidents each). A small number of patients (4%) were responsible for most (60%) of the violence. Staff were targeted more than other patients. Maden et al. (1993) reported 33% of a resident cohort was violent over a year, with an estimated rate of 3 serious incidents per week in each of the 3 English high security hospitals. Reiss et al. (1999) found that high PCL-R scores were associated with seclusion and need for special care (proxies for aggressive behaviour) amongst psychopathic disorder patients. Gordon et al. (1997) described the 7 homicides committed by 8 patients (6 incidents with 7 victims) in UK high security hospitals from 1966-95. All but one victim was a patient. Associated factors seemed to be sexual relationships and pathology, and escape attempts.

Medium security

About half these studies examined in-patient violence in medium security and half violence following discharge. Baxter et al. (1998) found 67% of 63 patients with schizophrenia were violent over 10 years following discharge. Maden et al. (1999) reported that 26% of their discharge cohort of 234 patients had been violent in medium security. Gudjonsson et al. (2000) and Rutter et al. (2004) studied in-patient violence in the same medium secure unit between 1980-96. Of the 280 patients resident, 59% were violent, leading to 2180 incidents, more often towards staff than patients. Violence to staff rather than patients was associated with gender, ethnicity, diagnosis and legal section. Only 6% of patients were responsible for 67% of the incidents, each responsible for 25 or more episodes. This persistently aggressive minority were more likely to be female, less likely to have been imprisoned previously, and more likely to have received special education.

Dolan et al. (2002) found in-patient violence following admission was associated with PCL-SV, VRAG and H10 (subscale of HCR-20) scores. Gray et al. (2003) found that 50% of 34 patients were verbally aggressive, 32% aggressive to property and 32% physically violent over 3 months following admission. BPRS and HCR-20 totals were strongly related to

aggression, PCL-SV score moderately so; young age at first psychiatric contact was associated with property and verbal aggression. Dolan and Khawaja (2004) found the HCR-20 score to be associated with violence during 2 years after discharge. Dolan and Davies (2006) in a study of in-patient violence in 134 males with schizophrenia over 3 months, found 45% of non-psychopathic and 60% of psychopathic patients were violent; PCL-SV score was associated with violence.

Alexander et al. (2006) found that 58% of 64 learning disability patients were involved in 'offending-like' behaviour over 1-13 years following discharge. Such behaviour was associated with readmission. Davies et al. (2007) followed up 550 patients reporting 2 and 5 year rates of violence of 28% and 42% respectively. Ho et al. (2009) found that 41% of 96 patients were violent, 4% seriously, over 2 years following discharge. Violence was associated with VRAG, PCL-SV and H10 scores.

Doyle and Dolan (2006), in a mixed study involving medium secure and general psychiatry discharges to the community, found that 19% were violent (9% from records, 11% from self-report, 13% from informants), 12% of the 34 medium secure cases and 22% of the 78 general cases. Factors associated with violence were PCL-SV score not being on enhanced CPA, HCR-20 score, VRAG score, anger and impulsiveness.

Absconding and escape

Only six studies reported on absconding or escape. Walker and McCabe (1973) found that 21% of male patients and 23% of female patients given hospital orders in 1963-4 absconded and gained their discharge in absence from detention. The vast majority of these patients will have been in non-secure hospitals. This was associated with subsequent conviction for a new offence. Absconding (whether patients returned or not) was 19% in males and 15% in females in patients staying in hospital for less than a year. Huws and Shubsachs (1993) described the 30 patients who absconded from high security hospitals in 1976-88. All were found and returned, a third of their own accord. Two committed serious offences whilst absent. Psychopathic disorder was associated with absconding, but, except where there was a serious offence, absconding did not hinder subsequent discharge. Dolan and Snowden (1994) found that 27 patients (responsible for 31 episodes) escaped from a medium secure unit in 1986-93. Escapees were largely young, male, mentally ill, acquisitive offenders transferred from prison or police custody. All were apprehended within 10 days and there was little risk to the public. The majority returned to prison. Brook et al. (1999) found that absconding from high security was rare, with minimal risk to the public. Most absconding was from

authorised leave. Previous absconding, acting-out behaviour and assaults were associated with absconding. Castro et al. (2002) found that 13% of 49 patients discharged from medium security absconded over 6 months. Gow et al. (2010) reported that 22% of 219 patients in a medium secure unit absconded (none escaped, all absconded whilst on leave) over a 5 year period.

Exworthy and Wilson (2010) commented on media reporting of statistics on escape and absconding from secure psychiatric units. The report stated that 116 patients had 'escaped' from low and medium secure units during 2007, and over the same period 5 people had escaped from prison. Most of these 'escapes' were 'absconds' (i.e. patients not returning from authorised leave rather than breaching a secure perimeter), and there were a number of problems with the statistics quoted. The actual figures for prisons in 2006 were 601 absconds and 6 escapes.

Lack of co-operation

Main and Gudjonsson (2006) found that non-compliance with the regime in a medium secure unit in 65 patients was associated with previous substance misuse.

Clinical outcomes

Psychopathology

One study reported on the course of psychopathology (Reiss et al. 1996), and this was in a small cohort of 49 psychopathic disorder high security patients with ascertainment of psychopathology from case notes. It reported that 16% developed symptoms of mental illness. Another small study of 49 patients discharged from a medium secure unit reported that at follow-up 51% showed no or slight improvement in mental state, 11% showed moderate improvement, 36% showed a good improvement and 2% a full improvement (Castro et al. 2002). No studies examined the course of psychopathology in mentally ill patients, and no studies used interviews to assess mental state at follow-up.

Treatment

Reiss et al (1996) described the range of psychosocial treatments received by 49 psychopathic disorder patients and a comparison group of 40 psychopathic disorder patients in Broadmoor. Acres (1975) found that, of 92 patients directly discharged to the community from high security hospitals followed up for 2 years, 64% had contact with a GP, 32% a psychiatrist, and 97% with a probation officer or social worker. At the end of the two years only 48% were in contact with probation or social work. Lack of contact was associated with conviction. One study (Swinton and Haddock 2000) looked at pharmacological treatment, finding that patients with schizophrenia in high security were more likely to be discharged if treated with clozapine. Castro et al. (2002) described good or full compliance with medication in 63% of 49 patients over 6 months following discharge from medium security. During this period 17% attended day centres, 31% day hospitals, 23% individual therapy and 15% group therapy.

Self-harm

Although suicide as a cause of death has been examined in a number of studies (see below), deliberate-self-harm as an outcome has only been examined in a few studies. Maden et al. (1993) found that of 296 high security patients 18% self-harmed and 2% attempted suicide over a year. Castro et al. (2002) reported a self-harm rate of 6% in 49 patients over 6 months after discharge from medium security. Gray et al. (2003) found that 53% of 34 patients admitted to medium security self-harmed within 3 months, and this was associated with scores on Becks Hopelessness Scale. Gow et al. (2010) reported at self-harm rate of 9% in 219 patients in medium security over 5 yeas.

Mortality

High mortality rates for secure hospital patients have been reported in every study that has examined death rates.

High security

Mortality rates for high security hospital patients have ranged from 4% to 22%, depending on the length of follow-up. A rate of 4% was reported by Acres (1975; 2 year follow-up after discharge), by Reiss et al. (1996; mean follow-up of 5 years after discharge) and by Butwell et al. (2000; unusually this was not a discharge cohort, but the percentage of patients who left high security by dying rather than being discharged). With a 5 year follow-up from discharge Jamieson and Taylor (2005) reported a mortality rate of 12% for the 1984 cohort and 14% for the 1996 cohort. The mortality rate with 11-12 year follow-up of the 1984 cohort was 22% (Jamieson and Taylor 2002). The proportion of unnatural deaths was 25% (Butwell et al. 2000), 42% (Jamieson and Taylor 2005; 1984 cohort) and 29% (Jamieson and Taylor 2005; 1996 cohort).

Medium security

Mortality rates for medium security patients have ranged from 3% to 10%. A rate of 3% was reported by Baxter et al. (1999; up to 10 year follow-up of schizophrenia), 9% by Maden et al. (1999; mean 6.6 year follow-up), 6% by Halstead et al. (2001; up to 5 year follow-up of learning disability), 2% by Edwards et al. (2002; 5 year follow-up), 5% by Coid et al. (2007b; mean 6.2 year follow-up for forensic follow-up cohort), 9% by Coid et al. (2007b; mean 6.2 year follow-up for general follow-up cohort), and 10% by Davies et al. (2007; mean 9.4 year follow-up). Suicide was the cause of death in a third of cases in three studies (Maden et al. 1999, Coid et al. 2007b, Davies et al. 2007).

Mixed

For patients detained on hospital orders at different security level in 1963-4, Walker and MacCabe (1973) reported that 4% were dead in 1970.

Needs/satisfaction

The only 'need' that has been examined in many studies is security need (see above). Baxter et al. (1999) examined the health and social needs of patients with schizophrenia using the Camberwell Assessment of Needs (CAN) finding an average of 7.6 needs according to patients and 7.8 according to staff. Harty et al. (2004) used the forensic version of the CAN to assess 1255 high security patients, finding most clinical and social needs were met, but that the most frequent unmet needs covered daytime activities, substance misuse, sexual

offending, safety to others and psychotic symptoms.

Social outcomes

Employment

Walker and McCabe (1973) found that of patients discharged in the first year after being detained on a hospital order 61% of males and 20% of females gained some sort of contributory employment during the 2 year follow-up period. Employment at follow-up was associated with longer admission, not absconding (and being discharged in absence), and being in employment at index offence (in females). Acres (1975) reported that during a 2 year follow-up of 92 patients following discharge from high security 17% did not gain work, 23% were employed for up to a month, 50% for up to 6months and 61% for up to 12 months. Amongst the 83% who did work at some point there were 178 changes of job. Leaving a job was due to poor behaviour (35%), getting a better job (35%), poor work (12%). Reiss et al. (1996) reported that 57% of their young psychopathic disorder patients discharged from a high security ward had a good employment outcome. Castro et al. (2002) found that of 49 patients discharged from medium security followed up for 6 months, 7% had full-time, 17% part-time and 13% voluntary (unpaid) employment.

Relationships

Acres (1975) found that 15% of high security hospital patients discharged to the community had no family contact; 60% were in an intimate relationship at some point, but this had decreased from 74% at offence the time of the index offence. Reiss et al. (1996) reported a good social interaction outcome (i.e. contact with friends or family) in 89% of their young psychopathic males patients. Castro et al. (2002) found that of patients discharged from medium security 89% had contact with friends and 89% had contact with family over 6 months.

Accommodation

Two years after discharge to the community from high security, 57% of patients were in the community, with 55% in their own home, 2% living in at work and 2% in hostels (Acres 1975). During the follow-up period 22% lived in one place, 50% had not more than 2 moves, and 9% moved 9 or more times. There were 235 changes of accommodation in the cohort of 92 patients. Moving accommodation was associated with poor behaviour/criminal record (55%) or getting better accommodation (32%). Reiss et al. (1996) reported a good accommodation outcome in 68% of their young male psychopathic disorder high security cohort with a mean follow-up of 5 years.

Substance use

Reiss et al. (1996) reported 29% of young psychopathic disorder patients discharged from a specialist unit at Broadmoor had problematic substance misuse during a mean follow-up of 5 years. Castro et al. (2002) reported a substance misuse rate of 8% in 49 patients discharged from medium security over 6 months. Dolan and Davies (2006) found that 58% of non-comorbidly psychopathic and 82% of comorbidly psychopathic patients with schizophrenia misused substances in a medium security during 12 weeks of follow-up.

Conclusions

Methodology of review and studies

This was not a systematic review in the strict sense, but systematic review methodology was attempted as far as was feasible. There were three questions: (i) What outcomes have been examined? (ii) What are the findings regarding these outcomes? (iii) What are the associates of these outcomes? The outcomes of primary interest were meaningful administrative, forensic, clinical and social outcomes. The search strategy seemed exhaustive with respect to journal articles, reports and book chapters, but may have missed some unpublished studies. All studies presenting original data on outcomes were included regardless of methodology. Using only truly prospective studies would have severely limited the review, but the methodology of individual studies was examined and recorded. Only one researcher examined studies identified, extracted data and synthesised the data. Analysis of data was narrative through a structured summary, rather than quantitative, except for a fairly simple combination of conviction data. This quantitative summary of conviction rates did not attempt a truly meta-analytic approach to data combination.

The standards for studies of prognosis in evidence based medicine are: (1) a representative and well-defined sample of patients at a similar point in the course of the condition; (2) follow-up sufficiently long and complete; (3) objective and unbiased outcome criteria; (4) adjustment for important prognostic factors. Truly prospective studies are preferable to pseudo-prospective studies, with retrospective and cross-sectional studies far inferior. Most of the studies met the first three of these criteria. Some studies met the fourth criterion, either through defining subgroups in advance (e.g. psychopathic disorder vs. mental illness) or, more often, through tests to find factors associated with outcomes. There were no truly prospective studies of long-term outcomes, over 5 to 10 years or more. Such studies require resources rarely available in forensic psychiatry research, and it could be argued that given the nature of the samples and objective outcomes, they offer few advantages over pseudo-prospective designs.

Samples studied and length of follow-up

The review presents results from 72 studies on the outcomes of secure hospital patients in the UK, with 39 studies of high security samples, 29 of medium security samples and 4 of mixed samples. Studies were generally of samples of mixed diagnosis and gender, representative of patients within secure settings in the UK. In most mixed samples patients with schizophrenia predominated. Many studies, over a third, were quite small with less than 100 subjects, with

only a fifth having a sample size of more than 500. For outcomes requiring lengthy follow-up (e.g. conviction) length of follow-up was generally adequate.

Outcomes reported

The outcome most frequently reported was conviction following discharge, in 57% of studies. This outcome is relatively easily ascertained from a national database, is objective and meaningful, as conviction, particularly for violent or other serious offences, is an outcome clinicians, the public, politicians and patients wish to avoid. However convictions underestimate actual offending and violence, as shown by the few studies that have looked at this as an outcome following discharge. The other outcomes reported relatively frequently, in between 15 and 25% of studies, were readmission, length of stay, institutional violence, discharge process, destination on discharge and mortality. Between 10 and 15% of studies reported placement after discharge, and clinical and social outcomes were reported in less than 10% of studies. More easily gathered data (e.g. conviction, readmission) were reported more often than less easily gathered data (mental state and social circumstances at follow-up). Nationally available statistics (e.g. criminal records) were used more than hospital case records, which in turn were used more than tracing individual patients after discharge. Interviews with patients after discharge were very rare. Studies focussed on objective meaningful data rather than presenting outcomes from rating scales, which can be difficult to interpret and compare with other studies. This made outcomes (such as conviction, readmission, death, reaching the community) comparable across studies. However different lengths of follow-up and different ways of reporting outcomes makes some comparisons between studies difficult.

Are the outcomes reported of interest? If so, to whom? Patients, clinicians, managers, politicians and the public may have different priorities. The ideal outcome for all is for a patient in a secure hospital to leave secure care, to live independently in the community, to not re-offend and to be unaffected by symptoms of illness. The public and politicians may prioritise re-offending, patients may prioritise independent living, clinicians may prioritise symptom improvement, whilst managers might prioritise administrative outcomes, such as length of stay. Although the studies available help answer questions regarding re-offending (although limited to convictions rather than actual behaviour) and leaving secure care, there are few studies on clinical and social outcomes. Also, few studies make links between different outcomes. So whilst associates of various forensic and administrative outcomes have been ascertained, these are largely baseline variables, rather than other outcomes or variables relating to what happens after secure care. We know little, if anything, for example,

about whether the course of schizophrenia (the most common condition in secure hospital patients in the UK) is related to forensic, administrative, social or other clinical outcomes.

Outcomes and their associates

Below I summarise and discuss the main findings regarding specific outcomes and their associates. Associates will be considered if they have been reported in more than one study or in one large study.

Administrative outcomes

Length of stay in high security is long (an average of 5 – 10 years in most studies), and despite changes in legislation, treatment and services, does not appear to have changed over the years. Length of stay in medium security is much shorter (less than a year in most studies). However many medium secure units do not take patients for long-term care. There have not been replicated studies of associates of length of stay.

There were a number of studies on the discharge process in high security in the 1990s. These repeatedly highlighted that most patients were ready for less secure settings and there were delays in moving patients on. A recent study found that despite developments over the last 10 – 15 years, 40% of patients do not require high security care (Harty et al. 2004). Problems discharging patients from high security relate to the nature of services out with high security, and the clinical and behavioural problems of patients.

Most patients go to less secure hospitals on discharge from high security, increasingly to medium secure units rather than lower security and open wards. Discharge to the community has become less common, and to courts and prison more common. This reflects changes in services and changes in the types of patients admitted. Patients discharged from medium security go to less secure hospitals and the community. A very small minority go to high security hospitals or prison. Direct community discharge is common.

The proportion of high security patients reaching the community depends on the length of follow-up, ranging from about half to three quarters over 5-10 years. A significant minority of ex-high security patients never reach the community. Patients with mental illness appear to be over represented in this group. Ascertaining the proportion of medium secure patients who reach the community is more difficult as there are different lengths of follow-up, some studies report any time in community and some report community placement at the end of follow-up. But, like high security, it appears that about half to three quarters reach the community over 5-10 years.

In most studies readmission rates to high security hospital are about 20-30% (range 4-46%), with most readmissions within a few years of discharge. For medium secure units readmission rates range from 20-75%, depending on length of follow-up and whether readmission includes admission to non-medium secure settings.

Forensic outcomes

The method used to calculate follow-up conviction rates, by combining the results of individual studies, was relatively crude but did weight studies by sample size, grouped studies with similar follow-up lengths and used relatively consistent definitions of conviction outcomes. For high security patients conviction rates at about 5 years were any conviction 30.5%, violent conviction 10%, and serious conviction 15.5%; and at about 10 years were any 41.4%, violent 17.6%, serious 19.9%. For medium security patients conviction rates at 2 years were any 20.8%, violent 6.9%, serious 6.3%; and at about 5 years any 34.4%, violent 16%, serious 11.4%. The similarity between the figures for 5 years follow-up in high and medium secure samples is notable; although considering the lack of overlap of the 95% confidence intervals, medium secure patients seem to acquire slightly more convictions of any type, whilst high secure patients acquire slightly more serious convictions over 5 years. Although serious convictions are uncommon, between 1 in 10 and 1 in 5 patients discharged from secure hospitals will commit a violent or serious offence over 5 to 10 years. The re-conviction rates are lower than the re-conviction rates of offenders given community sentences (2 year re-conviction rate of 50-60% in England and Wales) or released from prison (2 year re-conviction rate of 60-70%; Ministry of Justice 2010). This may be explained by mental disorders, the supervision and care of patients following discharge, or younger age of offender samples. Re-offending rates of restricted patients and life-sentenced prisoners have been found to be similar and low (Kershaw et al. 1997).

Factors associated with conviction included psychopathic disorder/personality disorder, young age, male gender, previous convictions, higher scores on risk assessment instruments, not having a mental illness, lack of compulsion on discharge, low IQ, shorter admission and substance misuse. These mirror the factors found to predict general recidivism in Bonta et al's (1998) meta-analysis of predictors of recidivism in mentally ill offenders and those found to be associated with recidivism in patients discharged from a Canadian maximum security hospital which has been researched extensively (Quinsey et al. 2006). Factors associated with violent or serious recidivism included psychopathic disorder/personality disorder, young age, male gender, previous convictions, previous serious convictions, lack of compulsion or restriction following discharge, not having mental illness, higher scores on

risk assessment instruments, shorter admission and substance misuse. Again these factors mirror those from Bonta et al. (1998) and Quinsey et al. (2006).

No study has reported directly on unconvicted violence by patients after they leave high security hospitals. High rates of violence in high security have been found. The few studies that have examined actual (not just convicted) violence and offending following discharge from medium security report far higher rates of violence than found using re-conviction data (by a factor of 4 to 5). High rates of inpatient violence in medium security have also been reported. Like other studies of inpatient violence, violence in UK secure hospitals is aimed at other patients and staff, a small number of patients commit a disproportionate amount of violence, and females feature more in inpatient violence than they do in convicted offending/violence.

From the few studies of absconding, all but one of which report absconding from high or medium security, rather than absconding following discharge to a less secure setting, absconding from high security is very rare, but from medium security is not uncommon. Absconding very rarely leads to serous violence or offending, and the overwhelming majority of absconding is going absent whilst on authorised leave rather than escaping from within a secure perimeter.

Clinical outcomes

Although the majority of patients in the high and medium secure follow-up studies reviewed had mental illnesses, particularly schizophrenia, we know next to nothing about the course of psychosis or psychopathological outcomes in such patients. We also know little about the treatment of patients and their contact with services during follow-up. Contact with services may be associated with reduced offending, clozapine may increase the chances of leaving high security, and it may be that most patients, particularly as they are subject to ongoing compulsion, are compliant with treatment. Rates of self-harm after discharge have only been reported in two studies (6 and 18%), the other two reporting self-harm rates (9% and 53%) were during secure hospital care. No studies have looked at the association between self-harm and other outcomes.

Mortality is the only clinical outcome that has been reported in more than 10 studies. Mortality rates in secure hospital patients are high, ranging from 3 to 22%. High rates of unnatural death (about a third of high security deaths) and suicide (about a third of medium security deaths) have been reported. Factors involved have not been examined in any detail. High mortality rates have been reported in mentally disordered offenders in Sweden (Björk

and Lindqvist 2005) and in young offenders, particularly those with psychiatric disorders and substance misuse (Sailas et al. 2005).

Social outcomes

Like clinical outcomes, there is little to inform us about the social outcomes of secure hospital patients. The very few studies that report such outcomes are very old (two studies from the early 1970s), of a very small sample of psychopathic patients or of a very small sample of medium secure patients followed up for a short period. It would be unsafe to generalize from any of these studies to answer questions about patients in medium or high secure care at present. So we cannot give a meaningful evidence based answer to questions about employment, relationships, accommodation or substance misuse, the first three of which are often questions patients are concerned about. There is also very little from secure hospital studies to inform whether good social outcomes are correlated with forensic or clinical outcomes.

Implications for this study

Prospective methodology is ideal in studies of prognosis. All of the long-term studies identified above have used a pseudo-prospective methodology where baseline and follow-up factors were ascertained retrospectively after they had occurred. The research reported in this Thesis was both truly prospective and pseudo-prospective, which makes it one of the few studies of the long-term outcomes of secure hospital patients with a truly prospective aspect to the method. A balance has to be struck between sample size and the richness of data that can be collected on cases. Survival analysis should be used to present time to outcome data where feasible and regression analysis should be used to ascertain the relative contribution of variables to outcomes. Outcomes presented should be objective and meaningful.

The literature reviewed here will allow some comparison of outcomes in the current research with outcomes in other studies of UK security hospital patients. But there is very little specifically on psychotic patients. There are a number of studies of conviction, readmission and mortality that will provide comparative data. Studies of the associates of conviction highlight a number of variables which it will be important to consider, but for other outcomes there are few replicated findings to guide the identification of relevant correlates.

No study of UK security hospital patients has looked in detail at the clinical course of psychotic illness and its relationship with forensic, social and administrative outcomes. There are no studies that have looked at the relationship between these outcomes. Most studies have only considered a handful of readily available baseline variables as associates of outcomes (primarily criminal conviction).

CHAPTER 4
Aims and research questions

Aims

The aims of the research were to describe the administrative, forensic, clinical and social outcomes of patients with schizophrenia detained in a high security hospital, and ascertain the factors associated with these outcomes. The term administrative is used to refer to progress from one service or setting to another, and to changes in legal status. Forensic outcomes include criminal convictions, aggression (whether leading to conviction or not) and absconding. The clinical outcome of most interest was the course of psychosis, but clinical outcomes also included treatment provided, side-effects, self-harm, physical morbidity and mortality. Social outcomes included intimate relationships, work and accommodation.

Research questions

To meet these aims the following research questions were posed:

A. CLINICAL OUTCOMES

1. What is the course of psychopathology of patients with schizophrenia detained in a high security hospital?

2. What factors are associated with the course of psychosis in these patients? In particular, what is the relationship between course of psychosis and forensic outcomes? And, what is the relationship between course of psychosis and progress from high security towards the community?

3. What medications do these patients receive? How has medication prescribed changed over a decade? What side-effects do they suffer? What psychosocial interventions are used? How compliant are patients with treatment?

4. What is the mortality of these patients over a decade? What is the rate of self-harm?

B. FORENSIC OUTCOMES

1. Over a decade how many patients are convicted of an offence? How many are aggressive (whether convicted or not)? How many patients cause serious harm to others? How many are

persistently aggressive? What is the nature of antisocial and aggressive incidents committed by these patients over a decade, whether in an institutional setting or in the community?

2. What factors are associated with these forensic outcomes? What are the associates of conviction, aggression, serious harm and persistent aggression? What baseline factors are correlated with forensic outcomes over the ten-year follow-up? Are factors identified in the literature as predictors of re-conviction and further violence (such as young age, previous convictions, previous violence, substance misuse, antisocial personality, psychopathy) associated with forensic outcomes in these patients? What is the relationship between forensic outcomes and other outcomes, particularly course of psychosis and progress through services?

3. How many patients abscond or escape? Does absconding lead to offending and/or violence?

C. ADMINISTRATIVE OUTCOMES

1. Over a decade how many patients leave high security hospital? How many leave institutions (hospitals or prisons) and reach the community? What settings do patients spend time in and for how long?

2. What are the differences and similarities between patients who remain in high security, patients who leave high security but remain in institutions, and patients who reach the community? What are the differences between these groups in their forensic outcomes and in the course of psychosis?

3. How many patients return to high security care over ten years? What are the factors associated with returning to high security?

D. SOCIAL OUTCOMES

1. Over a decade how many patients achieve intimate relationships, employment or independent living in the community?

2. Are patients misusing alcohol or drugs at follow-up?

E. COMORBIDITY

1. What is the association between comorbid substance dependence, antisocial personality disorder or psychopathy and administrative, forensic, clinical and social outcomes over ten years?

2. Are these comorbid conditions independently associated with these outcomes?

CHAPTER 5
Method

The research presented in this thesis examines a cohort of 169 patients with schizophrenia resident in high security psychiatric care in Scotland in 1992-3, who were followed up until the end of 2001. Interview and case record data were collected at baseline in the State Hospital Survey (Thomson et al. 1997). I was primarily responsible for the follow-up study, involving comprehensive examination of case records, patient interviews and informant interviews to ascertain administrative, forensic, clinical and social outcomes.

Setting

The State Hospital, Carstairs, is the high security hospital serving Scotland and Northern Ireland. When the sample examined in this research was ascertained in 1992 and 1993, the State Hospital was the only secure psychiatric hospital for Scotland and Northern Ireland providing more than low secure care. There were no medium secure units in either jurisdiction until a decade later, so all detained patients from these two countries requiring more than a locked door were detained at the State Hospital. To be detained at the State Hospital patients had to be considered to have 'dangerous, violent or criminal propensities' as set out in mental health legislation. In effect the sample used for this study was all patients with schizophrenia in Scotland and Northern Ireland who were known to require detention as they, at the time, were considered to pose a risk of serious harm to others. Patients were admitted from less secure hospitals (usually due to aggression in hospital), from criminal courts (usually after committing serious offences) or from prison (usually after a deterioration in mental state). Patients were detained under civil or criminal procedures; at the time of ascertainment the two relevant pieces of legislation were the Mental Health (Scotland) Act 1984 and the Criminal Procedure (Scotland) Act 1975.

During most of the follow-up period, until the end of 2001, the other psychiatric services available to meet the needs of these patients when they left the State Hospital were low security wards in local psychiatric hospitals (intensive psychiatric care units and locked forensic wards), open psychiatric wards (rehabilitation wards and acute general adult) wards and community services (in some areas specialist forensic teams existed). Some patients returned to prison. Right at the end of the follow-up period, in 2001, the first medium secure unit opened in Scotland. A few patients moved to services in England.

Sample

The sample was all patients with schizophrenia resident in the State Hospital between 25 August 1992 and 13 August 1993. All patients detained at the State Hospital at this time were identified and studied in the State Hospital Survey (Thomson et al. 1997). Diagnoses were made using St Louis criteria (Feighner et al. 1972; see Appendix B1), and all patients from the State Hospital Survey with a definite or probable diagnosis of schizophrenia according to these criteria were followed up in the research reported in this thesis. Of the 241 patients in the State Hospital at that time, there were 169 patients with schizophrenia as defined here. Although patients had to be resident during the relevant time-period, as there was a time lag until data collection, some baseline interviews and data collection were conducted in 1994.

Baseline data

Data from the State Hospital Survey

In the State Hospital Survey (Thomson et al. 1997) data were collected from case records, and interviews were conducted with patients, their psychiatrists and nursing staff. Not all the data collected in the State Hospital Survey were used in the current study, and only the collection of the data used in the current study will be described here (table 5.1).

Case records at the State Hospital were examined using a specifically designed data collection sheet. The nature of the information gathered was based on a study of the English Special Hospitals (Maden et al. 1993) and a follow-up study on the 'Disabilities and Circumstances of Schizophrenic Patients' (Johnstone et al. 1991). A psychiatrist or psychologist undertook records reviews, and 20% were duplicated independently to ensure good inter-rater reliability.

The structured interview schedules used to assess psychopathology and neurological side-effects of medication are set out in table 5.1. For 5% of interviews the psychiatrist was joined by an external rater who scored the questionnaires independently. Good inter-rater reliability was achieved (rho = 0.88).

Table 5.1. Baseline data collected in 1992 – 1994.

Data source	Data collected
State Hospital case records	Demographic details Legal status Psychiatric history (e.g. age at first admission, number of admissions, total length of stay in hospital) Drug history (maximum dose and name of oral/depot neuroleptic medication; and the use of anti-cholinergics, mood stabilisers, anti-depressants, benzodiazepines, anti-convulsants and anti-libidinals); current medication – from drug prescription chart recording current dose and preparation name. Medical history Forensic history Admission details Social and personal history Family history Diagnoses – using St Louis criteria (Feighner et al.1972) Clinical features – using the Present State Examination (PSE) Syndrome checklist (Wing et al. 1967)
Interviews with patients	Standardized psychiatric assessment for chronic psychotic disorders (Krawiecka et al. 1977) Mania rating scale (Bech Rafaelsen et al. 1978) Depression rating scale (Montgomery and Asberg 1979) Assessment of Involuntary Movements scale (AIMS) (Guy 1976) Scale for Targeting Abnormal Kinetic Effects (TAKE) (Wojcik et al. 1980)
Interviews with psychiatrists	Need for high security care Current treatment Current problems (non-response to treatment, aggression, non-co-operation)

VRAG, H-10 (of HCR-20) and PCL-R

The Violence Risk Appraisal Guide (VRAG; Quinsey et al. 1998) is an actuarial violence risk assessment instrument, the Historical, Clinical, Risk Mangement-20 (HCR-20; Webster et al. 1997) is a structured clinical violence risk assessment instrument and the Psychopathy Check List-Revised (PCL-R; Hare 1991) is a structured dimensional assessment of psychopathic personality disorder (see Appendix B2). Unlike the State Hospital Survey data, which were collected contemporaneously in the early 1990s, the VRAG, the Historical (H-10) items of the HCR-20 and the PCL-R were applied retrospectively in 2000-1 using only information from case records available before 1st January 1994. By this date 51 (30.2%) patients had left the State Hospital, so for these patients the scales were scored using information documented until the date they left. These instruments were rated primarily for a study of their predictive validity for future violence and offending in this cohort, which is not reported in this thesis (Thomson et al. 2009). The researcher coding the 3 scales, a psychologist, was blind to outcome and completed formal training in the use of the PCL-R and HCR-20. The H-10 and PCL-R were coded using the guidelines provided in the manuals. The VRAG was rated using the instructions available in Quinsey et al. (1998) with clarification provided by one of the authors (Dr Catherine Cormier). Nine patients were scored on the three scales independently by another researcher: 4 by one researcher and 5 by another. Spearman's rho correlation coefficients were .834 ($p = 0.079$) and .884 ($p < 0.01$) for the H-10, .946 ($p<0.01$) and .703 ($p = 0.052$) for the VRAG, and .827 ($p= 0.084$) and .714 ($p = 0.071$) for the PCL-R. This is consistent with previous research (Gray et al, 2004).

Patient tracking

For the 169 patients with schizophrenia identified, records at the State Hospital were examined to ascertain whether these patients had left the State Hospital, and if so where they had gone. The service that patients had moved on to was contacted to see if the patients were there or had moved on again. This process continued for each patient until where the patient was located in 2000 was ascertained. Some patients had died during the follow-up period, and some had moved on but could not be traced.

Follow-up data

Follow-up data was collected from records until the end of 2001 and from interviews conducted with patients and informants in 2000 and 2001.

Records data

The case records of all mental health services with which subjects had contact until the end of 2001 were examined where possible. For those subjects who spent time in prison during the follow-up period prison medical files were examined. For each year of follow-up the following data were collected using a specifically designed data collection sheet. For 30 patient years two psychiatrists rated records data independently.

A. ADMINISTRATIVE DATA

Legal status: Whether they were subject to compulsory measures under mental health or criminal procedure legislation; which measures they were subject to; how long they were subject to these measures; changes in legal status.

Residence: Where they were resident (i.e. high security hospital, other secure hospital, open in-patient unit, community or prison); how long they were resident there; changes in residence.

B. FORENSIC DATA

Incidents: Incidents of aggression, offending and self-harm were identified. Although self-harm was defined as a clinical rather than forensic outcome, data relating to it were collected in this category as self-harm episodes were usually recorded in paper and electronic records as incidents. Types of *aggressive incident* included:

1. Physical violence: any non-sexual aggression involving physical contact with a victim or a threat with a weapon. Subdivided as follows:

- *Homicide* – victim died
- *Serious* – life-threatening
- *Injured* – victim required medical treatment (excludes medical assessment without requirement for treatment)
- *Other* – physical contact but no medical treatment required
- *Threat with weapon* – no physical contact but threats made with weapon in hand or immediately available

2. Sexual aggression: any inappropriate sexual behaviour. Subdivided as follows:

- *Rape* – vaginal or anal penetration of victim.
- *Contact* – any other incident involving sexual contact
- *Non-contact* – sexual incident not involving contact (e.g. exposing self, masturbating openly)

3. Property damage: any incident involving damage to property. Includes:

- *Fire-raising* – any incident involving setting a fire

For each aggressive incident the following features were recorded: type and severity (as defined above); victim; evidence of provocation; relationship with psychotic symptoms (were symptoms present, and if so did they drive incident); alcohol or drug use a time; use of weapon; setting where incident occurred; response to incident (medication, restraint, seclusion, transfer to greater level of security, arrest). Some aggressive incidents led to convictions. Data on these were collected as above, and they were also coded as offences (see below).

Offending: Scottish Criminal Records Office (SCRO) lists of convictions were obtained for all patients who did not object to this. Each conviction for an offence committed during the follow-up period was noted along with details of the date of sentence, the nature of the offence and the sentence imposed. Convicted offences were also ascertained from case notes, noting the number and types of convictions and the penalties imposed. This was cross-referenced with data from the SCRO.

Incidents of *absconding* were ascertained, noting the nature of the absconding and whether it led to aggression or offending. Incidents of *self-harm* were ascertained, noting the nature of the self-harm.

C. CLINICAL DATA

Symptoms: Whether there was definite, probable, possible or no evidence of the following symptoms during each follow-up year was noted:

- Positive symptoms (delusions, hallucinations, thought disorder
- Negative symptoms
- Affective symptoms (depression, elation, suicidal thoughts, anxiety

Physical health: Episodes of physical illness, including those requiring treatment in hospital were recorded. If patients died information about the cause of death was recorded as was the date and place of death.

Treatment: Data were collected on whether subjects were offered treatments (physical, psychological or social), and if so whether they engaged in treatment. For each psychotropic medication prescribed the length of treatment on each different dose and preparation prescribed was recorded for the whole follow-up period.

For 23 patients, a rating of whether there were definitely, probably, possibly, or no positive symptoms in a particular year was made from clinical records independently by two researchers. The weighted kappa of .79 indicated a good level of inter-rater reliability.

D. SOCIAL DATA

Relationships: Whether subjects were married or in intimate relationships was recorded. The length of time in a relationship was also recorded.

Employment: Whether subjects were in paid or unpaid work, and for how long.

Accommodation: If patients were not in hospital or prison, the type of accommodation they were living in and who they were living with was recorded.

Interviews with patients and third parties

Patients were approached to take part in interviews twice, once in 2000-1 and once in 2001-2. At the time of each interview a third party who knew the patient well, usually a nurse, was also approached. Interviews were conducted using structured questionnaires and specific rating scales.

Patient and informant interviews included structured questions from the various instruments used (see table 2.2 and Appendix B3) and questions covering: medication prescribed and compliance; alcohol and drug use over last 4 weeks; contact with mental health services; intimate relationships; accommodation; and employment. All instruments were used with patients. Only the SANS, SDAS and CAN-FOR were used with informants.

I was trained in the use of all the measures used in this study, as was the other psychiatrist who undertook follow-up assessments. For eight interviews another psychiatrist, who rated the instruments independently, joined me. Inter-rater reliability was good. For examples the intra-class correlation coefficient (using a one-way random effects model) for the total score on the BPRS of .953 ($p < .001$) indicated a high degree of inter-rater reliability.

Table 2.2. Instruments used to assess patients at follow-up

Area assessed	Instrument (abbreviation)	Reference
Psychopathology	Standardized psychiatric assessment for chronic psychotic disorders ('Krawiecka')	Krawiecka et al. (1977)
	Brief Psychiatric Rating Scale (BPRS)	Overall (1962)
	Comprehensive Psychopathological Rating Scale (CPRS)	Asberg et al. (1978)
	Scale for the Assessment of Negative Symptoms (SANS)	Andreasen (1989)
Neurological side-effects of antipsychotic medication	Assessment of Involuntary Movements Scale (AIMS)	Guy (1976)
	Scale for Targeting Abnormal Kinetic Effects (TAKE)	Wojcik et al. (1980)
	Rating Scale for Drug-Induced Akathisia ('Barnes')	Barnes (1989)
Aggression	Social Dysfunction and Aggression Scale (SDAS)	Wistedt et al. (1990)
Needs	Camberwell Assessment of Need – Forensic Version (CANFOR)	Thomas et al. (2003)

Completeness of data

Baseline data

Case record data was collected for all 169 patients. Interviews were completed with 160 subjects and psychiatrist interviews with 158.

Follow-up data

Eleven patients died during the follow-up period (i.e. before the end of 2001). Case record data was collected until death for all eleven patients. Two of these patients died in 2001, and so had had a follow-up interview in 2000.

For case record data, complete administrative data were collected until the end of 2001 for 143 (84.6%) patients. For forensic data this was 142 (84%) patients, and for case record data regarding clinical and social outcomes was 137 (81.1%). However bearing in mind that 11 patients died the actual percentages with complete case record data until the end of 2001 were 90.5%, 89.9% and 86.7% respectively. Where complete data were available the follow-up period was between 8 and 10 years, as some patients had not been admitted to the State Hospital until 1992 or 1993. Even where patients were not followed up until the end of 2001, for most patients records were available to cover most of the follow-up period. So the mean number of years of follow-up case record data was 8.8 years for administrative outcomes; 8.8 years for forensic outcomes; and 8.6 years for clinical and social outcomes. Scottish Criminal Records data was available for 135 (79.9%) patients.

A first follow-up interview was conducted with 106 (66.3% of the 160 alive) patients, and a second follow-up interview with 94 (59.5% of the 158 alive). At least one follow-up interview was conducted with 107. Third party interviews were conducted for 123 (76.9%) patients and 128 (81.0%) patients, for first and second follow-up respectively. Not all patients interviewed had all the rating scales completed.

Cases with missing data compared with cases with complete data

The nineteen cases where there was incomplete case record follow-up data were compared with the cases where case record follow-up data were complete, examining case record and interview data available at baseline. There were only four variables where there was a significant difference between the two groups. The missing cases were less likely to have shown a poor response to medication (according to their psychiatrists), were less likely to

have self-harmed, were more likely to have had non-compliance with treatment associated with the index behaviour, and were less likely to have a parental history of 'other mental illness'. Similarly, the 48 cases with no follow-up interviews at all were compared with the cases where at least one follow-up interview was conducted. There were only three variables where there was a significant difference between the two groups. The cases with no interviews were less likely to have self-harmed, were less likely to have parental alcohol or drug abuse, and were less likely to have abused alcohol.

Data storage and processing

Data from records and interviews were collected on specifically designed forms. These were stored in files and entered into a Statistical Package for Social Sciences (SPSS) database. Various versions of SPSS (8 to 19) were used from the initial study, through follow-up, to final data analysis.

Statistical analysis

Descriptive statistics used were numbers and proportions (percentages) for categorical variables; and means, medians and ranges for continuous variables.

For bivariate analyses the method depended on the nature of the variables being considered. When comparing two groups (e.g. patients who were re-admitted to high security to patients who were not) on categorical variables (e.g. gender) the chi-square test was used. When comparing two groups on continuous variables (e.g. age) the independent samples t-test was used. When comparing continuous variables within patients at two points in time (e.g. score on a rating scale at baseline and follow-up interviews) the paired samples t-test was used. When comparing three groups (e.g. patients who remained in high security, patients who left high security but remained in institutions, and patients who reached the community) on categorical variables the chi-square test was used. When comparing three groups on a continuous variable one-way analysis of variance (ANOVA) was used. Where association between two continuous variables (e.g. PCL-R score and number of convictions) was examined, Pearson's correlation coefficient was used.

Where time to event (e.g. time to leave high security, time to reach community, time to remission of psychosis) was examined survival analysis was used and Kaplan Meier survival curves were plotted. Survival analysis allows consideration of not just whether an outcome occurred but also when it occurred. Kaplan-Meier curves can take into account censored

data. Cases lost to follow-up and cases where the follow-up time was shorter than other cases may or may not have achieved a particular outcome. Such cases are censored. On a Kaplan-Meier curved a vertical tick mark indicates a case lost to follow-up where that cases survival time has been 'right censored'.

Logistic regression was used to examine the independent association between a number of variables (e.g. PCL-R score, age, previous convictions, substance dependence) and a yes/no outcome (e.g. conviction during follow-up). Logistic regression models for each outcome were developed and used as follows.

First models were developed for the dependent outcome variable (e.g. left high security or convicted during follow-up) using various baseline and follow-up factors as independent variables. Given the number of patients in the sample (169) no more than 16 variables were used in each model. Variables were selected based on the literature, bivariate analyses and clinical relevance. Where variables were highly correlated (Pearson's r >0.7 or <-0.7) only one of the variables was used. A model was developed by entering baseline variables; then follow-up variables were added to develop a further model; finally backwards conditional stepwise withdrawal of variables was used to develop the best fitting model. This enabled an examination of the relative association of outcomes with baseline and follow-up variables, identification of variables that were significantly associated with outcomes after adjusting for other variables in the model, and identification of the best combination of independent variables that 'predicted' (mathematically not causatively) the dependent outcome variable.

Then a model was developed using just variables relating to course of psychosis and comorbid conditions as independent variables to look more specifically at the clinical correlates of outcomes. This regression model was developed by entering PCL-R score, antisocial personality disorder, substance dependence, proportion of follow-up with positive symptoms, proportion of follow-up with negative symptoms and index behaviour precipitated by psychosis as independent variables. This enabled identification of the clinical associates of outcomes after adjusting for other clinical variables.

For each logistic regression model goodness of fit was examined using the Hosmer and Lemeshow test; the proportion of the variability in the dependent variable accounted for by the model was estimated using the Cox and Snell R Square and the Nagelkerke R Square; and the proportion of cases correctly classified by the model was established. For specific independent variables in any regression model adjusted odds ratios (Exp B) with 95%

confidence intervals and statistical significance determined by the Wald statistic were calculated.

Ethical approval

The State Hospital Survey was approved by the Research Ethics Committee at the State Hospital. Permission was sought from patients' consultants to approach patients to take part in the study.

The follow-up study received ethical approval from the Multi-centre Research Ethics Committee (MREC) for Scotland, and from the Local Research Ethics Committees (LRECs) in each area where patients were located. The Scottish Prison Service Research Committee also approved it. In each case permission was sought from the patient's current consultant psychiatrist to approach the patient to take part in the study, or for prisoners a representative of the prison governor was approached for permission.

The role of the author

The State Hospital Survey was designed by Eve Johnstone, David Owens, Martin Humphreys, Lindsay Thomson and John Bogue. Interviews and case note data were collected by Lindsay Thomson and John Bogue. The VRAG, H-10 and PCL-R assessments were made by Michelle Davidson under the supervision of Lindsay Thomson and me.

I was primarily responsible for the follow-up study. The follow-up study was designed by Lindsay Thomson, John Crichton and me. I led all aspects of the follow-up study under the supervision of Lindsay Thomson. I was responsible for gaining ethical approval, tracing patients, liaising with various services and clinicians, contacting and working with the Scottish Criminal Records Office, designing interview and records data collection forms, undertaking the first follow-up interviews and gathering the majority of the records data, setting up databases and data analysis. Jon Steele undertook the second follow-up interviews and collected some of the case record data. Joyce McKay provided administrative support: she made up data collection packs for interviews and case record reviews, and she entered data into the database. Caroline Brett undertook preliminary data analysis. I undertook virtually all of the statistical analysis presented in this thesis. Patrick Miller and Andrew McIntosh provided statistical advice. I wrote all of the material presented in this thesis. I conducted the literature reviews alone.

Chapter 6
Baseline characteristics of sample

Information from case records

Demographics

The demographic details of the sample are set out in table 6.1. Most were male, white, Scottish and single. Most were unemployed and few of them or their fathers had ever had skilled work. The average age was just under 36 years, and ages ranged from 19 to 63 years.

Legal status

Over half had been given a psychiatric disposal by a criminal court, two-fifths were transferred from prison and a quarter were detained on civil orders (table 6.2). The latter group had been transferred from less secure hospitals as their behaviour was not manageable. Just over half were subject to special restrictions. These cases had committed serious offences and/or were judged to pose a risk of serious harm to others. In these cases leave, transfer and discharge cannot be granted without the permission of the Scottish Government (or Scottish Office prior to 1999).

Psychiatric history

Most had had previous contact with psychiatric services and four-fifths had been in-patients (table 6.3). The average age at first contact with services was about 20 years and the average age at first admission was about 22 years. The average number of previous admissions was almost 6 and at baseline the cases had spent a mean total of 10 years in any hospital (including time in the State Hospital prior to the study). A quarter had had an admission to the State Hospital before the baseline episode. Two-thirds had a history of self-harm. Unsurprisingly the majority had previously been treated with anti-psychotics, both orally and by depot injection, but many had been on other psychotropic medications too. Most patients had been in the State Hospital for less than 5 years, almost a third had been there less than a year. A small group had been in the hospital for more than 15 years (figure 6.1).

Medical history

Two-fifths had some form of chronic physical illness (table 6.4).

Offending history

Four-fifths had previous convictions, including convictions for serious offences including homicide, sexual and non-sexual violence (table 6.5). Just under a half had been admitted because of a criminal offence. This was less than the number admitted on criminal procedure orders as some of those on the latter orders had been admitted to other hospitals first before being transferred to the State Hospital, as reflected in table 6.6 where source of admission is set out. Most index offences were serious, a third were homicides, but a third of the index offences were minor. Putting previous and index offences together, 90% had a conviction, over a quarter had killed and two-thirds had been convicted of a serious violent or sexual offence at some point.

Circumstances of behaviour leading to admission

Table 6.6 sets out the behaviours leading to admission. Victims were usually known, less often relatives, and least frequently strangers. The group with no victims had committed non-violent offences or had no index offence but may have attacked a member of staff, patient or prisoner prior to transfer to the State Hospital. Over two-thirds were psychotic at the time of the index behaviour, although this may or may not have driven the behaviour. Some were intoxicated with or withdrawing from alcohol or drugs. Non-compliance featured in a minority of cases.

Personal history

Adverse events in childhood were not uncommon and few succeeded in education (table 6.7). A quarter had been in special education, mostly due to behavioural problems rather than learning disability. A significant minority had family histories of mental illness and substance misuse.

Alcohol and drug history

Two thirds had abused alcohol or drugs at some point in their lives (table 6.8). About a half had abused alcohol, and a half drugs.

Comorbid diagnoses

Two thirds had at least one additional diagnosis (table 6.9). A third had antisocial personality disorder, a quarter alcohol dependence, a quarter drug dependence and 1 in 20 a learning disability.

Life-time symptoms

Lifetime-psychopathology (table 6.10) was dominated by persecutory delusions (about 9 in 10), auditory hallucination (about 9 in 10), irritability (about 9 in 10), nuclear syndrome (first rank symptoms; 8 in 10), loss of interest/concentration (7 in 10), residual syndrome (negative symptoms; two-thirds). Four in 10 had had incoherent speech indicating formal thought disorder, and 1 in 10 had been catatonic.

Table 6.1. Demographic details.

Mean age (range)		35.7 years (19 – 63)
Gender	Male	150 (88.8)
	Female	19 (11.2)
Country of origin	Scotland	150 (88.8)
	England	12 (7.1)
	Northern Ireland	6 (3.6)
	Ghana	1 (0.6)
Ethnic origin	Caucasian	168 (99.4)
	Scottish-Ghanaian	1 (0.6)
Marital status on admission	Single	144 (85.2)
	Married	2 (1.2)
	Separated	4 (2.4)
	Divorced	15 (8.9)
	Widowed	2 (1.2)
	Co-habiting	2 (1.2)
Employment status when last in community	Employed	50 (29.6)
	Unemployed	119 (70.4)
Best occupational level (social class)	I	2 (1.2)
	II	7 (4.1)
	III non-manual	10 (5.9)
	III manual	40 (23.7)
	IV	44 (26.0)
	V	49 (29.0)
	Unemployed / ill health	17 (10.1)
Father's socioeconomic status	I	5 (3.0)
	II	15 (8.9)
	III non-manual	6 (3.6)
	III manual	32 (18.9)
	IV	40 (23.7)
	V	19 (11.2)
	Unemployed / ill health / retired	18 (10.7)
	Dead / unknown	34 (20.1)

Table 6.2. Legal status.

Legal classification at baseline	Civilly detained	43 (25.4)
	Detained under criminal procedures legislation	94 (55.6)
	Transferred from prison to hospital	32 (18.9)
Subject to restrictions (restriction order or direction)		88 (52.1)

Table 6.3. Previous psychiatric history

Any previous contact with mental health services	
None	6 (3.6)
Outpatient only	8 (4.7)
Prison only	18 (10.7)
In-patient	137 (81.1)
Age – *mean (range)*	
At first contact	19.8 (5 – 41)
Age at first admission	21.8 (5 – 41)
Psychiatric admissions – mean (range)	
Number of admissions	5.9 (1-46)
Time spent in hospital prior to baseline assessment	9.4 years (1 month – 36 years)
Referral to the State Hospital previously	
Previous admission	43 (25.4)
Number of previous admissions (range)	0 - 3
Previous admission refused	18 (10.7)
Time between refusal and first admission – mean (range)	2.25 years (1 month – 7 years)
Self-harm	
Any	106 (62.7)
Mean number of episodes (range)	1.4 (0-9)

Table 6.3 (continued). Previous psychiatric history

Previous physical treatments	
Oral anti-psychotics	168 (99.4)
Depot anti-psychotics	150 (88.8)
Lithium	45 (26.6)
Anti-cholinergics	130 (76.9)
Anti-depressants	66 (39.1)
Benzodiazepines	61 (36.1)
Anti-libidinals	12 (7.1)
Anti-convulsants	44 (26.0)
ECT	49 (29.0)
Mean time in State Hospital since admission (range)	4.0 yrs (0 – 24.3)

Figure 6.1. Time in State Hospital, from admission, at baseline.

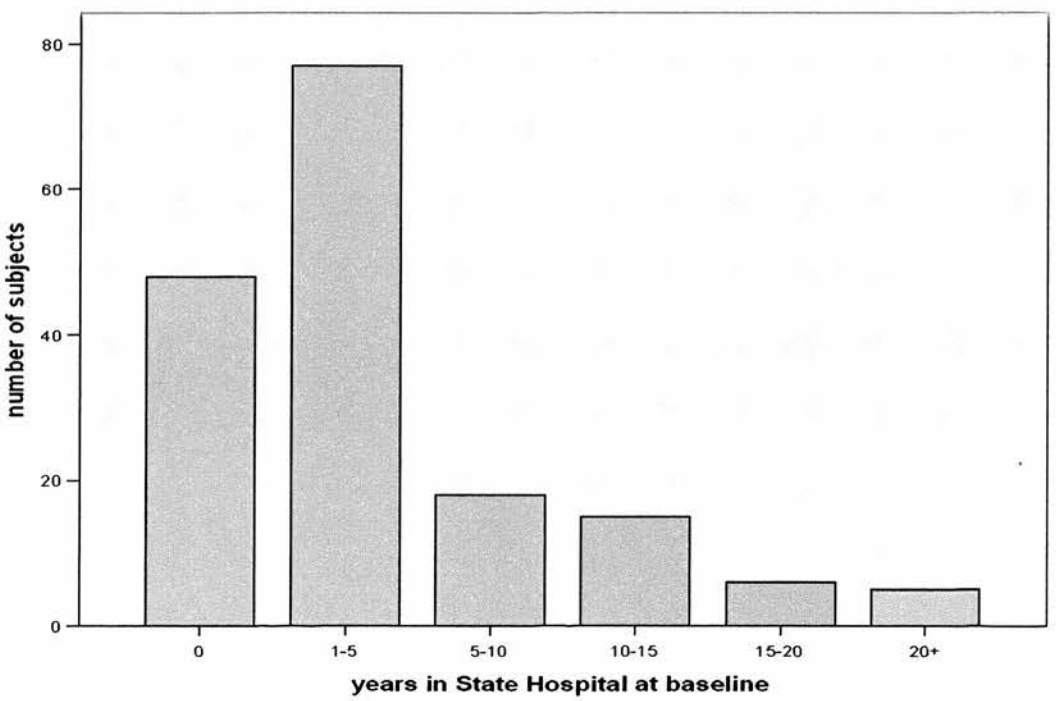


Table 6.4. Medical history

Chronic physical illness	70 (41.4)
Long term medical treatment	27 (16.0)
Epilepsy	23 (13.6)

Table 6.5. Criminal history

Previous convictions	
Any	141 (83.4)
Homicide	20 (11.8)
Non-fatal, non-sexual violence	68 (40.2)
Sexual offending	23 (13.6)
Dishonesty	80 (47.3)
Fire raising or drug offences	26 (15.4)
Minor offences	97 (57.4)
Average number of previous convictions (range)	11.4 (0 – 65)
Index offence	
Any	77 (45.6)
Homicide	27 (16.0)
Non-fatal, non-sexual violence	20 (11.8)
Sexual offending	6 (3.6)
Minor	24 (14.2)
Any convictions (as previous or index offences)	
Any	151 (89.3)
Homicide	47 (27.8)
Non-fatal, non-sexual violence	80 (47.3)
Sexual offending	29 (17.2)
Any serious offence (above 3 categories)	118 (69.8)

Table 6.6. Circumstances of admission to the State Hospital

Admitted from	
Court	69 (40.8)
Prison	33 (19.5)
Hospital	67 (39.0)
Index offence (see table 6.5)	77 (45.6)
Transferred from prison or another hospital (no index offence)	92 (54.4)
Reason for transfer where no index offence	
Physical violence	55 (32.5)
Absconding	17 (10.1)
Self-harm	19 (11.2)
Menace	49 (29.0)
Other	48 (28.4)
Victims of incident leading to admission	
None	52 (30.8)
Spouse	3 (1.8)
Close relative	19 (11.2)
Known	68 (40.2)
Stranger	27 (16.0)
Precipitants to index offence or behaviour	
Psychosis	116 (68.6)
Argument	22 (13.0)
Alcohol intoxication	29 (17.2)
Drug intoxication	6 (3.6)
Drug or alcohol withdrawal	27 (16.0)
Non-compliance with medication	24 (14.2)

Table 6.7. Personal and developmental history

Childhood	
Birth problem (n=147)	22 (14.9)
Abnormal infant development (n=155)	26 (16.8)
Significant events in childhood	118 (69.8)
Physical abuse	25 (14.8)
Sexual abuse	18 (10.7)
Education	
Mainstream education	*127 (75.1)*
University / college	4 (2.4)
Gained school leaving qualifications	30 (17.8)
No qualifications	84 (49.7)
Attainment level unknown	3 (1.8)
'Special' education	*42 (24.9)*
List D / secure school	31 (18.3)
Remedial education	10 (5.9)
School for deaf	1 (0.6)
Family history (n=168)	
Both parents normal	66 (40.2)
One parent normal	125 (74.4)
Parental history of psychosis	9 (5.4)
Parental history of other mental illness	56 (33.3)
Parental history of alcohol or drug misuse	51 (30.4)

Table 6.8. Alcohol and drug history.

Alcohol or drug abuse	*115 (68.0)*
Alcohol abuse	*91 (53.8)*
Drug abuse	*90 (53.3)*
Morphine / heroin	23 (13.6)
Other opiates	15 (8.9)
Amphetamine	30 (17.8)
Cannabis	72 (42.6)
Hallucinogen	53 (31.4)
Barbiturate	6 (3.6)
Benzodiazepine	19 (11.2)
Solvent	26 (15.4)
Other specific substances	5 (3.0)
Multiple substances	62 (36.7)
Intra-venous	18 (10.7)

Table 6.9. Co-morbid diagnoses (Feighner criteria).

Any co-morbid diagnosis	109 (64.5)
Number of co-morbid diagnoses	
One	58 (34.3)
Two	33 (19.5)
Three	18 (10.7)
Specific co-morbid diagnoses	
Secondary depression	17 (10.1)
Mental retardation	8 (4.7)
Alcohol dependence	42 (24.9)
Drug dependence	46 (27.2)
Anti-social personality disorder	56 (33.1)

Table 6.10. Life-time PSE psychopathology at baseline.

Nuclear symptoms of schizophrenia	137 (81.1)
Catatonic syndrome	21 (12.4)
Incoherent speech	70 (41.4)
Residual syndrome	105 (62.1)
Depressive delusions/hallucinations	25 (14.8)
Simple depression	107 (63.3)
Obsessional symptoms	16 (9.5)
General anxiety	81 (47.9)
Situational anxiety	16 (9.5)
Hysteria	5 (3.0)
Affective flattening	101 (6.0)
Hypomania	42 (24.9)
Auditory hallucinations	146 (86.4)
Persecutory delusions	147 (87.0)
Delusions of poisoning	28 (16.6)
Delusions of reference	69 (40.8)
Grandiose/religious delusions	75 (44.4)
Sexual/fantastic delusions	96 (56.8)
Visual hallucinations	66 (39.1)
Olfactory hallucinations	11 (6.5)
Overactivity	23 (13.6)
Slowness	58 (34.3)
Non-specific psychosis	85 (50.3)
Depersonalisation	9 (5.3)
Depression special features	24 (14.2)
Agitation	82 (48.5)
Self neglect	65 (38.5)
Ideas of reference	19 (11.2)
Tension	23 (13.6)
Lack of energy	4 (2.4)
Worrying	55 (32.5)
Irritability	152 (89.9)
Social unease	67 (39.6)
Loss of interest / concentration	121 (71.6)
Hypochondriasis	18 (10.7)
Depression other symptoms	42 (24.9)
Organic impairment	4 (2.4)
Sub-cultural delusions/hallucinations	0

Interviews with patients

About half the patients interviewed had delusions and a third had hallucinations according to the Krawiecka. The mean Krawiecka total score was 7.1 (S.D. 5.2) with a median of 7.0 (range 0 – 19). As ascertained from the Krawiecka assessment, 96 (60.0%) had reality distortion (delusions and/or hallucinations), 17 (10.6%) had disorganization and 51 (31.9%) had psychomotor poverty.

Symptoms of depression were uncommon using the Montgomery-Asberg scale. The mean Montgomery-Asberg total score was 5.8 (S.D. 6.1) with a median of 4.5 (range 0 – 32).

Using the AIMS and TAKE, 13 patients (8.1%) had tardive dyskinesia, 135 (84.4%) had parkinsonism and 83 (51.9%) had akathisia.

The detailed item-by-item results of assessments with psychopathology and side-effect ratings scales at baseline are in Appendix C1.

Medication

Almost all patients were on an anti-psychotic medication (table 6.11). Regular anti-psychotic was usually given by depot injection. Over one in ten were on clozapine, lithium, an anti-depressant, an anti-convulsant or a sedative. Most were on anti-cholinergic medication.

Interviews with psychiatrists

Psychiatrists (table 6.12) were of the opinion that two-thirds had positive symptoms (concurring with patient interviews) and three-quarters negative symptoms (an over-estimate compared to patient interviews). Psychiatrists under-estimated the prevalence of personality disorder, but their estimates of learning disability were accurate. The most common treatment problem reported was poor response to medication, and a number of potential problems following discharge were highlighted. Over a third of patients had grounds access within the hospital. Almost 6 in 10 were said not to require the security of the State Hospital, and a similar proportion had not been referred on. The main single reason for not referring on patients perceived not to need high security care was lack of adequate local facilities.

Table 6.11. Medication prescribed at the time of baseline assessment (n=164).

Medication	Number of patients (%)	Mean dose*	Dose range*
ANTI-PSYCHOTICS			
Any anti-psychotic (oral or depot)	162 (98.8)	1193	40 - 6300
Oral anti-psychotics	161 (98.2)	847	40 - 3600
Regular only	14 (8.5)		
As required only	43 (26.2)		
Regular & as required	104 (63.4)		
Depot anti-psychotics	106 (64.6)	1000	125 - 5000
Both oral & depot anti-psychotics	105 (64.0)	2076	388 - 6300
Depot with ...			
Regular oral only	10 (6.1)		
As required oral only	25 (15.2)		
Both as required and regular oral	70 (42.7)		
Clozapine	22 (13.4)	512	250-900
OTHER MEDICATIONS			
Lithium	17 (10.4)	1220	400 - 3120
Anti-depressant	25 (15.2)		
Hypnotic	22 (13.5)		
Regular	6 (3.7)		
As required	16 (9.8)		
Anti-convulsant	25 (15.2)		
Anti-cholinergic (regular or as required)	103 (62.8)		
Anti-libidinal	2 (1.2)		
Medication for physical health problem	103 (62.8)		

* Doses are in mg and are chlorpromazine equivalents except for clozapine and lithium.

Table 6.12. Structured interviews with psychiatrists (n=156).

Current problems:	
Positive psychotic symptoms	101 (64.7)
Negative psychotic symptoms	115 (73.7)
Neurotic symptoms	17 (10.9)
Affective symptoms	18 (11.5)
Organic disorder	9 (5.8)
Mental handicap	10 (6.4)
Personality disorder	24 (15.4)
Autism	1 (0.6)
Treatment problems:	
Poor response to medication	94 (60.3)
Non-compliance with medication	24 (15.4)
Lack of co-operation with staff	32 (20.5)
Lack of co-operation with therapies	28 (17.9)
Failure to relate to others	67 (42.9)
Persistent attempts at self-harm	8 (5.1)
Persistent aggression towards others	32 (20.5)
On discharge likely:	
Non-cooperation with supervision	97 (62.2) [Don't know 11(7.1)]
Misuse of alcohol or drugs	65 (41.7) [Don't know 20 (12.8)]
Abscond from lesser security	37 (23.7) [Don't know 1 (0.6)]
Problems due to ongoing symptoms	114 (73.1)
Behavioural problems	76 (48.7) [Don't know 7 (4.5)]
Danger to community	51 (32.7) [Don't know 16 (10.3)]
Re-offending	81 (51.9) [Don't know 16 (10.3)]
Serious re-offending	30 (19.2) [Don't know 17 (10.9)]
Risk of suicide	1 (0.6)

Table 6.12 (continued). Structured interviews with psychiatrists (n=156).

Ground parole:	
Currently has access to grounds unescorted	57 (36.5)
Currently suitable for access to grounds unescorted	65 (41.7) [Don't know 53(34.0)]
Does patient require the security of the State Hospital?	
Yes	50 (32.1)
No	91 (58.3)
Don't know	15 (9.6)
Has the transfer /discharge process been initiated?	
Yes – not imminent	59 (37.8)
Yes – transfer imminent	8 (5.1)
No	89 (57.1)
Reasons for no transfer/discharge plan, where State Hospital not necessary	
Secretary of State likely to refuse	1 (0.6)
Patient does not wish to leave	0
Family opposed	0
Clinical team in disagreement	1 (0.6)
Counter-therapeutic to move on	1 (0.6)
Lack of local facilities	23 (14.7)
Other reasons	32 (20.5)
(e.g. recent change of psychiatrist, transferred from prison, awaiting court appearance)	

PCL-R, VRAG and H-10

For the 161 cases where there were sufficient items scored to give a pro-rated total (table 6.13), the mean PCL-R score was 14.5 (S.D. 6.9) and the median score was 15.6 (range 1.1 - 31). Using the 'North American' cut-offs, only one (0.6%) patient was a psychopath (score 30 or more), 43 (26.7%) were moderately psychopathic (scores 21 – 30), 60 (37.3%) were mildly psychopathic (scores 11-20) and 47 (29.2%) were not psychopathic. Using 'UK' cut offs 9 (5.6%) were psychopaths (score of 25 or more) and 79 (49.1%) were moderately psychopathic (scores 15 – 24).

The average factor 1 score was 5.0 (S.D. 3.3) and the median score was 5.0 (range 0-15). The average factor 2 score was 7.7 (S.D. 3.7) and the median score was 8.0 (range 0-16). Using the 85th percentile from UK Male Offenders (Hare 2004), which is the percentile that gives the UK cut off of 25 for the total score, 19 (11.6%) had high factor 1 (10 or above) scores and 16 (9.9%) had high factor 2 scores (12 or above).

The average H10 total score was 13.4 (S.D. 3.4), and the median was 14.0 (range 6 – 20). Most items were definitely or partially present in most cases, except for personality disorder and psychopathy (table 6.14). The average patient scored 2 on 4 or 5 items, 1 on 2 or 3 items and zero on 1 or 2 items (figure 6.2).

The average VRAG score was 2.02 (S.D. 10.6), and the median was 1.0 (range -21 to 26). Table 6.15 shows the individual item scores. As would be expected, most patients fell in the medium risk 'bins', with few in the lowest and highest groups (figure 6.3).

Table 6.13. Ratings of individual items of the PCL-R.

Item	Number of cases where item could be rated	SCORES		
		0 N %	1 N %	2 N %
1. Glibness/Superficial Charm	164	129	32	3
		78.7	*19.5*	*1.8*
2. Grandiose Sense of Self Worth	164	131	26	7
		79.9	*15.9*	*4.3*
3. Need for Stimulation/Proneness to Boredom	164	107	47	10
		65.2	*28.7*	*6.1*
4. Pathological Lying	163	123	32	8
		75.5	*19.6*	*4.9*
5. Conning/Manipulative	163	105	38	20
		64.4	*23.3*	*12.3*
6. Lack of Remorse or Guilt	158	34	54	70
		21.5	*34.2*	*44.3*
7. Shallow Affect	163	87	46	30
		53.4	*28.2*	*18.4*
8. Callous/Lack of Empathy	163	77	42	44
		47.2	*25.8*	*27.0*
9. Parasitic Lifestyle	163	74	79	10
		45.4	*48.5*	*6.1*
10. Poor Behavioural Controls	163	41	54	68
		25.2	*33.1*	*41.7*
11. Promiscuous Sexual Behaviour	164	103	36	25
		62.8	*22.0*	*15.2*
12. Early Behavioural Problems	163	99	34	30
		60.7	*20.9*	*18.4*
13. Lack of Realistic, Long-term Goals	161	41	51	69
		25.5	*31.7*	*42.9*
14. Impulsivity	161	30	67	64
		18.6	*41.6*	*39.8*
15. Irresponsibility	162	30	103	29
		18.5	*63.6*	*17.9*
16. Failure to Accept Responsibility for Own Actions	163	51	51	61
		31.3	*31.3*	*37.4*
17. Many Short-term Marital Relationships	132	124	6	2
		93.9	*4.5*	*1.5*
18. Juvenile Delinquency	163	85	44	34
		52.1	*27.0*	*20.9*
19. Revocation of Conditional Release	132	44	18	70
		33.3	*13.6*	*53.0*
20. Criminal Versatility	164	72	46	46
		43.9	*28.0*	*28.0*

Table 6.14. Ratings of individual items of H-10 scale of HCR-20.

Item	Number of cases where item could be rated	SCORES		
		0 N %	1 N %	2 N %
H1. Previous Violence	163	0	4	159
			2.5	*97.5*
H2. Young Age at First Violent Incident	163	5	67	91
		3.1	*41.1*	*55.8*
H3. Relationship Instability	163	13	40	110
		8.0	*24.5*	*67.5*
H4. Employment Problems	159	35	35	89
		22.0	*22.0*	*56.0*
H5. Substance Use Problems	163	51	32	80
		31.3	*19.6*	*49.1*
H6. Major Mental Illness	164	0	16	148
			9.8	*90.2*
H7. Psychopathy	164	76	79	9
		46.3	*48.2*	*5.5*
H8. Early Maladjustment	162	41	66	55
		25.3	*40.7*	*34.0*
H9. Personality Disorder	164	70	36	58
		42.7	*22.0*	*35.4*
H10. Prior Supervision Failure	163	32	46	85
		19.6	*28.2*	*52.1*

Figure 6.2. Bar charts showing number of H-10 items where subjects scored zero, one and two.

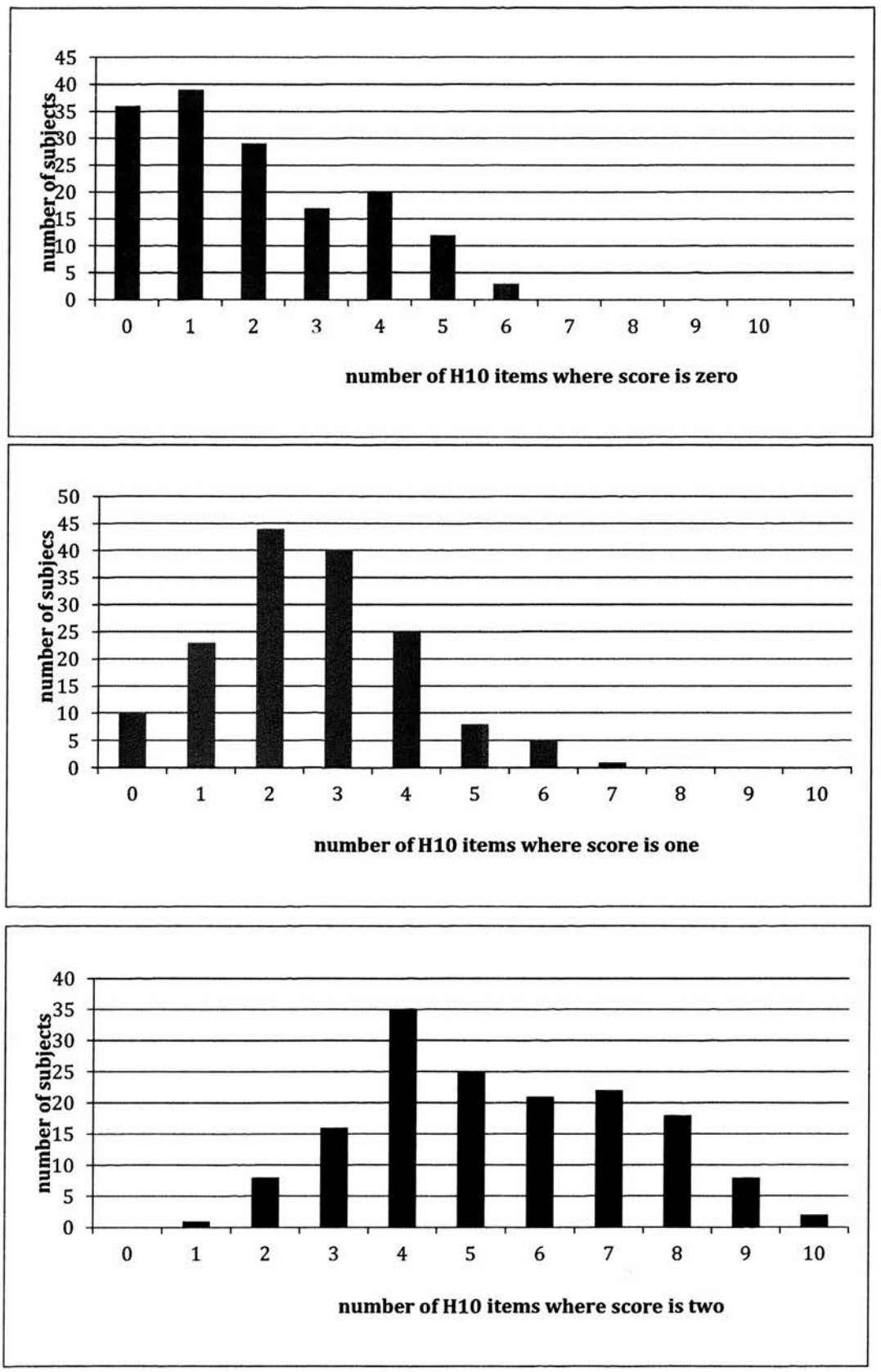
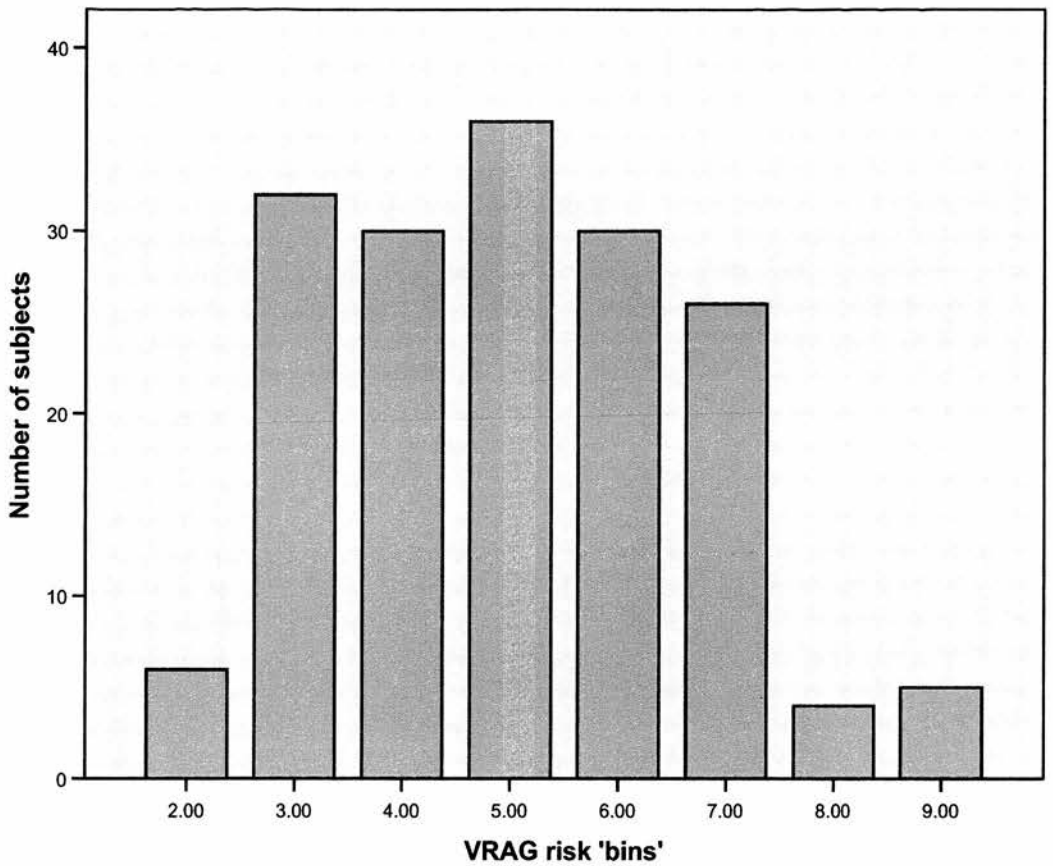


Table 6.15. Ratings of individual items of the VRAG.

Item	Number of cases where item could be rated	SCORES				
		Criterion N %	Criterion N %	Criterion N %	Criterion N %	Criterion N %
1. Lived with both biological parents to age 16	164	Yes (-2)	No (+3)			
		83	81			
		50.6	*49.4*			
2. Elementary School Maladjustment	162	No Problems (-1)	Slight or Moderate Problems (+2)	Severe Problems (+5)		
		75	48	39		
		46.3	*29.6*	*24.1*		
3. History of alcohol problems (parental, teenage, adult, at prior offence, at current offence)	164	None (-1)	1 or 2 items (0)	3 items (+1)	4 or 5 items (+2)	
		37	64	39	24	
		22.6	*39.0*	*23.8*	*14.6*	
4. Marital status (at the time of or prior to index offense)	164	Ever married (-2)	Never married (+1)			
		39	125			
		23.8	*76.2*			
5. Criminal history score for nonviolent offenses prior to the index offense	164	Score 0 (-2)	Score 1 or 2 (0)	Score 3 or above (+3)		
		45	25	94		
		27.4	*15.2*	*57.3*		
6. Failure on prior conditional release	164	No (0)	Yes (+3)			
		89	75			
		54.3	*45.7*			
7. Age at index offense	164	39 or over (-5)	34 – 38 (-2)	28 – 33 (-1)	27 (0)	26 or less (+2)
		10	17	41	13	83
		6.1	*10.4*	*25.0*	*7.9*	*50.6*
8. Victim Injury	164	Death (-2)	Hospitalized (0)	Treated and released (+1)	None or slight (+2)	
		42	18	15	89	
		24.9	*10.7*	*8.9*	*52.7*	
9. Any female victim (for index offense)	164	Yes (-1)	No (+1)			
		81	83			
		49.4	*50.6*			
10. Meets DSM criteria for any personality disorder	164	No (-2)	Yes (+3)			
		101	63			
		61.6	*38.4*			
11. Meets DSM criteria for schizophrenia	164	Yes (-3)	No (+1)			
		155	9			
		94.5	*5.5*			
12. Psychopathy Checklist-Revised score	162	4 or under (-5)	5-9 (-3)	10-14 (-1)	15-24 (0)	25-34 (+4)
		16	25	33	79	9
		9.9	*15.4*	*20.4*	*48.8*	*5.6*

Figure 6.3. Number of subjects falling into each of the VRAG risk 'bins'.



Discussion

A number of studies have described various characteristics of patients in the English high security hospitals, including sources of admission, legal status, behaviour leading to admission and length of stay (Street and Tong 1960; Greenland 1970; Tennent et al. 1974; Tidmarsh 1980; Royal College of Psychiatrists 1983; Hamilton 1985; Naismith and Coldwell 1990; Hamilton 1990; Maden et al. 1993; Vielma et al. 1993; Wong et al. 1993; Shubsacks et al. 1995; Dolan and Parry 1996; Taylor 1997; Taylor et al. 1998; Heads et al. 1998; Jamieson et al. 2000; Leese et al. 2006). There have been fewer descriptions of patients in high security care in Scotland (Mitchell and Murphy 1975; Brooks and Mitchell 1975; Baird 1984; Thomson et al. 1997). I reviewed the studies pre-dating 2000 in my MPhil Thesis (Darjee 2000). Schizophrenia has been the most prevalent single diagnosis in high security hospitals in the UK.

Medium secure units have played an increasingly important role in the provision of secure care for psychiatric patients in England and Wales since the 1980s and in Scotland since 2000. In effect, at the time of this study, patients requiring medium secure care in Scotland were admitted to the State Hospital, as there were no local units with more than low security provision. A few studies have reported the characteristics of patients in medium secure units in England ((Higgins, 1981; Gudjonsson and MacKeith 1983; Faulk and Taylor, 1986; Bullard and Bond 1988; Mohan et al. 1997; Coid et al. 2001; Lelliot et al. 2001; Melzer at al. 2001; Ricketts et al. 2001) and one study has described those in Scotland (Gow et al. 2010).

The baseline characteristics of the sample will be compared with those described in other studies of patients in secure care. Most other studies have described mixed diagnostic groups including patients with learning disabilities, personality disorders and mental illnesses other than schizophrenia Studies may or may not have reported findings for patients with schizophrenia or psychosis separately.

Demographics

The high proportion of male patients was comparable to studies in English high security hospitals and medium secure units (Taylor et al. 1998; Lelliiot et al. 2001), this reflects the general association between male gender and violence and offending. There were far less ethnic minority patients than in English secure settings (Taylor et al. 1998; Coid et al. 2001).

This reflects the demography of the Scottish population compared to England (Office for National Statistics 1999; General Register Office for Scotland 2003). In the English high security hospitals it is notable that there are relatively few ethnic minority patients from areas, such as Wales and the North of England, where there are less people from ethnic minorities in the general population. In Scotland the Afro-Caribbean population is very small compared to other ethnic groups, and it is the Afro-Caribbean group who predominate within non-white patients in English secure settings. The high number of unmarried patients is comparable to findings from English samples (Williams et al. 1999). The average age was slightly younger than in English high security samples (Naismith and Coldwell 1990; Taylor et al. 1998) and similar to or slightly older than those in English medium secure samples (Coid et al. 2001; Lelliot et al. 2001). This may reflect the lack of medium secure units in Scotland at the time.

Legal status

The proportion that were on civil orders was higher than in English high security hospitals (Taylor et al. 1998) and comparable to English medium secure units (Coid et al. 2001), reflecting the lack of local secure provision in Scotland at the time. But most patients had been admitted from criminal settings (prisons or courts) and had committed offences.

Psychiatric history

The high rates of previous treatment were similar to those reported in English samples (Tennent et al. 1974; Maden et al. 1993; Naismith and Coldwell 1996; Taylor et al. 1998; Lelliot et al. 2001). For most patients the events leading to admission to the State Hospital did not initiate contact with mental health services, and treatment for mental illness had been given to most as in-patients in the past. The age of first contact with and admission to services in the early 20s reflects the age of onset of schizophrenia in men. Those who had had contact with services in childhood had mostly been treated for conduct and behavioural problems rather than psychosis, a similar pattern to that described in English special hospital patients with psychosis (Taylor et al. 1998). Where patients had been admitted from other hospitals under civil detention behaviours leading to admission usually involved serious violence, as described in English high security hospitals (Taylor et al. 1998) and medium secure units (Coid et al. 2001).

Offending and aggression

The high rate of previous convictions was similar to that in English samples (Maden et al. 1993; Taylor et al. 1998; Coid et al. 2001; Lelliot et al. 2001). The number with an index offence of homicide was similar to that described by Maden et al. (1993) in the special hospitals, higher than that in admissions to medium secure units (Coid et al. 2001), but lower than that described in patients with psychosis in special hospitals (Taylor et al. 1998). However, if any history of homicide is considered or if civilly detained patients are excluded, then the homicide rate is similar to that reported by Taylor et al. (1998). Almost all patients had a history of serious violence and/or offending if criminal and non-prosecuted behaviour is considered. Where serious violence occurred in hospital, towards staff or other patients, police and prosecutors may have been reluctant to take criminal proceedings forward.

Victims of index offences or behaviours were infrequently strangers, as reported in the literature on schizophrenia and violence (Böker and Häfner 1973; Lindquist 1986; Gottlieb et al 1987; Steadman et al. 1998; Estroff and Zimmer 1994; Milton et al, 2001; Arsenealt et al 2002; Joyal et al. 2004). About a third of those who had a criminal offence leading to admission had attacked strangers, a similar proportion to that described in the English special hospitals (Johnston and Taylor, 2003).

The high proportion that had positive psychotic symptoms at the time of the offence or behaviour leading to admission is similar to that described by Taylor et al. (1998), although it should be noted that a substantial minority did not have such symptoms, and if positive symptoms were present they may not have driven the violence. Taylor et al. (1998) reported that in most patients with 'pure psychosis' symptoms, particularly delusions, drove violence, whilst in those with comorbid personality disorders this was less likely to be the case. If symptoms do not drive violence it cannot be assumed that other factors directly (e.g. disinhibition and impulsiveness) or indirectly attributable to psychosis (e.g. social decline and relationship problems) were not important.

Personal history

Childhood adversity and lack of educational success were common, and have been described in patients with schizophrenia in the English special hospitals (Heads et al. 1997), although few studies have reported the childhood characteristics of mentally ill special hospital

patients. Reiss et al. (1996) found high rates of childhood deprivation, disturbance and institutionalisation in personality disordered patients in Broadmoor Hospital. The family backgrounds of patients in secure settings have rarely been described in published studies. As might be expected, a significant minority had family histories of mental illness and alcohol and/or drug abuse.

Substance misuse

Levels of alcohol and substance misuse in the cohort were higher than reported in a contemporaneous cohort in England (Taylor et al. 1998; Taylor et al. 2008). Alcohol and substance misuse before admission have increased in patients in secure hospitals (McMahon et al. 2003; D'Silva and Ferriter 2003), reflecting increased levels of substance misuse in the community. Although alcohol consumption per person is higher in Scotland than in England (Office for National Statistics 1998), drug use was less likely (National Information and Statistics Division Edinburgh 2002; Home Office 2001). But is important to note the difference between substance use, misuse and dependence; and geographical variations in substance misuse within countries may be important considerations, with perhaps more of the current cohort coming from areas where drug misuse is more prevalent. Intoxication may play a role in violence or offending, even without misuse or dependence.

Comorbid diagnoses

Comorbid substance dependence and antisocial personality disorder were more common than described in patients with schizophrenia in high secure hospitals in England (Taylor et al. 1998; Taylor et al. 2008), and more common than would be expected in a general sample. As highlighted in the literature review, these two comorbidities are important in people with schizophrenia who are aggressive. Few patients had learning disability, but as would be expected, as there is a higher prevalence of schizophrenia in people with learning disability (Doody et al. 1998), the rate (4.7%) is higher than the 1-2% in the general population. Psychopathy is considered below.

Symptoms

There were high levels of life-time symptoms, as one might expect in a cohort of patients with schizophrenia, confirming the life-time presence of features of the illness. Almost all patients had symptoms of 'reality distortion', most had had negative symptoms, a substantial minority had evidence of 'disorganisation' (e.g. though disorder), and most had been irritable and/or hostile.

At interview about two-thirds still had positive symptoms and a third had negative symptoms as rated with the Krawiecka. Many patients had been in hospital for some time and had been chronically unwell. Compared with a study of 'non-forensic' patients with schizophrenia (Johnstone et al. 1991), less had tardive dyskinesia but more had parkinsonism; perhaps reflecting less chronic administration of, but higher dosing with typical anti-psychotics.

Psychiatrists' views

Most were assessed as not needing high security care, reflecting findings in contemporary samples in the English special hospitals (Taylor et al. 1991; Maden et al. 1993; Murray et al. 1994; Shaw et al. 1994 a and b; Maden et al. 1995; Bartlett et al. 1996). This was probably due to lack of local secure facilities (Taylor et al. 1996), lack of long-stay hospital beds (Pullen 1998) and, perhaps, the unpopularity of patients who are chronically psychotic and aggressive (Chiswick 1982). Since these studies the criteria for admission to the high security hospitals in England and, more recently, in Scotland have been tightened; there has been an expansion in medium secure services in England and the creation of such services in Scotland; and in Scotland high security patients have a legal appeal against detention in excessive security. The picture now may be different.

Psychiatrists concurred with interview based assessments of positive symptoms but reported a greater frequency of negative symptoms. This may have been due to the inadequacy of the Krawiecka scale at properly determining the level of negative symptoms. Other assessment methods used at follow-up, the SANS and BPRS, found higher levels of negative symptoms than the Krawiecka (see Chapter 9 and Appendix E). Psychiatrists under-estimated the prevalence of personality disorder. This may have been due to a focus on axis-II rather than axis-I pathology, a belief that personality disorder cannot or should not be diagnosed in people with schizophrenia, attribution of personality dysfunction to mental illness, or reluctance to use a sticky and pejorative label. The presence and nature of comorbid personality dysfunction has important clinical implications in this group of patients, so it is important that personality is assessed and taken into account in the management of these patients.

'Risk scales'

The PCL-R will be considered here, although it is really a personality assessment measure rather than a risk assessment instrument. Few patients reached the 25 point cut-off for a

diagnosis of psychopathy, but any personality measure is best viewed dimensionally rather than categorically (Livesley 2007). The level of psychopathy is comparable with, or perhaps slightly lower than, that found in mixed samples of mentally disordered offenders (Gray et al. 2003; Gray et al. 2004; Darjee 2000; Dernevik et al. 2002; Doyle et al. 2002; Ho et al. 2009), and, unsurprisingly, lower than that reported in personality disordered offenders in secure hospitals (Coid 1992; Reiss et al. 1996; Darjee 2000). In terms of a Scottish comparison groups, Cooke et al. (2001) and Cooke (2003) reported 3% of Scottish prisoners scored 30 or over and 15% scored 20-29; this compares with 0.6% and 27% in the current cohort. Eight percent of the Scottish prisoners scored at or over the suggested UK cut-off of 25; almost 6% of the current cohort were above that threshold. The mean score was 13.8 in the Scottish prisoners compared to 14.5 in the current cohort.

Using the H10 scale of the HCR-20 most patients had multiple risk factors for future violence. In clinical practice the HCR-20 items are not summed to give scores, as it is not an actuarial tool. Rather the present and relevant items are used by an experienced and trained practitioner to construct a risk formulation using clinical judgment rather than maths. For research purposes total scores on the sub-scales have been used. The total score on the H10 scale was similar to that reported in other samples of mentally disordered offenders (Doyle et al. 2002; Gray et al. 2003; Douglas et al. 2003; Gray et al. 2004; Grevatt et al. 2004; McKenzie and Curr 2005; Dernevik et al. 2002; Dolan and Khawaja 2004; Ho et al. 2009).

The VRAG is a 'pure' mathematically weighted actuarial tool. The total VRAG score was lower than that reported in other samples of mentally disordered offenders but the distribution of scores was similar (Quinsey et al. 1998; Grann et al. 2000; Dolan et al. 2002; Harris et al. 2002; Ho et al. 2009). The distribution of VRAG scores was similar to that reported in a cohort of forensic patients with schizophrenia in Sweden (Tengström 2001).

Conclusion

This sample of patients with schizophrenia and histories of serious offending or violence were all the patients from Scotland and Northern Ireland who were held in high security care at the time. Patients had multiple disadvantages of relevance to their clinical treatment, their social functioning and the risk of further offending or violence. There were many similarities between these patients and other samples of patients in high and medium secure settings. Few previous studies have focussed on patients with schizophrenia, even though those with schizophrenia have constituted the largest diagnostic group in most studies. At the time there

were no medium secure units in Scotland. Most patients in the study probably did not need high security care. There are now two medium secure units in Edinburgh and in Glasgow, with a third unit planned in Perth. Patients in high security care now may have different characteristics.

CHAPTER 7
Administrative outcomes

This chapter will look at the administrative outcomes of the sample including changes in legal status, progress through levels of security, associates of progress through levels of security (by comparing patients who remained in high security, patients who remained in an institution and patients who reached the community) and associates of return to high security hospital.

Changes in legal status

Tables 7.1, 7.2 and 7.3 set out the trends over-time in the number of patients on legal orders in hospital and in the community. As illustrated in Figure 7.1, there was an increase in the proportion of informal patients from 0 to 1 in 5, few patients were on community based orders of any type (1 in 10 by 2001), the proportion of patients on restriction orders remained fairly constant, there was a slight reduction in the number of patients detained on civil orders, and a more marked reduction in those detained on prison transfer orders or on non-restricted criminal procedure orders. Sixty-three (37.3%) of the subjects had a change in legal status at some point during follow-up.

Table 7.1. Legal status during follow-up. A. Community based orders.

Type of Order	Any time on order during each follow-up year - N above, *% in italics below*										For whole follow-up period	Average weeks on order (*range*)
	1992 (n= 156)	1993 (n= 168)	1994 (n= 161)	1995 (n= 158)	1996 (n= 155)	1997 (n= 155)	1998 (n= 153)	1999 (n= 152)	2000 (n= 147)	2001 (n= 147)		
Community based order	**2**	**4**	**12**	**13**	**10**	**19**	**18**	**8**	**13**	**16**	**47**	**76.0**
	1.3	***2.4***	***7.5***	***8.2***	***6.5***	***12.3***	***11.8***	***5.3***	***8.8***	***11.0***	***27.8***	***3-391***
Leave of absence from civil detention	0	1	5	4	3	9	9	2	3	4	22	42.6
		0.6	*3.1*	*2.5*	*1.9*	*5.8*	*5.9*	*1.3*	*2.0*	*2.7*	*13*	*3-104*
Leave of absence from hospital order	1	1	4	4	2	4	2	1	2	2	11	61.2
	0.6	*0.6*	*2.5*	*2.5*	*1.3*	*2.6*	*1.3*	*0.7*	*1.4*	*1.4*	*6.5*	*13-148*
Conditional discharge	1	1	2	4	3	4	5	4	6	9	12	118.4
	0.6	*0.6*	*1.2*	*2.5*	*1.9*	*2.6*	*3.3*	*2.6*	*4.1*	*6.1*	*7.1*	*9-376*
Life-license	0	0	0	0	0	1	0	0	1	0	2	11.5
						0.6			*0.7*		*1.2*	*3-20*
Probation	0	1	1	1	2	1	1	0	0	0	2	127.5
		0.6	*0.6*	*0.6*	*1.3*	*0.6*	*0.7*				*1.2*	*97-158*
Guardianship order	0	0	0	0	0	0	0	0	0	0	0	0
Community care order	0	0	0	1	0	1	1	1	1	1	2	124.0
				0.6		*0.6*	*0.7*	*0.7*	*0.7*	*0.7*	*1.2*	*5-243*

Table 7.2. Legal status during follow-up. B. Hospital (or institution) based orders.

Type of Order	Any time on order during each follow-up year - N above, *% in italics below*										For whole follow-up period	Average weeks on order (*range*)
	1992 (n= 156)	1993 (n= 168)	1994 (n= 161)	1995 (n= 158)	1996 (n= 155)	1997 (n= 155)	1998 (n= 153)	1999 (n= 152)	2000 (n= 147)	2001 (n= 147)		
Civil order	**39**	**45**	**42**	**41**	**39**	**38**	**34**	**35**	**33**	**33**	**61**	**320.8**
	25.0	***26.8***	***26.1***	***25.9***	***25.2***	***24.5***	***22.2***	***23.0***	***22.4***	***22.4***	***36.1***	***1-520***
Emergency detention	0	0	0	0	2	3	1	2	2	1	9	0.6
					1.3	*1.9*	*0.7*	*1.3*	*1.4*	*0.7*	*5.3*	*0.2-1*
Short-term detention	0	0	0	0	1	3	1	1	0	1	6	6.9
					0.6	*1.9*	*0.7*	*0.7*		*0.7*	*3.6*	*3.5-16*
Long-term treatment order	39	45	42	41	37	37	34	34	32	32	54	326.1
	25.0	*26.8*	*26.1*	*25.9*	*23.9*	*23.9*	*22.2*	*22.4*	*21.8*	*21.8*	*32.0*	*18-520*
Criminal procedures order	**85**	**92**	**80**	**82**	**78**	**74**	**74**	**69**	**68**	**67**	**101**	**376.9**
	55.2	***54.8***	***50.6***	***51.9***	***50.3***	***47.7***	***48.7***	***45.7***	***46.3***	***45.9***	***59.8***	***39-559***
Remand order or interim hospital order	15	6	1	1	0	0	1	1	0	0	20	12.0
	9.1	*3.6*	*0.6*	*0.6*			*0.7*	*0.7*			*11.8*	*2-19*
Hospital detention after finding of insanity	21	26	22	24	21	21	22	20	20	18	31	394.6
	13.5	*15.5*	*13.7*	*15.2*	*13.5*	*13.5*	*14.4*	*13.2*	*13.6*	*12.2*	*18.3*	*11-520*
Hospital order	24	29	25	22	22	20	16	15	14	12	37	248.1
	15.4	*17.3*	*15.6*	*13.9*	*14.2*	*12.9*	*10.5*	*9.9*	*9.5*	*8.2*	*21.9*	*16-513*

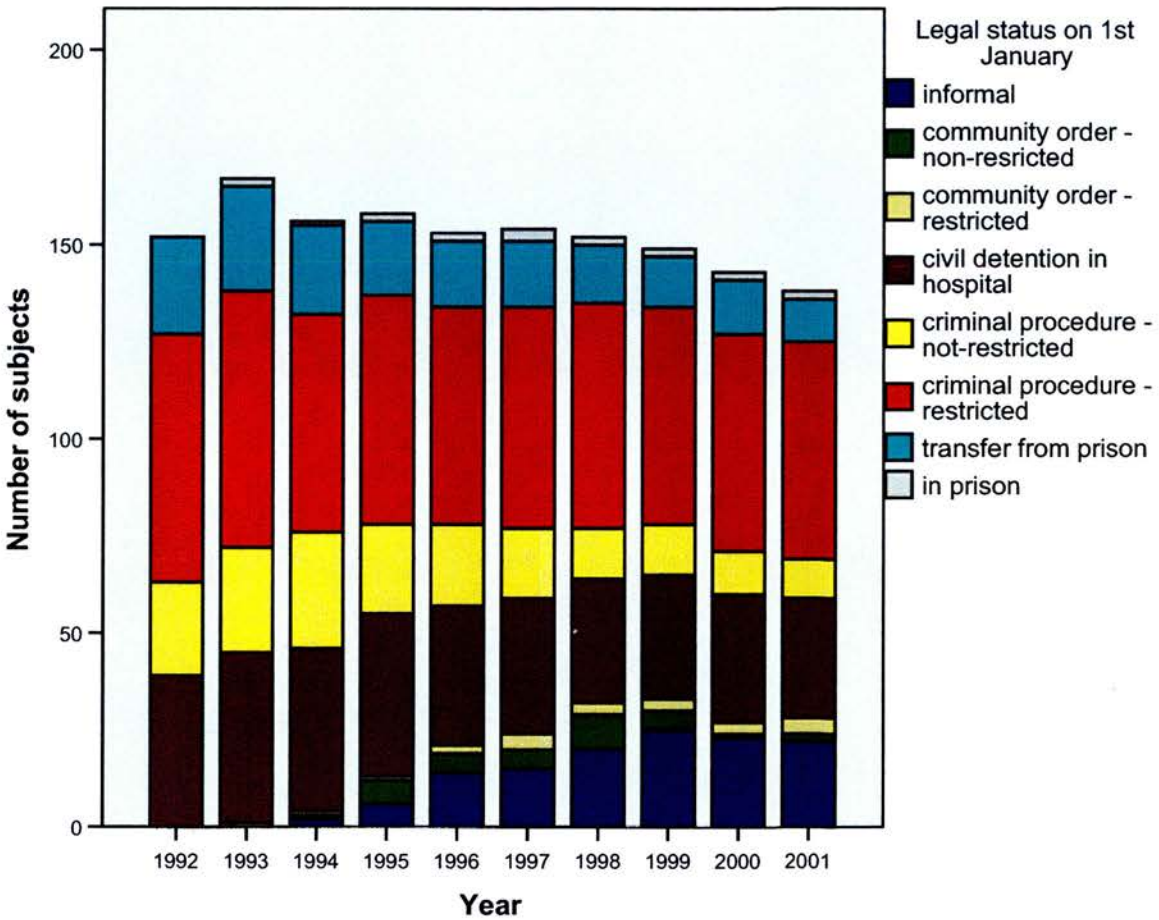
Table 7.2 continued. Legal status during follow-up. B. Hospital (or institution) based orders.

Hospital order with restriction order	41	39	36	36	35	35	36	34	34	37	46	394.6
	26.3	*23.2*	*22.5*	*22.8*	*22.6*	*22.6*	*23.5*	*22.4*	*23.1*	*25.2*	*27.2*	*38-520*
Prison transfer	**26**	**29**	**23**	**19**	**17**	**19**	**16**	**15**	**15**	**11**	**31**	**273.8**
	16.7	***17.3***	***14.4***	***12.0***	***11.0***	***12.3***	***10.5***	***9.9***	***10.2***	***7.5***	***18.3***	***1-520***
Remand transfer	0	2	0	0	0	0	1	2	0	0	3	14.3
		1.2					*0.7*	*1.3*			*1.8*	*1-28*
Sentenced transfer	2	4	3	3	4	4	2	2	2	0	7	178.4
	1.3	*2.4*	*1.9*	*1.9*	*2.6*	*2.6*	*1.3*	*1.3*	*1.4*		*4.1*	*24-416*
Sentenced transfer with restriction direction	24	26	20	16	13	15	14	12	13	11	26	276.1
	15.4	*15.5*	*12.4*	*10.1*	*8.4*	*9.7*	*9.2*	*7.9*	*8.8*	*7.5*	*15.4*	*8-520*
Serving prison sentence	0	3	3	5	6	5	4	4	3	3	10	112.1
		1.8	*1.9*	*3.2*	*3.9*	*3.2*	*2.6*	*2.6*	*2.0*	*2.0*	*5.9*	*8-338*

Table 7.3. Summary of legal status regardless of whether in community or hospital.

Type of Order	Any time on order during each follow-up year - N above, *% in italics below*										For whole follow-up period	Average weeks on order *(range)*
	1992 (n= 156)	1993 (n= 168)	1994 (n= 161))	1995 (n= 158)	1996 (n= 155)	1997 (n= 155)	1998 (n= 153)	1999 (n= 152)	2000 (n= 147)	2001 (n= 147)		
Informal	0	6	8	12	17	22	28	30	29	27	45	178.7
		3.6	*5.0*	*7.6*	*11.0*	*14.2*	*18.3*	*19.7*	*19.7*	*18.4*	*26.6*	*18-435*
Compelled – non-restricted	63	76	68	70	65	64	59	52	48	46	94	310.5
	40.4	*45.2*	*42.5*	*44.3*	*41.9*	*41.3*	*38.6*	*34.2*	*32.7*	*31.5*	*55.6*	*3-520*
Restricted	94	97	77	79	71	74	74	72	70	70	98	307.1
	61.0	*57.7*	*48.7*	*50.0*	*45.8*	*47.7*	*48.7*	*47.7*	*47.6*	*47.6*	*58*	*2-520*

Figure 7.1. *Change in legal status over follow-up period, showing status at start of each year.*



Progress through levels of security

Table 7.4 gives an overview of where patients were placed during the follow-up period. As patients could move between settings in any particular year an individual patient could contribute to the figure for more than one setting in any year. There was a flow of patients from high security care towards other secure care, open units and the community (figures 7.2 and 7.3). The 'final destination' of patients by the end of 2001 (or at the point a patient died or was lost to follow-up) was high security hospital 46 (27.2%), medium secure unit 6 (3.6%), low secure unit 37 (21.9%), open ward 35 (20.7%), community 40 (23.7%) and prison 3 (1.8%) (table 7.5). Of those patients still alive and with known whereabouts about a quarter were in the community 3/8 were in high security and 3/8 were in other hospitals. Only just over a third of patients spent any time in the community during follow-up.

Table 7.4. Placement during follow-up.

Setting	Any time in setting for each follow-up year - N above, *% in italics below*										For whole follow-up period - N (%)	Mean weeks in setting* *(range)*
	1992 (n=156)	1993 (n=168)	1994 (n=161)	1995 (n=158)	1996 (n=155)	1997 (n=156)	1998 (n=154)	1999 (n=152)	2000 (n=147)	2001 (n=147)		
High security hospital	156	161	123	106	96	82	73	62	52	50	169	258.2
	100	*95.8*	*76.4*	*67.1*	*61.9*	*52.6*	*47.4*	*40.8*	*35.4*	*34.0*	*100*	*14-520*
Medium secure unit	0	0	0	1	0	0	0	1	1	6	8	44.3
				0.6				*0.7*	*0.7*	*4.1*	*4.7*	*19-118*
Low secure unit	10	38	33	32	36	41	42	41	34	33	114	83.0
	6.4	*22.6*	*20.5*	*20.3*	*23.2*	*26.3*	*27.3*	*27.0*	*23.1*	*22.4*	*67.5*	*1-477*
Open unit	2	19	31	30	40	48	43	41	40	46	82	145.1
	1.3	*11.3*	*19.3*	*19.0*	*25.8*	*30.8*	*27.9*	*27.0*	*27.2*	*31.5*	*48.5*	*0.2-459*
Community	0	7	18	20	23	35	34	33	39	43	61	176.1
		4.2	*11.2*	*12.7*	*14.8*	*22.5*	*22.1*	*21.7*	*26.6*	*29.5*	*36.1*	*9-404*
Prison	0	4	4	5	6	7	4	5	2	4	15	72.5
		2.4	*2.5*	*3.2*	*3.9*	*4.5*	*2.6*	*3.3*	*1.4*	*2.8*	*8.9*	*2-338*

* Mean weeks in setting was just calculated for patients who spent any time in that setting. The number of these patients will be found in the column to the left (i.e. 'For whole follow-up period')

Figure 7.2. Placement of patients at the start of each follow-up year.

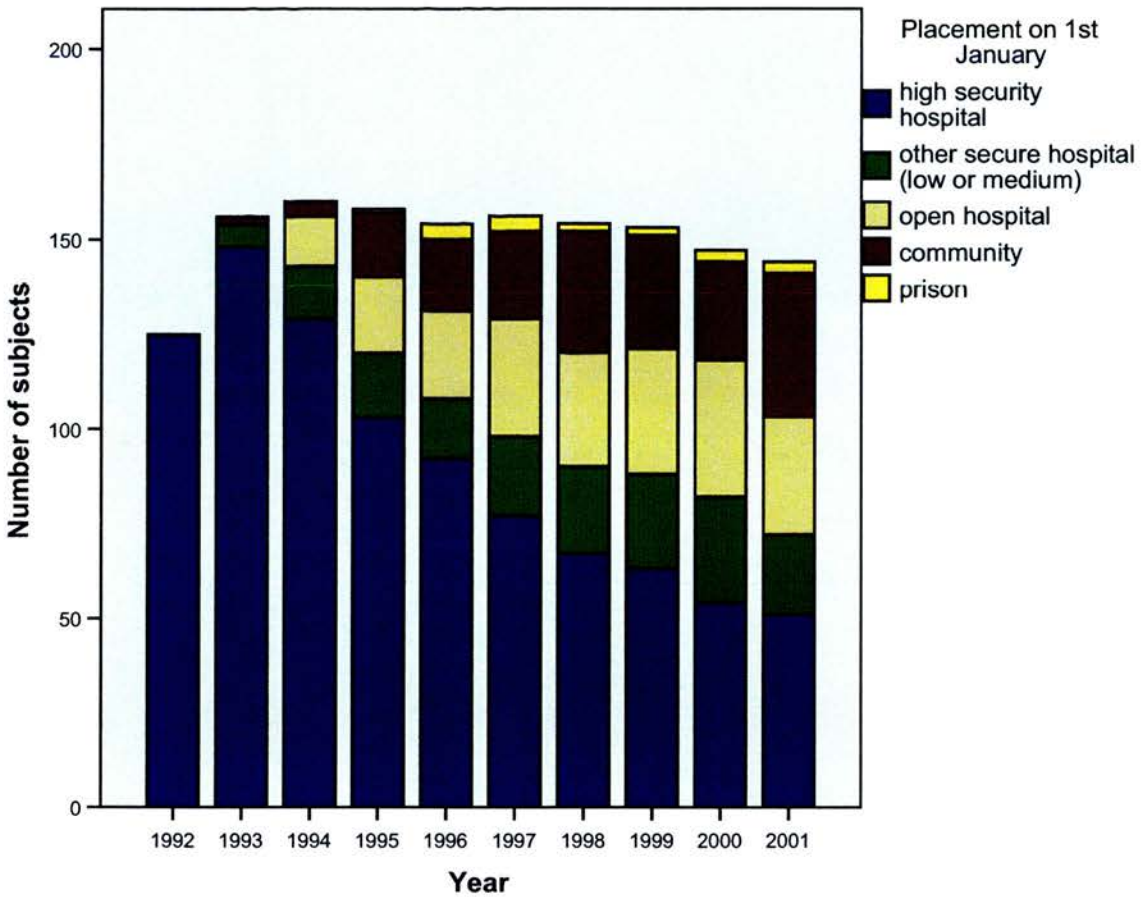


Figure 7.3. Flow chart showing number of episodes of movement of patients between different settings.

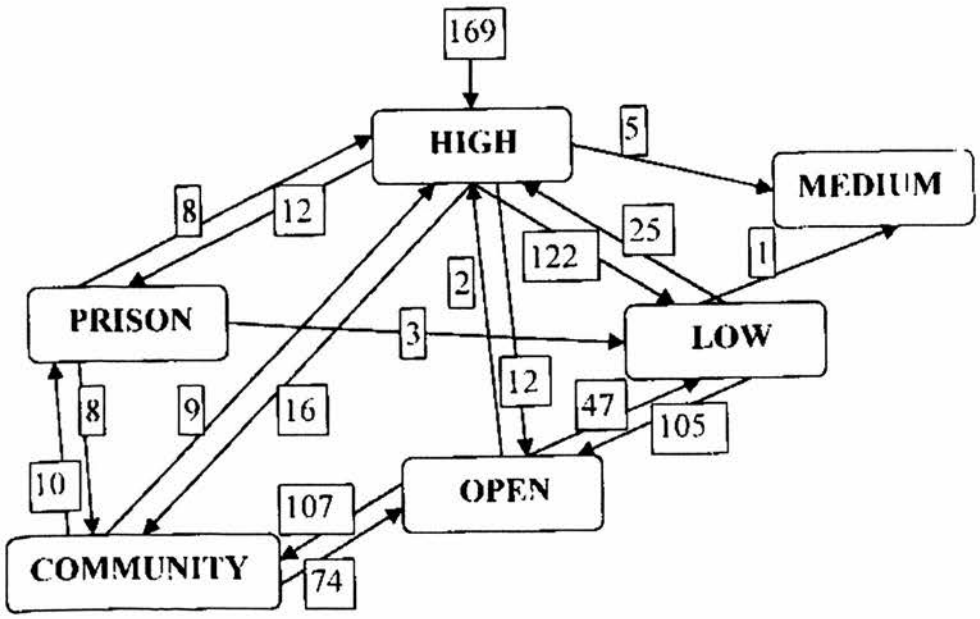


Table 7.5. Flow of patients into and out of different settings. Figures are number of episodes where this transition occurred, not number of patients.

SETTING	Episodes of admission to this setting at some point during study	Episodes leaving this setting at some point during study	Placement at end of 2001 or when whereabouts last known
HIGH	213*	167	**46**
MEDIUM	6	0	**6**
LOW	186	150	**37**
OPEN	191	156	**35**
COMMUNITY	150	108	**40**
PRISON	22	19	**3**
TOTALS	768	599	**169**

*Figure for high security includes 169 episodes of 'admission' before baseline, so there were 44 readmission episodes to high security during follow-up.

Leaving high security

A hundred and thirty three (78.7%) subjects left the State Hospital, so 36 (21.3%) did not leave the State Hospital at all during the follow-up period. One hundred and forty one (83.4%) patients experienced only one episode of high security placement, 26 (15.4%) experienced 2, while two (1.2%) patients experienced more than 2 (3 and 7 respectively). For all 169 patients, the mean length of stay prior to baseline assessment in 1992-3 was 4.0 years (range 0.1 – 24.3), since 1992 was 4.4 years (range 0.1 – 10.0), with an average total time at the State Hospital of 8.4 years (range 0.1 – 34.0). Excluding subjects who never left the State Hospital these figures were: 3.6 (0-24.1), 3.3 (0.1-10) and 6.9 (0.1-28.5) respectively. Survival curves for time to leaving high security from baseline assessment and from admission are shown in figures 7.4 and 7.5, respective mean survival times in years being 4.6 (C.I. 4.1 – 5.1) and 10.4 (C.I. 8.9 – 11.9). Although Figure 11 seems to show that leaving high security is quicker soon after admission, and then tails off, the fact that the cohort is a prevalence rather than incidence sample means that new admissions and long-stay cases are over-represented, perhaps distorting the findings.

Figure 7.4. Kaplan-Meier survival curve for time to leave high security from 1992.

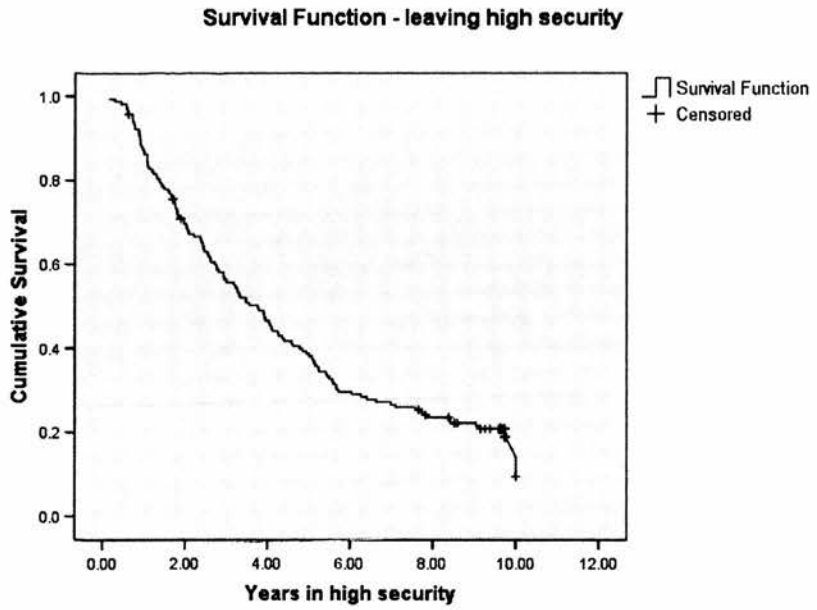
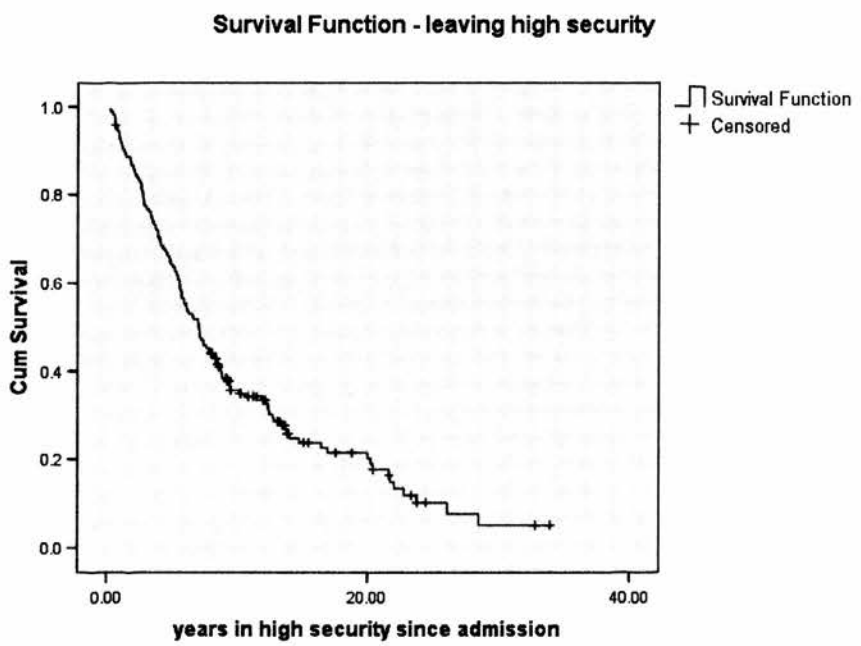


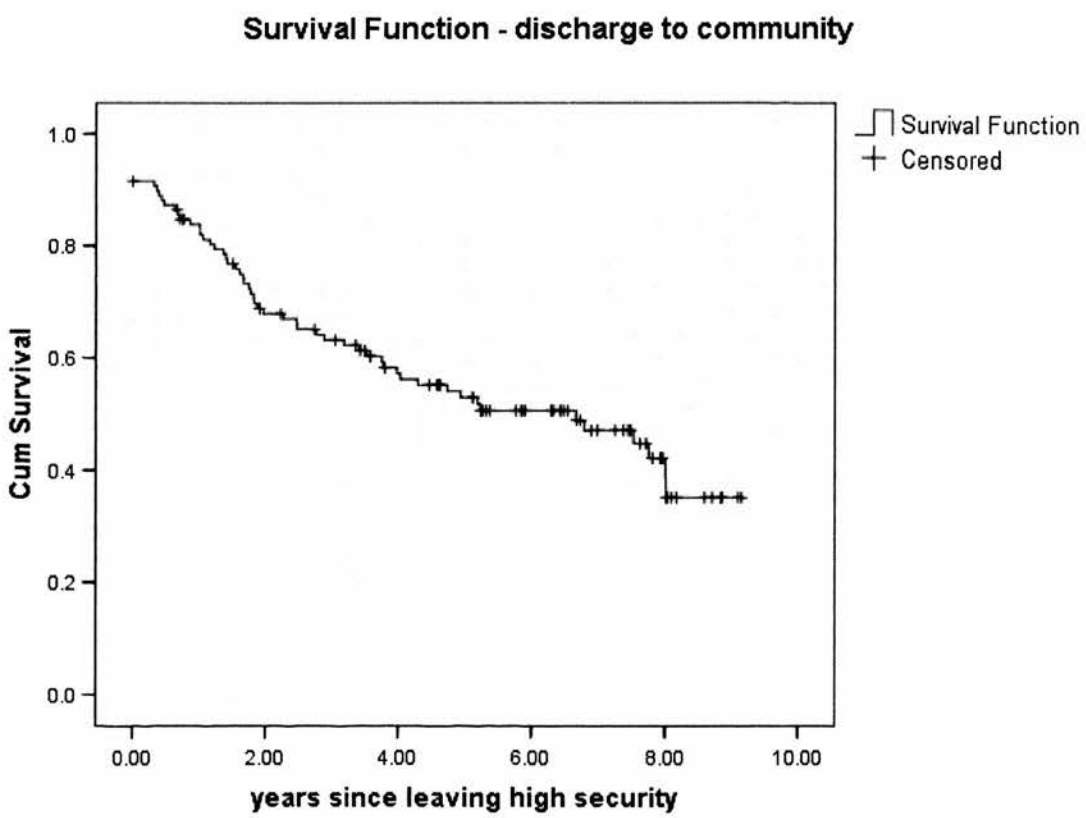
Figure 7.5. Kaplan-Meier survival curve for time to leave high security since admission.



Returning to the community

Of the 133 patients who left high security, 4 died in hospital and 6 had insufficient follow-up data. Fifty-nine (48.0%) of the remaining 123 were discharged to the community. Having left the State Hospital it took an average of 2.3 (range 0 - 8.0) years to be discharged to the community. But the mean time to community discharge estimated by survival analysis was 5.3 years (C.I. 4.6 – 6.0). The rate of moving on to the community was fairly steady and did not appear to tail off (figure 7.6). For those who reached he community the average proportion of time in the community under a legal order was 43% (range 0 – 100%) with the average proportion of time on a restriction order 18% (range 0 – 100%). Of 57 community discharges where there was sufficient data, 29 (51.0%) were readmitted to hospital at some point.

Figure 7.6. Kaplan-Meier survival curve for discharge to the community for patients who left high security.



Comparison of patients who remained in high security, who left high security but remained in hospital, and who reached the community

Patients who remained in high security ('high security' group), patients who left high security but remained in hospital ('hospital' group), and patients who reached the community ('community' group) were compared (tables 7.6, 7.7, 7.8, 7.9).

Baseline variables

The high security group were significantly more likely to have fathers from better socioeconomic groups. They were significantly more likely to be on criminal disposals, to be restricted, to have index offences, serious index offences and to have stranger victims, but were no more likely to have previous convictions or previous serious convictions. They were significantly less likely to have substance dependence and more likely to be described by psychiatrists as poorly responsive to treatment.

The hospital group were intermediate between the high security and community group with respect to being on a criminal disposal, being restricted, having an index offence and having a serious index offence. They were the least likely to have previous violent convictions and to have stranger victims. They had significantly less deliberate self-harm histories. They had the lowest mean PCL-R factor 2 and H10 totals. They were just as likely as the high security group to be described as requiring high security by their psychiatrists.

The community group were least likely to be on criminal disposals, to be restricted, to have index offences, to have serious index offences and to have any history of homicide. They were intermediate with respect to stranger victims, but had the most previous convictions. They were significantly more likely to have been transferred from prison. They were younger, and had spent less time in hospital or in the State Hospital than the other groups. They had significantly higher PCL-R factor 2 and H10 totals. They had the highest rates of substance dependence.

Follow-up variables

There were few differences between the high security and hospital groups. They had similar courses of psychosis. They were significantly more likely to receive atypical antipsychotics and lithium. The high security group had more aggressive incidents, were more likely to be

aggressive and had a higher mean SDAS total at follow-up assessment. Although they were more likely to be seriously violent, this was not a statistically significant difference between the groups.

The community group were the least aggressive, as indicated by number of incidents and mean SDAS total, but the most likely to receive a conviction and a violent conviction. They had a better course of psychosis, with significantly less patients with a continuous course, and lower mean totals on the BPRS and SANS. They were more likely than those who remained in hospital to form intimate relationships.

Table 7.6. Comparison between patients remaining in high security, leaving but remaining in hospital and reaching the community: categorical baseline variables

	Remain in high security	Leave high security, but remain in hospital	Discharged to community	DF	Chi-square	P
DEMOGRAPHICS						
Male	34 (97.1)	67 (89.3)	49 (83.1)	2	4.42	0.110
Father's socio-economic group non-manual	12 (43.3)	9 (12.0)	5 (8.5)	2	12.43	0.002
LEGAL STATUS						
Civil	7 (20.0)	21 (28.0)	15 (25.4)	2	0.81	0.669
Criminal	25 (71.4)	43 (57.3)	26 (44.1)	2	6.82	0.033
Prison transfer	3 (8.6)	11 (14.7)	18 (30.5)	2	8.49	0.014
Restricted	23 (65.7)	38 (50.7)	27 (45.8)	2	3.61	0.164
PSYCHIATRIC / MEDICAL HISTORY						
Previous State Hospital admission	8 (22.9)	21 (28.0)	14 (23.7)	2	0.47	0.789
Previous deliberate self-harm	24 (68.6)	39 (52.0)	43 (72.9)	2	6.80	0.033
Epilepsy	6 (17.1)	13 (17.3)	4 (6.8)	2	3.60	0.166
FORENSIC HISTORY						
Convictions (either as index or previous offence)						
Any	30 (85.7)	65 (86.7)	56 (94.9)	2	2.97	0.226
Homicide	13 (37.1)	24 (32.0)	10 (16.9)	2	5.64	0.060
Violent	18 (51.4)	26 (34.7)	36 (61.0)	2	9.49	0.009
Sexual	6 (17.1)	14 (18.7)	9 (15.3)	2	0.27	0.873
'Serious'	27 (77.1)	49 (65.3)	42 (71.2)	2	1.66	0.436
Index offence						
Any	23 (65.7)	33 (44.0)	21 (35.6)	2	8.17	0.017
'Serious'	16 (45.7)	24 (33.3)	12 (20.3)	2	6.82	0.033
Stranger victim	12 (34.3)	5 (6.7)	10 (16.9)	2	13.62	0.001
PERSONAL HISTORY						
Early maladjustment	9 (27.3)	20 (28.6)	26 (44.1)	2	4.25	0.119
Employment problems	14 (42.4)	37 (53.6)	38 (66.7)	2	5.26	0.072
Relationship instability	27 (81.8)	47 (66.2)	36 (61.0)	2	4.27	0.118
COMORBIDITY						
Learning disability	1 (2.9)	5 (6.7)	2 (3.4)	2	1.13	0.568
Alcohol or drug dependence	8 (22.9)	25 (33.3)	37 (62.7)	2	18.02	0.000
Antisocial personality disorder	11 (31.4)	22 (29.3)	23 (39.0)	2	1.45	0.485
DSM Personality disorder	10 (30.3)	27 (37.5)	21 (35.6)	2	0.515	0.773

Table 7.6 (continued). Comparison between patients remaining in high security, leaving but remaining in hospital and reaching the community: categorical baseline variables

	Remain in high security	Leave high security, but remain in hospital	Discharged to community	DF	Chi-square	P
PSYCHIATRIST'S OPINION						
Need high security	16 (45.7)	27 (36.0)	7 (11.9)	6	16.66	0.011
Poor response to treatment	28 (82.4)	40 (58.0)	26 (49.1)	2	9.86	0.007
Non-co-operative with staff	4 (11.8)	14 (20.3)	14 (26.4)	2	2.73	0.255
Persistent aggression	6 (17.6)	17 (24.6)	9 (17.0)	2	1.30	0.523

Table 7.7. Comparison between patients remaining in high security, leaving but remaining in hospital and reaching the community: continuous baseline variables

	Remain in high security (n=35)	Leave high security, but remain in hospital (n=75)	Discharged to community (n=59)	F	P
DEMOGRAPHICS					
Age (years)	36.8	37.9	**32.1**	7.18	0.001
PSYCHIATRIC HISTORY					
Age at first contact (years)	19.7	19.7	20.0	0.07	0.935
Time in hospital (years)	12.4	11.7	**4.6**	13.75	0.000
Time since admission to State Hospital (years)	5.6	4.7	**2.2**	5.13	0.007
FORENSIC					
Number of convictions	7.7	8.8	**16.2**	7.57	0.001
PSYCHOPATHY					
PCL-R total	14.7	13.2	15.9	2.40	0.094
PCL-R factor 1	5.4	4.7	5.0	0.47	0.628
PCL-R factor 2	7.6	**6.8**	**8.8**	5.02	0.008
RISK INSTRUMENTS					
VRAG	5.4	4.4	5.2	0.04	0.958
H10 (of HCR-20)	13.2	**12.8**	**14.2**	3.01	0.052
MENTAL STATE (KRAWIECKA)					
Total	8.2	7.2	6.2	1.64	0.197

Table 7.8. Comparison between patients remaining in high security, leaving but remaining in hospital and reaching the community: categorical follow-up variables

	Remain in high security	Leave high security, but remain in hospital	Discharged to community	DF	Chi-square	P
LEGAL STATUS						
Informal	1 (2.9)	5 (6.7)	37 (62.7)	2	66.55	0.000
Restricted	27 (77.1)	43 (57.3)	28 (47.5)	2	7.97	0.019
PROGRESS						
Return to high security	-	15 (20.0)	12 (20.3)	1		
FORENSIC						
Any aggressive incident	32 (91.4)	56 (75.7)	43 (72.9)	2	4.81	0.090
Serious violence	10 (28.6)	14 (18.9)	8 (13.6)	2	3.21	0.201
Conviction	2 (5.7)	2 (3.0)	20 (35.1)	2	27.53	0.000
Violent conviction	2 (5.7)	2 (3.0)	11 (19.0)	2	9.90	0.007
SOCIAL FUNCTIONING						
Intimate relationship	3 (8.6)	3 (4.0)	28 (47.5)	2	42.47	0.000
COURSE OF PSYCHOSIS						
Continuous	17 (48.6)	34 (45.3)	10 (16.9)	4	16.24	0.003
Fluctuating	11 (31.4)	28 (37.3)	27 (45.8)			
Recover	7 (20.0)	13 (17.3)	22 (37.3)			
TREATMENT						
Atypical antipsychotic	33 (94.3)	50 (66.7)	36 (61.0)	2	12.58	0.002
Clozapine	20 (57.1)	33 (44.0)	23 (39.0)	2	2.98	0.226
Lithium	15 (42.9)	13 (17.6)	8 (14.0)	2	11.94	0.003
Anti-convulsant	16 (45.7)	26 (35.1)	14 (24.6)	2	4.46	0.108
Non-compliance with medication	3 (8.6)	13 (17.3)	14 (23.7)	2	3.47	0.176
Non-compliance with psychosocial intervention	17 (50.0)	21 (31.3)	20 (37.0)	2	3.36	0.187

Table 7.9. Comparison between patients remaining in high security, leaving but remaining in hospital and reaching the community: continuous follow-up variables

	Remain in high security	Leave high security, but remain in hospital	Discharged to community	F	P
FORENSIC					
Number of aggressive incidents	**25.9**	11.4	**6.7**	5.34	0.006
Number of episodes of self-harm	4.5	2.5	6.5	1.62	0.202
Number of episodes of absconding	0.6	0.6	1.2	1.57	0.211
COURSE OF PSYCHOSIS					
Proportion of years with positive symptoms	0.76	0.66	**0.44**	12.80	0.000
Proportion of years with negative symptoms	**0.72**	**0.51**	**0.35**	13.35	0.000
MENTAL STATE / BEHAVIOUR AT FOLLOW-UP					
SDAS total	**8.9**	6.2	**3.8**	4.45	0.014
BPRS total	38.1	36.7	**30.3**	3.33	0.040
SANS total	40.6	39.5	**26.6**	4.95	0.009

Analysis of associates of leaving high security using logistic regression

Baseline and follow-up independent variables

A model using the eight baseline variables in table 7.10 was able to correctly classify 79.5% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=7.36, df=8, p=0.499) and explained between 12.1 and 18.8% of the variability in the dependent variable (i.e. whether patients left high security). The significant baseline variables were not having a stranger victim and substance dependence. Adding four follow-up variables to these baseline variables (table 7.11) improved the model to one which correctly classified 87.5% of cases, was also a good fit (Hosmer and Lemeshow test: chi-square=10.61, df=8, p=0.225) and explained between 30.6 and 47.4% of the variability in the dependent variable. Significant variables in this model were stranger victim, proportion of years with negative symptoms and number of aggressive incidents during follow-up. Using backward conditional withdrawal of variables, the factors which best predicted leaving high security were female gender, not having a serious index offence, not having a stranger victim, having substance dependence, less chronic negative symptoms, achieving a year free of positive symptoms and having fewer episodes of aggression during follow-up.

Course of psychosis and comorbidity as independent variables

A model using the six variables antisocial personality disorder, PCL-R score, substance dependence, proportion of years with positive symptoms, proportion of years with negative symptoms and psychosis as precipitant to index behaviour (table 7.12) was able to correctly classify 78.1% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=7.43, df=8, p=0.491) and explained between 20 and 31.1% of the variability in the dependent variable (i.e. left high security). The significant factors in this model were lower psychopathy, persistent positive symptoms and persistent negative symptoms.

Table 7.10. Logistic regression using only baseline factors as independent variables; dependent variable is 'left high security'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	.017	.030	.342	1	.558	1.018	.960	1.079
Time in high security	-.026	.041	.397	1	.529	.975	.900	1.055
PCL-R total	.014	.032	.186	1	.666	1.014	.952	1.080
Male gender	-1.143	1.089	1.101	1	.294	.319	.038	2.697
Criminal disposal	-.203	.530	.146	1	.702	.816	.289	2.309
Serious index offence	-.248	.518	.229	1	.632	.780	.282	2.155
Stranger victim	-1.440	.535	7.234	1	.007	.237	.083	.677
Substance dependence	1.202	.506	5.641	1	.018	3.326	1.234	8.968
Constant	1.786	1.479	1.458	1	.227	5.966		

Table 7.11. Logistic regression using both follow-up and baseline factors as independent variables; dependent variable is 'left high security'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	.010	.035	.089	1	.765	1.011	.943	1.083
Time in high security	-.001	.046	.001	1	.978	.999	.912	1.094
PCL-R total	-.037	.040	.836	1	.360	.964	.890	1.043
Male gender	-5.626	4.596	1.498	1	.221	.004	.000	29.43
Criminal disposal	-.332	.644	.265	1	.607	.718	.203	2.535
Serious index offence	-1.026	.632	2.638	1	.104	.358	.104	1.236
Stranger victim	-1.764	.644	7.495	1	.006	.171	.049	.606
Substance dependence	.638	.609	1.098	1	.295	1.893	.574	6.247
Proportion of years with negative symptoms	-2.948	.885	11.083	1	.001	.052	.009	.298
At least one year free of positive symptoms	.714	.566	1.591	1	.207	2.043	.673	6.201
Serious violence	.167	.657	.064	1	.800	1.181	.326	4.282
Number of aggressive incidents	-.038	.017	4.961	1	.026	.962	.931	.995
Constant	9.524	5.057	3.547	1	.060	13690.3		

Table 7.12. Logistic regression: course of psychosis and comorbid conditions as 'predictors' of leaving high security during follow-up.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
PCL-R score	-.087	.038	5.379	1	.020	.916	.851	.987
Antisocial personality disorder	.318	.540	.348	1	.555	1.375	.477	3.962
Substance dependence	.480	.513	.877	1	.349	1.617	.592	4.419
Psychosis precipitated index behaviour	.144	.509	.080	1	.777	1.155	.426	3.134
Proportion of years with positive symptoms	-2.018	.763	6.984	1	.008	.133	.030	.594
Proportion of years with negative symptoms	-2.721	.807	11.358	1	.001	.066	.014	.320
Constant	5.251	1.148	20.915	1	.000	190.78		

Analysis of associates of reaching the community using logistic regression

Baseline and follow-up independent variables

A model using the nine baseline variables in table 7.13 was able to correctly classify 71.3% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=9.09, df=8, p=0.335) and explained between 28.2 and 37.6% of the variability in the dependent variable (i.e. whether patients reached the community). The only significant baseline variable was having a history of more convictions. Adding four follow-up variables to these baseline variables (table 7.14) improved the model to one which correctly classified 79.1% of cases, was also a good fit (Hosmer and Lemeshow test: chi-square=10.25, df=8, p=0.248) and explained between 35.5 and 47.3% of the variability in the dependent variable. Significant variables in this model were more previous convictions at baseline and less aggressive incidents during follow-up. Including the variable 'conviction during follow-up' lead to a model that correctly classified 86.4% of cases, but this model is not presented as most convictions occurred after a patient reached the community and conviction at follow-up was correlated with previous convictions.

Course of psychosis and comorbidity as independent variables

A model using the six variables antisocial personality disorder, PCL-R score, substance dependence, proportion of years with positive symptoms, proportion of years with negative symptoms and psychosis as precipitant to index behaviour (table 7.15) was able to correctly classify 71.7% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=9.07, df=8, p=0.337) and explained between 24.8 and 33.1% of the variability in the dependent variable (i.e. reached community). The significant factors in this model were not having persistent positive symptoms, not having persistent negative symptoms, psychosis as precipitant to index behaviour and substance dependence.

Table 7.13. Logistic regression using only baseline factors as independent variables; dependent variable is 'reached the community'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	-.031	.032	.955	1	.329	.970	.911	1.032
Male gender	-.924	.721	1.640	1	.200	.397	.097	1.632
Time in high security	-.040	.051	.636	1	.425	.960	.870	1.061
Serious index offence	-.152	.613	.061	1	.805	.859	.258	2.858
PCL-R total	.022	.040	.293	1	.588	1.022	.945	1.106
History of homicide	-.888	.617	2.073	1	.150	.411	.123	1.378
Transferred prisoner	.945	.694	1.854	1	.173	2.573	.660	10.03
Substance dependence	.767	.485	2.495	1	.114	2.153	.831	5.576
Number of convictions	.069	.027	6.631	1	.010	1.071	1.017	1.128
Constant	.662	1.365	.236	1	.627	1.939		

Table 7.14. Logistic regression using both baseline and follow-up factors as independent variables; dependent variable is 'reached the community'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	-.025	.036	.487	1	.485	.975	.909	1.046
Male gender	-1.566	.846	3.431	1	.064	.209	.040	1.095
Time in high security	-.025	.058	.186	1	.666	.975	.871	1.093
Serious index offence	-.826	.676	1.493	1	.222	.438	.116	1.647
PCL-R total	.016	.043	.142	1	.707	1.016	.934	1.107
History of homicide	-.945	.623	2.298	1	.130	.389	.115	1.319
Transferred prisoner	.482	.778	.384	1	.536	1.619	.353	7.435
Substance dependence	.674	.515	1.717	1	.190	1.963	.716	5.381
Number of convictions	.088	.029	9.031	1	.003	1.092	1.031	1.156
Number of aggressive incidents	-.056	.023	5.932	1	.015	.946	.904	.989
Proportion of years with negative symptoms	-1.303	.784	2.762	1	.097	.272	.058	1.263
At least a year without positive symptoms	.417	.668	.390	1	.532	1.517	.410	5.616
Constant	1.868	1.735	1.159	1	.282	6.473		

Table 7.15. Logistic regression: course of psychosis and comorbid conditions as 'predictors' of reaching community during follow-up.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
PCL-R score	.038	.038	1.013	1	.314	1.039	.964	1.120
Antisocial personality disorder	.448	.519	.746	1	.388	1.565	.566	4.327
Substance dependence	.833	.439	3.594	1	.058	2.300	.972	5.442
Psychosis precipitated index behaviour	1.161	.486	5.700	1	.017	3.195	1.231	8.289
Proportion of years with positive symptoms	-1.730	.668	6.701	1	.010	.177	.048	.657
Proportion of years with negative symptoms	-1.459	.686	4.527	1	.033	.232	.061	.891
Constant	-.425	.786	.292	1	.589	.654		

Readmission to high security hospital

Of the 133 who left high security, 23 were readmitted within an average of 1.5 years (range 10 days – 4.5 years). Mean survival having left high security was 7.9 years (C.I. 7.3 – 8.5) (figure 7.7). Beyond 4 years after leaving high security readmissions did not occur.

Factors associated with readmission to high security

For the 133 patients who left the State Hospital, the 23 who were readmitted were compared with the 110 who were not (tables 7.16, 7.17, 7.18 and 7.19).

Baseline variables

Patients readmitted were less likely to have serious index offences, were younger (but not significantly so), were more likely to be described by their psychiatrists as non-co-operative with staff, and had higher mean totals on the PCL-R, VRAG and H10.

Follow-up variables

At follow-up significantly more re-admitted patients had convictions and violent convictions, and had been non-compliant with treatment. But there were no differences between re-admitted and non-readmitted patients with respect to course of illness, social outcomes and aggressive behaviour. More re-admitted patients were seriously violent, but this did not reach statistical significance.

Figure 7.7. Kaplan-Meier survival curve for readmission to high security.

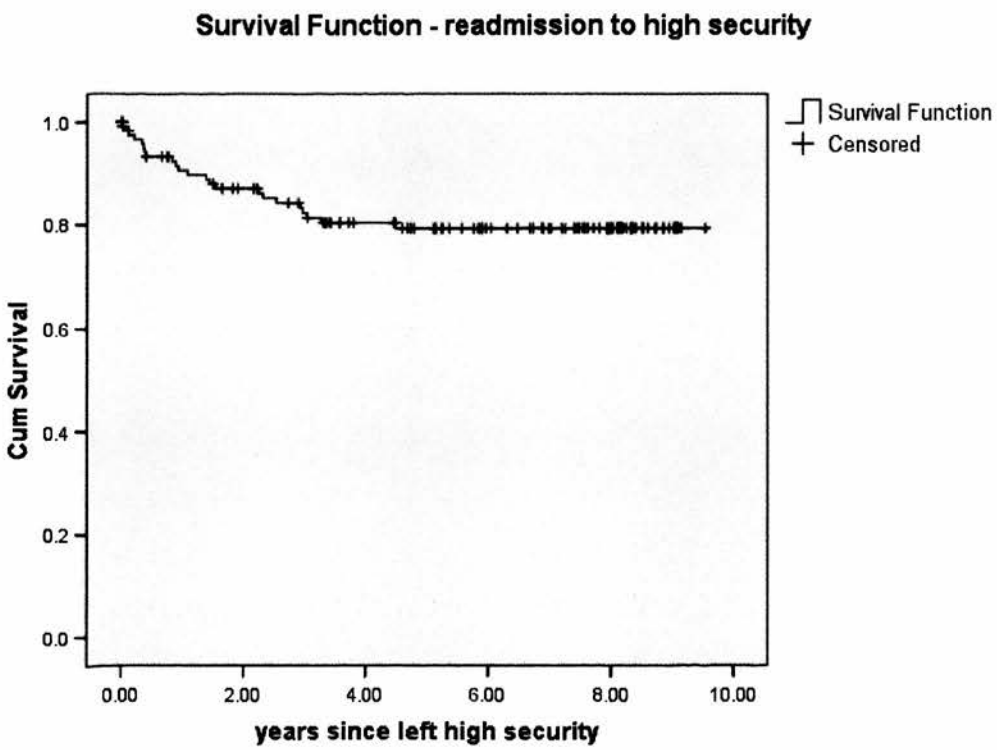


Table 7.16. Comparison between patients re-admitted to the State Hospital and patients not re-admitted: categorical baseline variables

	Readmitted to the State Hospital (n=23)	Not readmitted to State Hospital (n=110)	DF	Chi-square	P
DEMOGRAPHICS					
Male	21 (91.3)	94 (85.5)	1	0.56	0.456
Father's socio-economic group non-manual	1 (4.3)	13 (11.8)	1	1.13	0.288
LEGAL STATUS					
Civil	8 (34.8)	27 (24.5)	1	1.03	0.311
Criminal	9 (39.1)	60 (54.5)	1	1.81	0.178
Prison transfer	6 (26.1)	23 (20.9)	1	0.30	0.584
Restricted	13 (56.5)	52 (47.3)	1	0.65	0.420
PSYCHIATRIC / MEDICAL HISTORY					
Previous State Hospital admission	9 (39.1)	25 (22.7)	1	2.69	0.101
Previous deliberate self-harm	12 (52.2)	71 (64.5)	1	1.24	0.265
Epilepsy	3 (13.0)	15 (13.6)	1	0.01	0.940
FORENSIC HISTORY					
Convictions (either as index or previous offence)					
Any	21 (91.3)	100 (90.9)	1	0.00	0.952
Homicide	6 (25.1)	28 (25.5)	1	0.00	0.950
Violent	12 (52.2)	50 (45.5)	1	0.35	0.557
Sexual	2 (8.7)	21 (19.1)	1	1.44	0.231
'Serious'	15 (65.2)	76 (69.1)	1	0.13	0.716
Index offence					
Any	6 (26.1)	48 (43.6)	1	2.43	0.119
'Serious'	2 (8.7)	35 (31.8)	1	5.07	0.024
Stranger victim	3 (13.0)	12 (10.9)	1	0.09	0.769
PERSONAL HISTORY					
Early maladjustment	11 (50.0)	35 (33.0)	1	2.28	0.131
Employment problems	14 (66.7)	63 (60.6)	1	0.27	0.601
Relationship instability	17 (77.3)	65 (60.7)	1	2.15	0.142
COMORBIDITY					
Alcohol or drug dependence	13 (56.5)	49 (44.5)	1	1.10	0.295
Learning disability	1 (4.3)	6 (5.5)	1	0.05	0.829
Antisocial personality disorders	9 (39.1)	37 (33.6)	1	0.25	0.614
DSM Personality disorder	11 (50.0)	36 (33.3)	1	2.20	0.138

Table 7.16 continued. Comparison between patients re-admitted to the State Hospital and patients not re-admitted: categorical baseline variables

	Readmitted to the State Hospital (n=23)	Not readmitted to State Hospital (n=110)	DF	Chi-square	P
PSYCHIATRIST'S OPINION					
Need high security	6 (26.1)	27 (24.5)	3	1.77	0.622
Poor response to treatment	10 (50.0)	54 (53.5)	1	0.08	0.777
Non-co-operative with staff	9 (45.0)	18 (17.8)	1	7.114	0.008
Persistent aggression	5 (25.0)	19 (18.8)	1	0.40	0.526

Table 7.17. Comparison between patients re-admitted to the State Hospital and patients not re-admitted: continuous baseline variables

	Readmitted to the State Hospital	Not readmitted to State Hospital	DF	t	P
DEMOGRAPHICS					
Age (years)	32.0	35.9	32.5	1.90	0.067
FORENSIC					
Number of convictions	17.4	11.2	26.1	-1.66	0.108
PSYCHIATRIC HISTORY					
Age at first contact (years)	19.3	20.0	44.0	0.54	0.593
Time in hospital (years)	8.3	8.6	30.0	0.14	0.890
Time since admission to State Hospital (years)	2.1	3.9	38.8	1.60	0.117
PSYCHOPATHY					
PCL-R total	17.2	13.9	29.5	-2.13	0.04
PCL-R factor 1	5.4	4.6	31.4	-1.06	0.298
PCL-R factor 2	9.7	7.4	27.5	-2.44	0.021
RISK INSTRUMENTS					
VRAG	13.3	3.1	28.3	-2.23	0.034
H10 (of HCR-20)	15.1	13.1	30.5	-2.68	0.012
MENTAL STATE (KRAWIECKA)					
Total	6.6	6.7	28.4	0.15	0.885

Table 7.18. Comparison between patients re-admitted to the State Hospital and patients not re-admitted: categorical follow-up variables

	Readmitted to the State Hospital	Not readmitted to State Hospital	DF	Chi-square	P
LEGAL STATUS					
Informal	7 (30.4)	35 (31.8)	1	0.02	0.897
Restricted	13 (56.5)	58 (52.7)	1	0.11	0.740
PROGRESS					
Reach community	11 (47.8)	48 (43.6)	1	0.14	0.713
FORENSIC					
Any aggressive incident	20 (87.0)	79 (72.5)	1	2.12	0.145
Serious violence	7 (30.4)	15 (13.8)	1	3.80	0.051
Conviction	9 (39.1)	13 (13.1)	1	8.54	0.003
Violent conviction	6 (26.1)	7 (7.0)	1	7.21	0.007
SOCIAL FUNCTIONING					
Intimate relationship	7 (30.4)	24 (21.8)	1	0.79	0.374
Living independently at end of follow-up	2 (10.5)	17 (18.9)	1	0.76	0.383
COURSE OF PSYCHOSIS					
Continuous	6 (26.1)	36 (32.7)	2	1.55	0.460
Fluctuating	12 (52.2)	42 (38.2)			
Recover	5 (21.7)	32 (29.1)			
TREATMENT					
Atypical antipsychotic	17 (73.9)	68 (61.8)	1	1.21	0.272
Clozapine	10 (43.5)	46 (41.8)	1	0.02	0.883
Lithium	3 (13.0)	18 (16.8)	1	0.20	0.655
Anti-convulsant	5 (21.7)	35 (32.7)	1	1.07	0.301
Non-compliance with medication	8 (34.8)	18 (16.4)	1	4.10	0.043
Non-compliance with psychosocial intervention	10 (50.0)	30 (30.0)	1	3.00	0.083

Table 7.19. Comparison between patients re-admitted to the State Hospital and patients not re-admitted: continuous follow-up variables

	Readmitted to the State Hospital	Not readmitted to State Hospital	DF	t	P
FORENSIC					
Number of aggressive incidents	16.5	7.7	25.2	-1.58	0.126
Number of episodes of self-harm	5.6	4.0	31.3	-0.49	0.626
Number of episodes of absconding	1.5	0.7	27.4	-1.32	0.199
COURSE OF PSYCHOSIS					
Proportion of years with positive symptoms	0.56	0.55	35.5	-0.12	0.907
Proportion of years with negative symptoms	0.38	0.45	37.1	1.04	0.306
MENTAL STATE / BEHAVIOUR AT FOLLOW-UP					
SDAS total	6.5	4.9	22.3	-0.84	0.408
BPRS total	31.8	33.8	22.8	0.52	0.612
SANS total	28.4	33.7	25.1	0.92	0.365

Analysis of associates of readmission to high security using logistic regression

Baseline and follow-up independent variables

A model using the seven baseline variables in table 7.20 was able to correctly classify 82.7% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=9.41, df=8, p=0.309) and explained between 12.2 and 19.3% of the variability in the dependent variable (i.e. whether patients returned to high security). The significant baseline variables were higher PCL-R score, being on a restriction order and not having a serious index offence. Adding three follow-up variables to these baseline variables (table 7.21) improved the model slightly to one which correctly classified 82.7% of cases, was also a good fit (Hosmer and Lemeshow test: chi-square=9.91, df=8, p=0.272) and explained between 16.5 and 26.1% of the variability in the dependent variable. Significant variables in this model were not having a serious index offence and non-compliance with medication.

Course of psychosis and comorbidity as independent variables

A model using the six variables antisocial personality disorder, PCL-R score, substance dependence, proportion of years with positive symptoms, proportion of years with negative symptoms and psychosis as precipitant to index behaviour (table 7.22) was able to correctly classify 82.5% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=9.93, df=8, p=0.452) and explained between 4.8 and 7.9% of the variability in the dependent variable (i.e. readmitted to high security). There were no significant factors in this model, the only variable approaching significance was psychopathy.

Table 7.20. Logistic regression using only baseline factors as independent variables; dependent variable is 'readmitted to high security'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	-.037	.032	1.268	1	.260	.964	.905	1.027
Male gender	.234	.865	.073	1	.787	1.264	.232	6.886
Substance dependence	-.193	.560	.119	1	.730	.824	.275	2.471
PCL-R score	.089	.043	4.175	1	.041	1.093	1.004	1.189
Restriction order	1.057	.530	3.971	1	.046	2.877	1.018	8.132
Serious index offence	-1.725	.705	5.983	1	.014	.178	.045	.710
Time in high security	.048	.051	.865	1	.352	1.049	.949	1.159
Constant	-1.990	1.464	1.848	1	.174	.137		

Table 7.21. Logistic regression using both baseline and follow-up factors as independent variables; dependent variable is 'readmitted to high security'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	-.035	.035	1.026	1	.311	.965	.902	1.034
Male gender	.569	.968	.345	1	.557	1.766	.265	11.78
Substance dependence	-.060	.609	.010	1	.922	.942	.285	3.110
PCL-R score	.076	.046	2.762	1	.097	1.079	.986	1.180
Time in high security	.041	.055	.549	1	.459	1.042	.935	1.160
Restriction order	1.025	.575	3.176	1	.075	2.787	.903	8.601
Serious index offence	-1.619	.740	4.784	1	.029	.198	.046	.845
Number of aggressive incidents	.017	.017	1.056	1	.304	1.017	.985	1.051
Reached community	-.431	.603	.509	1	.476	.650	.199	2.122
Non-compliance with medication	1.144	.559	4.196	1	.041	3.139	1.051	9.381
Constant	-2.432	1.680	2.096	1	.148	.088		

Table 7.22. Logistic regression: course of psychosis and comorbid conditions as 'predictors' of readmission to high security during follow-up.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
PCL-R score	.082	.046	3.137	1	.077	1.086	.991	1.189
Antisocial personality disorder	-.189	.552	.117	1	.733	.828	.280	2.445
Substance dependence	.511	.516	.979	1	.322	1.667	.606	4.585
Proportion of years with positive symptoms	.315	.775	.165	1	.685	1.370	.300	6.260
Proportion of years with negative symptoms	-.166	.810	.042	1	.838	.847	.173	4.147
Psychosis precipitated index behaviour	-.123	.527	.054	1	.816	.884	.315	2.485
Constant	-3.050	1.055	8.350	1	.004	.047		

Discussion

Legal compulsion

By the end of the follow-up period a fifth of patients were not compelled under legislation. This is a very small proportion compared to patients under general services, and reflects the nature of the sample, i.e. chronically ill patients with a history of serious violence. Ongoing application of legal sanctions has been found to reduce violence and offending in some studies (Acres 1975; Bailey and MacCulloch 1992a; Swanson et al. 2000). Restriction orders tended to remain in place, civil orders diminished with some of these patients becoming informal, and prison transfers reduced as patients returned to prison or reached the end of determinate sentences.

Leaving high security

Most patients (almost four-fifths) left high security at some point during the study. The proportion remaining in high security care is very similar to that described for the English special hospitals by Butwell et al. (2000). A third of patients alive and not lost to follow-up were in high security at the end of the study, and the 'final destination' (at the end of the study, death or when lost) was high security care for a quarter of patients. The small difference between those who left at any point and those who had left at 'final destination' was accounted for by readmissions some of whom were not then discharged again. During the study period (i.e. since baseline) patients spent an average of over 4 years in high security care. But including time in the State Hospital before baseline the average length of time in high security was over 8 years for all patients. Even excluding those who never left, the average length of stay in high security was almost 7 years. This may be an overestimate of how long the average patient with schizophrenia might expect to remain in the State Hospital as this was a prevalence cohort, but is similar to the average length of stay of mentally ill patients in the English special hospitals (Butwell et al. 2000). The longer a patient had remained in high security the less likely they were to move on. This may be different today with the establishment of medium secure units. In England medium secure units did not cater for patients who required long-term care (Taylor et al. 1996), and this may be a factor in Scotland, although the legal appeal against being held in excessive security may prevent this.

When considering leaving high security it is important to bear in mind that the clinical features of a patient will interact with the perceptions and judgment of those responsible for their clinical care who will make a decision as to when a patient is ready to be referred on.

Moving on will then depend on an assessment by receiving clinicians, availability of services, and, in some case, political agreement. So what leads to a patient being judged unsuitable to leave high security will include the patient's characteristics alongside the perceptions of others, whether or not these are evidence based or objective.

Patients who did not leave high security had more serious index offences with stranger victims, in keeping with higher rates of restriction orders, criminal disposals and psychopathy. They had more chronic psychosis, in keeping with better background socio-economic group, more frequent treatment with atypical antipsychotics and lithium, and lower rates of substance dependence. They were more chronically aggressive and seriously violent during follow-up. Seriousness of index offence was related to length of stay in psychopathic but not mentally ill patients, whereas course of illness and behaviour was important in mentally ill patients in Dell et al.'s (1987) study. The results in the current study indicate both these factors were important in a psychotic cohort. This may indicate two underlying groups given that stranger victim and chronic aggression were independently associated with not leaving high security. Two such groups would be similar to those needing high secure care described by Murray et al. (1994): aggressive patients with chronic treatment resistant psychosis and patients with severe personality disorders. In the current study personality disorder, antisocial personality disorder and psychopathy were not significantly associated with remaining in high security in bivariate or regression analyses including baseline and follow-up factors. But psychopathy was associated with having a stranger victim (see Chapter 10) and regression analysis focusing on psychosis and comorbidity found psychopathy and chronic psychosis were independently and significantly associated with remaining in high security. Shaw et al. (1994b) also described a chronically psychotic group who remained in high security. Substance misuse was associated with leaving high security, contrary to the description by Shaw et al. (1994b), and contrary to the apparent association between substance misuse and poor outcome of schizophrenia (Soyka 2000); but, as described in Chapters 9 and 10, in the current study substance dependence was associated with a better course of psychosis.

The types of violence that were relevant to this group were persistent violence/serious violence in high security and serious offending against strangers prior to admission. It is understandable that these factors are characteristic of patients who remain in high security care, as such factors are likely to be concerning to clinicians in high security, to clinicians in local services and have been found to be associated with further violence (Coid et al. 2007a).

The underlying clinical determinants of such behaviours seem to be course of psychosis and psychopathy.

Readmission to high security

Readmission to high security following discharge occurred in 17% of cases compared to 20-30% of patients in most of the studies reviewed in Chapter 3. The readmission is very similar to that at Broadmoor reported by Black (1982), for all three English special hospitals reported by (Jamieson and Taylor, 2002), but lower than that reported for a sample of high security patients transferred to a medium secure unit (Cope and Ward 1993) and lower than the rate of readmission to secure care of any type reported for patients discharged from English medium secure units (Davies et al. 2007; Maden et al.1999a – see Chapter 3). It is slightly lower than the rate of 22% reported for the State Hospital by Duncan et al. (2002). The average survival was comparable to that reported by Jamieson and Taylor (2002). Like the finding of Duncan et al. (2002), patients were most likely to be readmitted soon after discharge, and almost all readmissions occurred within 3 years of discharge.

The factors that distinguished patients readmitted to high security were high PCL-R, not having a serious index offence, being non-compliant/uncooperative, convictions and violence during follow-up, but not course of psychosis (if anything course of illness was better in those re-admitted to high security). Despite being re-admitted to high security, these patients were no more or less likely to spend time in the community or move on subsequent to readmission. Conviction and violence during follow-up may have been the specific behaviours leading to readmission, but the key factors in these cases seemed to be psychopathy and lack of cooperation. Being on a restriction order was associated with readmission in a regression model but not in the bivariate analysis, despite a negative association between serious index offence and readmission. It may be that non-compliance, aggression or offending in restricted patients was more likely to lead to readmission, given the intense scrutiny of such cases by the government and the low threshold for action if things appear to be going awry. The findings were not entirely in keeping with the few studies that have examined readmission to high security. Jamieson and Taylor (2002) found that readmission was associated with not reaching the community, and Duncan et al. (2002) found that not being restricted was associated with readmission. Although not reaching significance, readmission seemed to be associated with a shorter initial admission, as found by Duncan et al. (2002). The discrepancy with Jamieson and Taylor (2002) may reflect that in the current study some patients reached the community, then offended and then were re-admitted.

Reaching the community

About half of patients who left high security spent sometime in the community. This is less than the 90% of patients discharged from the English special hospitals in 1984 who reached the community by the end of 1995 (Jamieson and Taylor 2002). However, it took an average of 3 years for patients to leave high security, so the average patient in the current study had less time to achieve the outcome. The proportion of patients that spent some time in the community, of those who left high security, was comparable to that reported for patients discharged from a medium secure unit in London (Maden et al. 1999a).

As with leaving high security, clinical characteristics of patients, decisions of clinicians and, in some cases, political concerns, will play roles in determining who reaches the community. In addition the difference between low security, open rehabilitation and community living may be more apparent than real. Some patients may be highly supervised and restricted in staffed accommodation in the community, whilst others in low secure care may spend much of any week away from the unit.

Patients who reached the community had less serious index offences (in keeping with less criminal disposals, less restriction orders, less homicide offences, although not less stranger victims), but were more generally antisocial (in keeping with younger age, male gender, more previous convictions, more substance dependence, being transferred from prison and higher PCL-R factor 2). They had less chronic psychosis, particularly less socially incapacitating negative symptoms (in keeping with higher rates of substance dependence and ability to form intimate relationships), and were less chronically aggressive. They had spent less time in secure care at baseline, reflecting less serious index offences, less chronic illness and less chronic behavioural disturbance. They were more likely to be convicted during follow-up, reflecting both their antisociality and the opportunity afforded by being in the community. Regression analysis using clinical factors highlighted psychosis as precipitant to index behaviour, along with not having chronic psychosis and having substance dependence, as a significant correlate of reaching the community. If psychosis precipitated behaviour leading to secure care and psychosis improved then patients were probably seen as less risky.

A number of associates found in this study matched those identified by Jamieson and Taylor (2002); not reaching the community was associated with male gender, mental illness (rather than personality disorder), older age, longer stay in secure care at baseline and civil detention. The one discrepant finding was that Jamieson and Taylor (2002) found the nature of the index offence was not related to reaching the community.

The patients who remained in hospital were therefore a chronically psychotic, socially damaged and chronically behaviourally disturbed group, who were less 'criminal'/'antisocial'. Most of their aggressive behaviour was chronic, but not serious. It is understandable why such behaviour, in a chronically ill and functionally impaired group was incompatible with living in the community. However an interactional effect must also be borne in mind. Those retained in hospital will be living in close proximity with other patients and staff, and therefore will have more opportunity to be aggressive to people they interact with regularly (Estroff et al. 1994; Estroff and Zimmer 1994).

Most patients spent most of the follow-up period in hospital. The majority of these patients, due to their illnesses, poor social functioning and/or risk of violence, required long-term care in hospital, a provision that is disappearing in general services with the move to community provision. A substantial number, over 50%, required long-term secure care. The growth of forensic units recently has been termed 're-institutionalisation' as these take over many of the functions previously provided by long-stay psychiatric wards (Priebe et al. 2005; Priebe et al. 2008).

CHAPTER 8
Forensic outcomes

Description of forensic outcomes

Self-harm is described in this chapter, alongside violence, convictions and absconding, as although it is a clinical outcome, data on self-harm was more conveniently collected with forensic outcome data.

Aggressive incidents

Table 8.1 gives the number of patients involved in various types of aggressive incidents during the follow-up period, and table 8.2 presents similar data for all untoward incidents, including aggression, conviction, absconding and self-harm. Three-quarters of patients were aggressive at some point during follow-up, and in any one year between a quarter and a third of patients were aggressive at least once. Most of these were non-sexual physical violence and there was no increase or decrease in such incidents over time. There was one homicide during follow-up. Forty-eight (28.4%) patients committed a serious act of violence during follow-up, and in any one year about 5% of patients were seriously aggressive. There was not a change in this over time. About 1 in 5 patients were sexually aggressive, and there was a steady increase in the rate of sexual aggression from under 1% to 8% year on year during the follow-up period.

There were 1924 aggressive incidents in total during the follow-up period; only 106 of these (5.5%) fell in the 'serious' category (table 8.3). Victims were usually staff or other patients and all but 20 incidents occurred in hospital or in prison. The vast majority of incidents occurred in high security. Only two serious assaults (one sexual the other non-sexual) occurred in the community – in both cases the victims were strangers. Only 10 incidents (0.5%) were against strangers, and only two of these, the two mentioned already, were serious. Fewer than 1 in 10 incidents involved a weapon. Over three quarters of incidents occurred when patients had psychotic symptoms, and about half seemed to be driven by psychotic symptoms. Presence of psychotic symptoms was less common with serious violent or serious sexual incidents. Psychotic drive occurred more with minor non-sexual aggression and was less frequent with more serious violence, sexual aggression and fire-raising. Alcohol or drugs were rarely involved, probably as most incidents occurred in secure settings.

Medication and restraint were used in response to 1 in 5 and a quarter of incidents respectively. The police were called in less than 1% of cases. Sexual incidents were much more frequently towards staff rather than patients, whereas most other incidents were spread evenly between staff and patients, or were slightly more frequently towards staff. Relatives and non-patient acquaintances were rarely victimised, again probably because most incidents were in secure settings.

Figure 8.1 gives an indication of the time period over which patients were aggressive. Using a definition of persistence where an individual was aggressive (physical, sexual or property incidents) in at least 50% of follow-up years, 46 (27.2%) patients were persistently aggressive. Over a half of patients were not aggressive or were only aggressive during less than 10% of follow-up, whereas almost 1 in 5 was aggressive during at least 80% of the follow-up period.

Most patients involved in incidents were only involved in one. A small number of patients were responsible for high numbers of incidents (figure 8.2).

Table 8.1. Numbers of patients committing aggressive incidents during follow-up.

Type of incidents	Any patient with incident for each follow-up year - N above, *% in italics below*										For whole follow-up period	Average number of incidents per patient who 'offended' *(range)*
	1992 (n=154)	1993 (n=168)	1994 (n=161)	1995 (n=159)	1996 (n=157)	1997 (n=158)	1998 (n=156)	1999 (n=153)	2000 (n=148)	2001 (n=147)		
Homicide	0	0	0	0	0	0	0	1	0	0	1	1.0
								0.7			*0.6*	*1-1*
Severe physical assault	0	0	0	0	2	1	0	0	0	0	3	1.0
					1.3	*0.6*					*1.8*	*1-1*
Assault leading to injury	4	7	6	6	8	5	6	3	2	5	28	2.7
	2.6	*4.2*	*3.7*	*3.8*	*5.1*	*3.2*	*3.8*	*2.0*	*1.4*	*3.4*	*16.6*	*1-13*
Physical assault not causing injury	34	63	59	52	42	43	45	43	30	31	118	14.2
	22.1	*37.7*	*36.6*	*32.7*	*26.8*	*27.2*	*28.8*	*28.1*	*20.3*	*21.1*	*69.8*	*1-233*
Threat with weapon	3	2	3	2	3	7	5	2	1	2	18	2.1
	1.9	*1.2*	*1.9*	*1.3*	*1.9*	*4.4*	*3.2*	*1.3*	*0.7*	*1.4*	*10.7*	*1-7*
Rape	0	0	0	0	0	0	0	0	0	0	0	0
Other contact sexual assault	1	1	1	2	1	2	3	2	2	3	18	1.5
	0.6	*0.6*	*0.6*	*1.3*	*0.6*	*1.3*	*1.9*	*1.3*	*1.4*	*2.0*	*10.7*	*1-4*
Non-contact sexual incident	1	1	2	4	4	6	4	6	6	10	28	3.25
	0.6	*0.6*	*1.2*	*2.5*	*2.5*	*3.8*	*2.6*	*3.9*	*4.1*	*6.8*	*16.6*	*1-20*
Fire-raising	0	2	3	1	1	0	1	2	0	0	6	1.7
		1.2	*1.9*	*0.6*	*0.6*		*0.6*	*1.3*			*3.6*	*1-4*

Table 8.2. Numbers of patients involved in untoward incidents during follow-up – summary of aggressive incidents, convictions, absconding, self-harm.

Type of incidents	Number of patients involved in incidents for each follow-up year - N above, % in italics below										For whole follow-up period	Average number of incidents *(range)*
	1992 (n=154)	1993 (n=167)	1994 (n=161)	1995 (n=159)	1996 (n=157)	1997 (n=158)	1998 (n=156)	1999 (n=153)	2000 (n=148)	2001 (n=147)		
Any aggressive incident (sexual, violent, or property)	**41**	**68**	**67**	**56**	**49**	**50**	**50**	**52**	**35**	**42**	**131**	**16.4**
	26.6	***40.7***	***41.6***	***35.2***	***31.2***	***31.6***	***32.1***	***34.0***	***23.6***	***28.6***	***77.5***	***1-265***
Any non-sexual violence to person	38	63	61	51	42	45	45	46	30	31	118	14.8
	24.7	*37.7*	*37.9*	*32.1*	*26.8*	*28.5*	*28.8*	*30.1*	*20.3*	*21.1*	*69.8*	*1-239*
Any sexual aggression	1	2	3	6	4	7	5	7	8	13	36	2.8
	0.6	*1.2*	*1.9*	*3.8*	*2.5*	*4.4*	*3.2*	*4.6*	*5.4*	*8.8*	*21.3*	*1-20*
Any property damage	9	11	15	7	14	10	12	16	9	18	55	4.5
	5.3	*6.6*	*9.3*	*4.4*	*8.9*	*6.3*	*7.7*	*10.5*	*6.1*	*12.2*	*32.5*	*1-27*
Serious violence (sexual or non-sexual, including arson)	5	9	8	9	12	7	10	8	4	7	48	2.4
	3.2	*5.4*	*5.0*	*5.7*	*7.6*	*4.4*	*6.4*	*5.2*	*2.7*	*4.8*	*28.4*	*1-13*
Any conviction	**1**	**2**	**2**	**2**	**2**	**2**	**5**	**4**	**0**	**2**	**15**	**2.4**
	0.6	***1.2***	***1.2***	***1.3***	***1.3***	***1.3***	***3.2***	***2.6***		***1.4***	***8.9***	***1-12***
Absconding	**5**	**3**	**12**	**11**	**4**	**10**	**13**	**7**	**8**	**6**	**49**	**2.7**
	3.2	***1.8***	***7.5***	***6.9***	***2.5***	***6.3***	***8.3***	***4.6***	***5.4***	***4.1***	***29.0***	***1-19***
Self-harm	**22**	**27**	**31**	**19**	**19**	**18**	**16**	**15**	**11**	**11**	**57**	**12.6**
	14.3	***16.0***	***19.3***	***11.9***	***12.1***	***11.4***	***10.3***	***9.8***	***7.4***	***7.5***	***33.7***	***1-85***

Table 8.3. Description of aggressive incidents (n=1924). Numbers of incidents (not numbers of patients) with percentages in brackets.

	Non-sexual physical aggression					Sexual aggression		Fire-raising	Total
	Homicide	Severe physical	Assault leading to injury	Other physical assault	Threat with weapon	Contact	Non-contact		
Number	1	3	75	1680	37	27	91	10	1924
Victims									
Staff		1 (33.3)	37 (49.3)	734 (43.7)	24 (64.9)	17 (63.0)	75 (82.4)		888 (46.2)
Patients	1 (100)	2 (66.7)	24 (32.0)	879 (52.3)	11 (29.7)	4 (14.8)	6 (6.6)		927 (48.2)
Relatives				15 (0.9)	2 (5.4)	2 (7.4)			19 (1.0)
Other known			13 (17.3)	72 (4.3)		1 (3.7)	1 (1.1)		87 (4.5)
Strangers			1 (1.3)	7 (0.4)	1 (2.7)	1 (3.7)			10 (0.5)
Provoked	0	0	2 (2.7)	84 (5.0)	0	0	0	0	86 (4.5)
Weapon	0	0	18 (24.0)	121 (7.2)	37 (100)	0	0	1 (10.0)	177 (9.2)
Psychotic symptoms at time	0	1 (33.3)	33 (44.0)	1352 (80.5)	22 (59.5)	13 (48.1)	71 (78.0)	6 (60.0)	1498 (77.9)
Psychotic drive	0	0	18 (24.0)	900 (53.6)	11 (29.7)	0	39 (42.9)	1 (10.0)	969 (50.4)
Alcohol or drug use involved	0	0	0	21 (1.3)	3 (8.1)	0	2 (2.2)	0	26 (1.4)
Setting									
High security		2 (66.7)	51 (68.0)	1404 (83.6)	28 (75.7)	18 (66.7)	57 (62.6)	4 (40.0)	1564 (81.3)
Other secure	1 (100)	1 (33.3)	2 (2.7)	99 (5.9)	6 (16.2)	7 (25.9)	26 (28.6)	5 (50.0)	147 (7.6)
Open unit				88 (5.2)	2 (5.4)	1 (3.7)	3 (3.3)	2 (20.0)	96 (5.0)
Prison			13 (17.3)	66 (3.9)					79 (4.1)
Community			1 (1.3)	12 (0.7)	3 (8.1)	1 (3.7)	2 (2.2)	1 (10.0)	20 (1.0)
Outcome									
Medication			13 (17.3)	344 (20.5)	8 (21.6)	1 (3.7)	22 (24.2)		388 (20.2)
Restrained		1 (33.3)	22 (29.3)	454 (27.0)	10 (27.0)	1 (3.7)	1 (1.1)		489 (25.4)
Secluded		1 (33.3)	17 (22.7)	51 (3.0)	4 (10.8)	1 (3.7)		1 (10.0)	75 (3.9)
Police called			1 (1.3)	7 (0.4)	3 (8.1)	2 ((7.4)	1 (1.1)	1 (10.0)	15 (0.8)
Transferred to greater security	1 (100)	1 (33.3)		28 (1.7)	3 (8.1)	0	1 (1.1)	2 (20.0)	36 (1.9)

Figure 8.1. Proportion of follow-up years where individuals were aggressive.

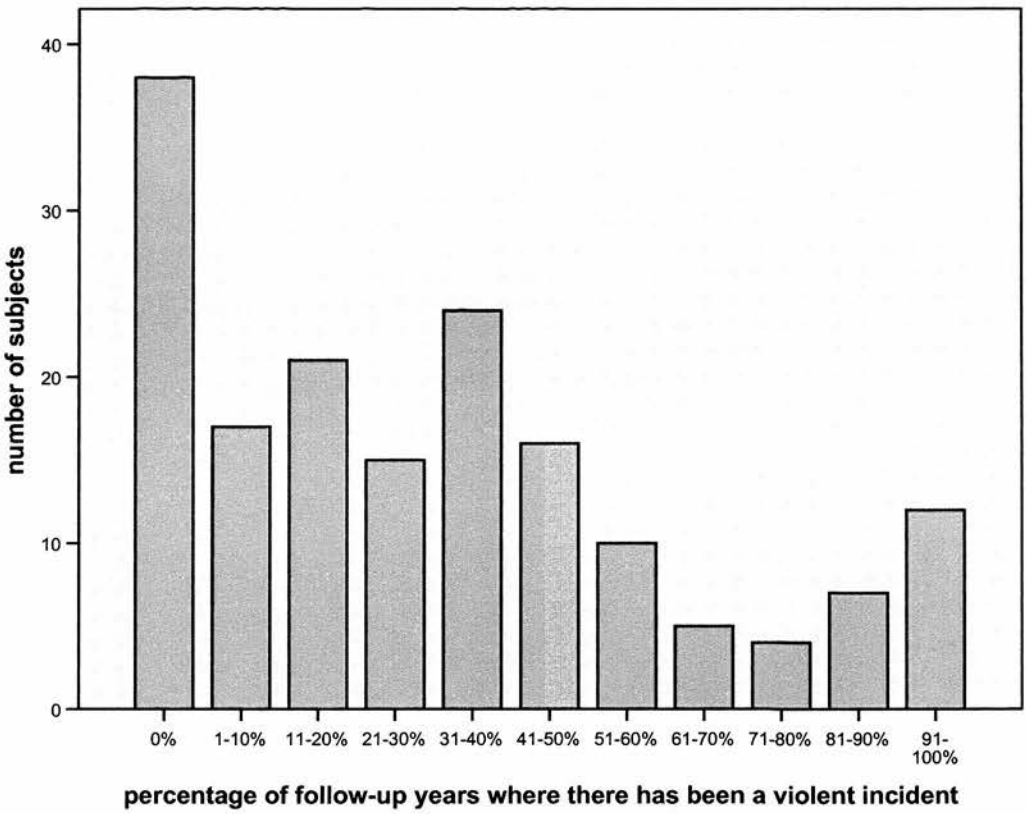
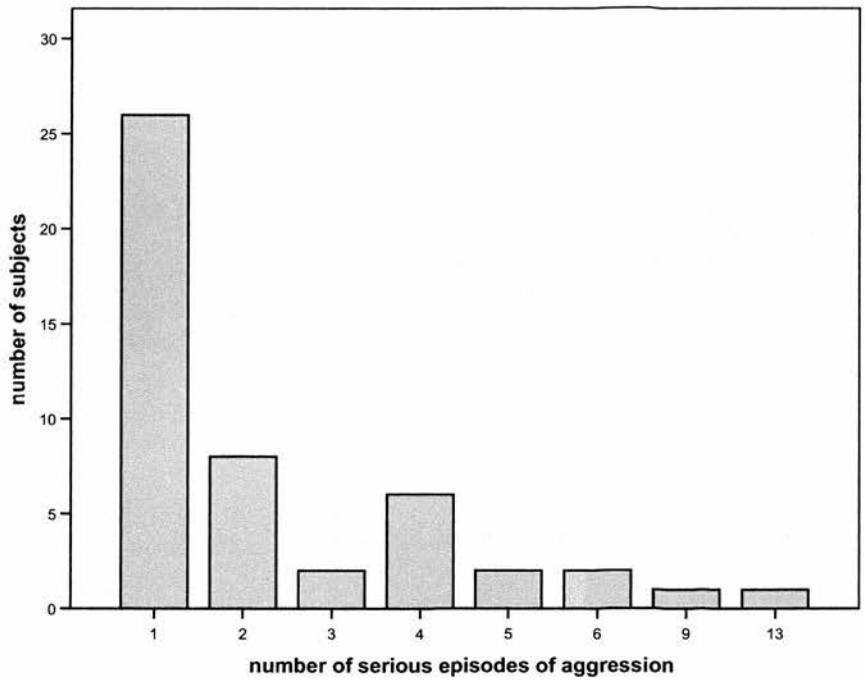
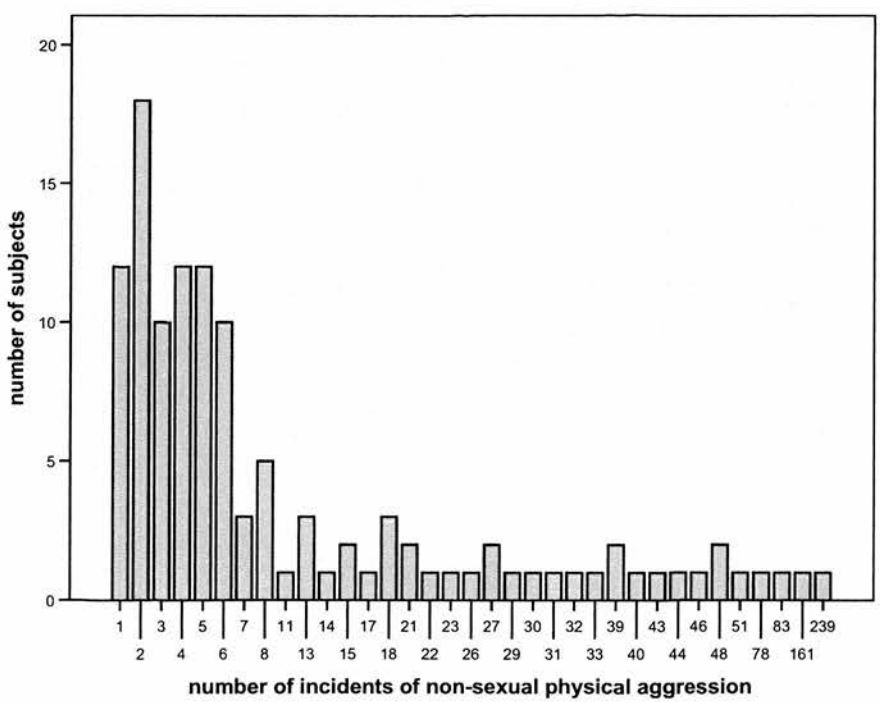
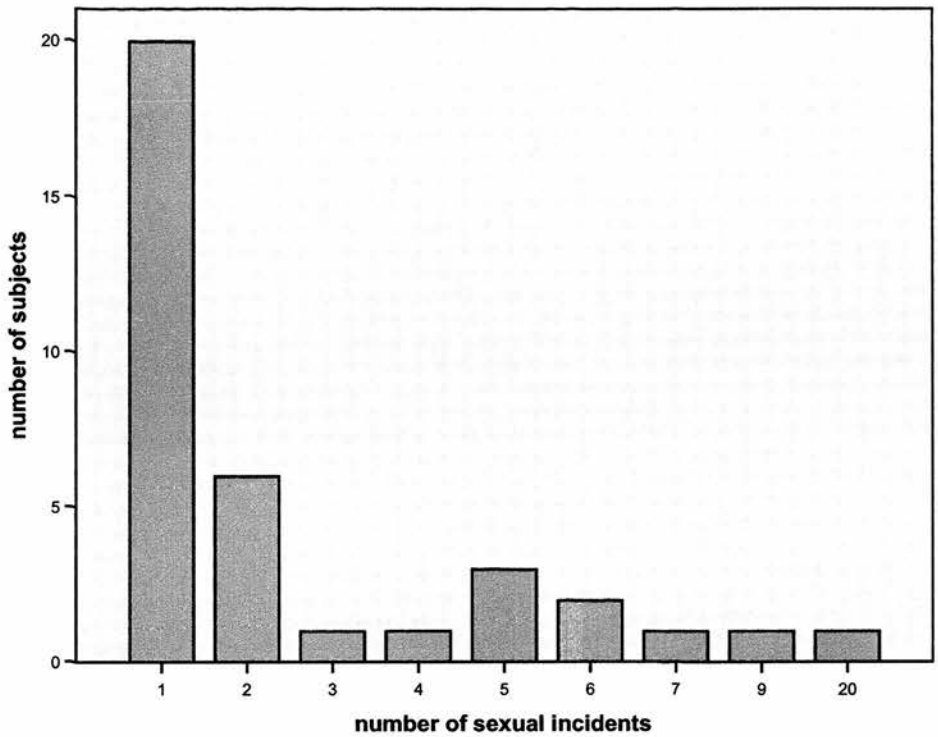
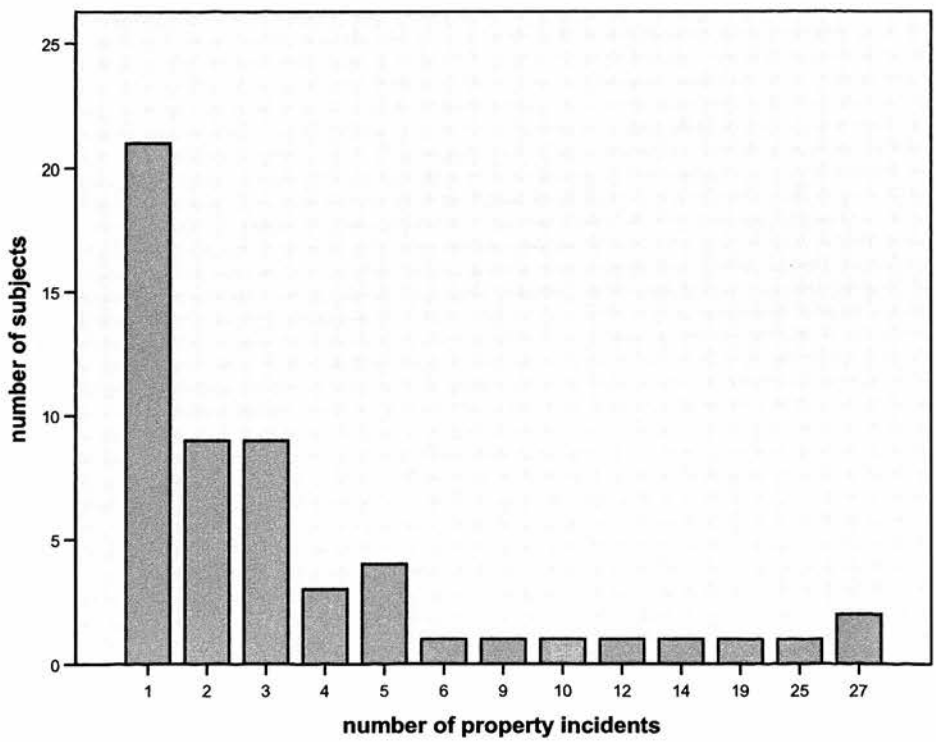


Figure 8.2. Bar charts showing spread of number of subjects committing each number of incidents for serious aggression (of any type), non-sexual physical aggression and property damage.






number of subjects
20
15
10
5
0
1
2
3
4
5
6
7
9
20
number of sexual incidents


number of subjects
25
20
15
10
5
0
1
2
3
4
5
6
9
10
12
14
19
25
27
number of property incidents

Absconding

About 3 in 10 patients absconded at some point (table 8.2), with between 1 and 8% of patients absconding each year. Despite the shift towards more patients in open and less secure units over time, there was no trend towards increased absconding. The types of absconding are set out in table 8.4. Only 1 of the 133 episodes of absconding led to aggression and none led to criminal offending. A small number of patients were responsible for high numbers of absconding incidents (figure 8.3).

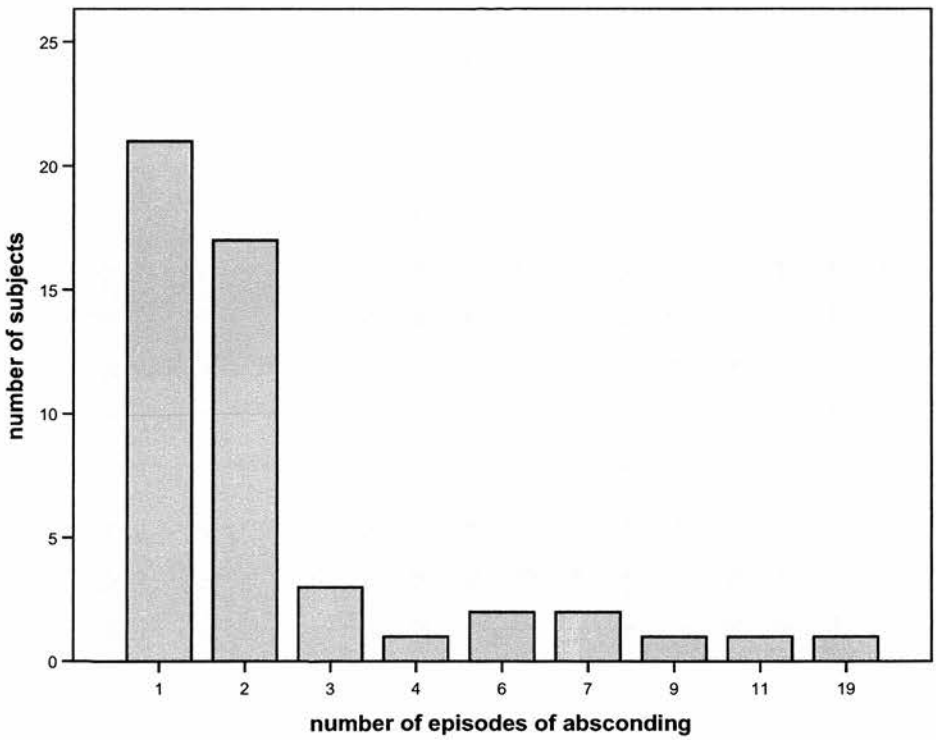
Self-harm

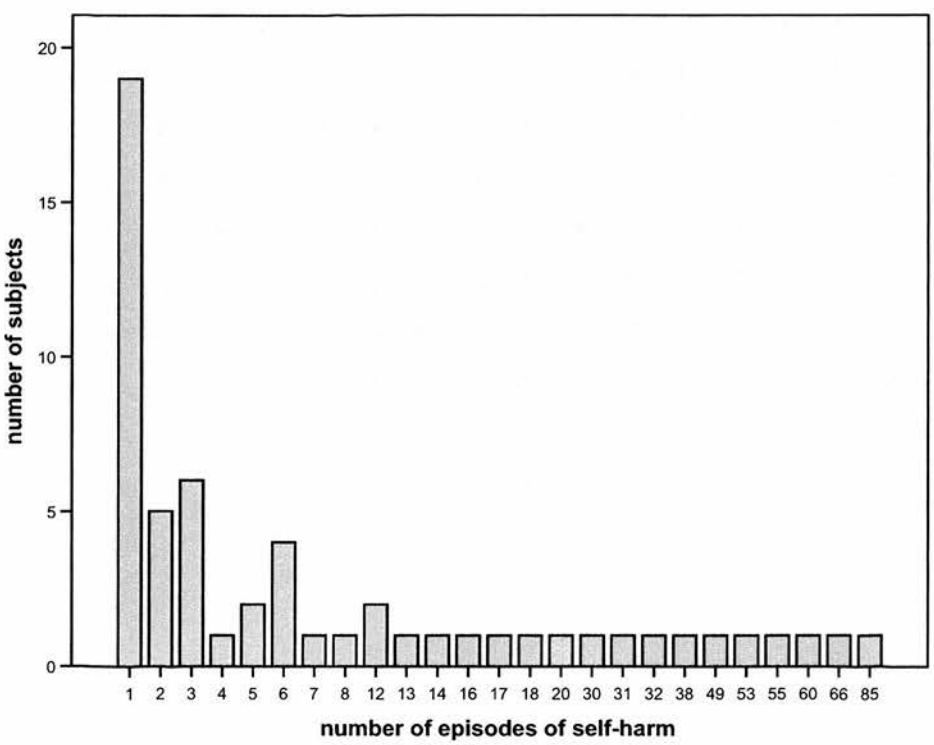
A third of patients self-harmed at some point during follow-up, and there appeared to be a year on year reduction in the number of patients harming themselves from about 15% to 7.5% (table 8.2). Of the 727 incidents of self-harm, cutting and overdose were the most frequent methods used (table 8.4). Only one incident led to the death of a patient by suicide. This patient hanged himself in a low secure unit. A small number of patients were responsible for high numbers of self-harm incidents (figure 8.3).

Table 8.4. Description of episodes of absconding and self-harm. Numbers of episodes (not numbers of patients) with percentages in brackets.

Absconding	**133**
Escape from ward	19 (14.3)
Escape from hospital	16 (12.0)
Absconding from supervision in hospital	29 (21.8)
Absconding from supervision outside hospital	7 (5.3)
Failure to return from unescorted time in hospital	19 (14.3)
Failure to return from unescorted time in community	45 (33.8)
Absconding leading to aggression	1 (0.8)
Absconding leading to offending	0
Self –harm	**727**
Over-dose	86 (11.8)
Superficial cutting	290 (39.9)
Deep laceration	12 (1.6)
Strangulation / hanging	32 (4.4)
Swallowing objects	36 (5.0)
Inserting objects into orifice	47 (6.5)
Burning	18 (2.5)
Jumping	4 (5.5)
Head-banging / hitting self	162 (22.3)
Suffocation	1 (0.1)
Other	65 (9.0)
(Examples – drowning, gouging eyes, fire, friction, pulling nails off, pulling hair, boiling water, biting)	

Figure 8.3. Bar charts showing spread of number of patients responsible for each number of episodes of absconding and self-harm.





Interview assessments

Aggressiveness was assessed using the SDAS, based on interviews with patients, and where available, an informant, covering the 4 weeks up to the interview. Tables D1 and D2 (see Appendix D) show the results at the first and second follow-up interviews.

At first follow-up, as defined by a score over 1 on relevant items, 39 (33.6%) were aggressive, 10 (8.6%) were physically violent and 5 (4.3%) self-harmed. The average total score was 5.4, median 3.0, range 0-35. At second follow-up 34 (29.6%) were aggressive, 14 (12.2%) were physically violent and 2 (1.7%) self-harmed. The average total score was 6.6, median 4.0 , range (0 – 32).There were no significant differences between first and second follow-up SDAS total scores or presence of aggression, physical violence or self-harm.

Scores for the items physical towards things, physical towards staff or others than staff, and self-mutilation were significantly correlated with the number of property incidents, the number of physical incidents and the number of self-harm incidents in that year from the case notes (Pearson correlation for first interview: 0.59, 0.18, 0.38; for second interview: 0.50, 0.55 and 0.56).

Criminal convictions

According to case records 15 (8.9%) patients received a criminal conviction during follow-up. Year-on-year the percentage receiving a conviction ranged from 1 to 3% (table 8.2). SCRO data on officially recorded convictions was available until 2002 for 135 subjects. Of these 17 (12.6%) had a conviction during the follow-up period. But from case records 15 subjects had been convicted. Seven of these had already been identified from SCRO data, so the total number known to have a conviction during follow-up was 24. For the 9 individuals whose convictions were only ascertained from SCRO data, all 9 had incomplete case records. Where case records were complete, then all convicted subjects according to SCRO data had already been identified from case records. Therefore in addition to the 135 SCRO cases and the further 7 convicted subjects, it was felt appropriate, when considering individuals without a conviction, to include, in addition to the SCRO negative cases, those individuals with complete case record follow-up. Therefore the total number of cases with complete conviction data for the follow-up period was 158. Conviction data is summarized in table 8.7. Of the 24 convictions 15 were categorised as serious: 13 non-sexual violence and 2 sexual offences. The rate of serious offending in the sample was therefore 9.5%. Most

offences (about 70%) occurred in the community, and this proportion held for both serious and minor offences.

Table 8.7. Convictions during the follow-up period, combining SCRO and case record information (n=158).

Convictions	**N (%)**	**Range***
Any conviction	**24 (15.2)**	**1 – 12**
Serious conviction	**15 (9.5)**	**1 – 4**
Homicide	0	
Non-sexual violence	13 (8.2)	1 – 4
Sexual offence	2 (1.2)	1 – 1
Property damage	1 (0.6)	1 – 1
Dishonesty	3 (1.8)	1 – 3
Other (mainly breach of the peace)	13 (8.2)	1 - 11
Placement when offence committed (n=24)		
High security	1 (4.2%)	
Other hospital	6 (25.0%)	
Community	17 (70.8%)	
Placement when serious offence committed (n=15)		
High security	1 (6.7%)	
Other hospital	3 (20.0%)	
Community	11 (73.3%)	

* for those who had that type of conviction

Correlations between different types of incidents

The number of episodes of physical aggression, sexual aggression and property damage correlated with each other, with a particularly strong correlation between sexual incidents and physical aggression (table 8.8). Number of episodes of self-harm correlated with all other incidents except sexual incidents, especially property damage and absconding. The lack of association with sexual incidents was probably due to the high rate of self-harm in female patients. Number of convictions was only associated with self-harm, and this correlation was relatively weak. Number of episodes of absconding correlated with property damage and deliberate-self-harm. The correlation between the number of minor and the number of serious incidents was 0.45 ($p<0.01$). Only one subject who committed a serious incident did not also commit a minor incident at some point. Of the 122 who committed a minor incident 31 (25% compared with 2% of the 47 without a minor incident) also committed a serious incident (chi sq 11.69, p=0.001).

Table 8.8. Correlations between numbers of different types of incidents committed by patients

	Physical	Sexual	Property	Conviction	Absconding	Self-harm
Physical		0.59**	0.37**	-0.03	0.03	0.29**
Sexual			0.18*	-0.04	0.05	0.08
Property				0.00	0.31**	0.43**
Conviction					0.08	0.15*
Absconding						0.38**
Self-harm						

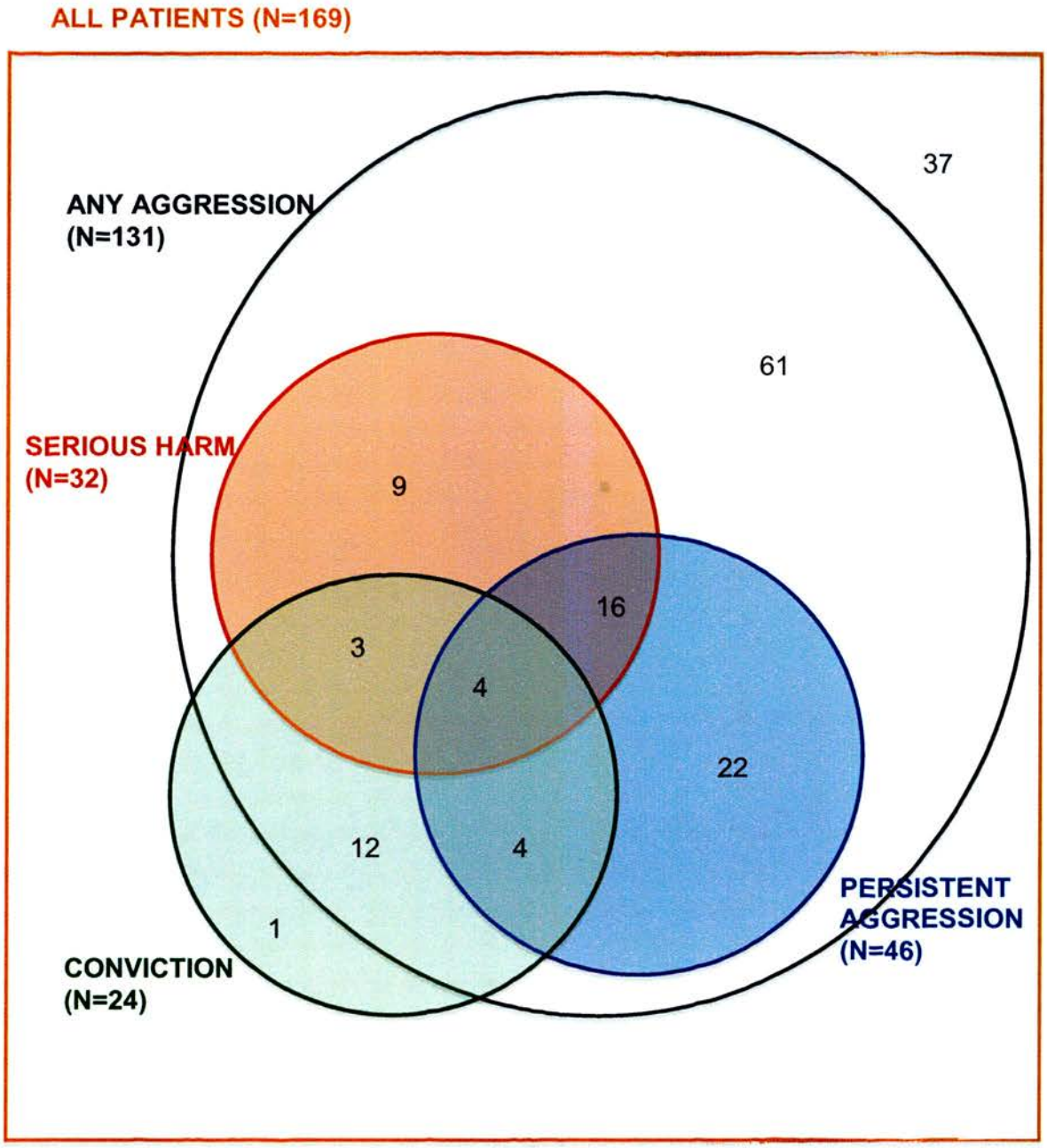
Pearson correlations: ** significant at 0.01 level; * significant at 0.05 level.

Aggression, persistent aggression, serious aggression and convictions: what's the overlap?

The Venn diagram in figure 8.4 illustrates the overlap between patients who were aggressive, persistently aggressive (aggressive incident in more than 50% of follow-up years), seriously aggressive and convicted of a criminal offence. Only 1 of the 24 patients with a conviction was not aggressive. There was a significant overlap between patients who were seriously violent and those who were persistently violent. Sixty-one (46.6%) of the 131 aggressive patients were not persistently or seriously aggressive and were not convicted.

As different factors may be associated with persistent aggression, serious harm and convicted offending, each of these was looked at in comparison to non-aggressive/convicted individuals and in comparison with other aggressive individuals.

Figure 8.4. *Venn diagram showing the overlap between categories of aggression and conviction.*



Comparison of patients who seriously harmed, who were non-seriously aggressive, and who were not aggressive

Patients who committed a seriously harmful act of violence ('serious aggression' group), patients who were aggressive but not seriously harmful ('minor aggression') and patients who were not aggressive ('no aggression' group) were compared (tables 8.9, 8.10, 8.11 and 8.12).

Baseline variables

Significantly more of those who were aggressive, whether serious or minor, had histories of deliberate self-harm and were described as seriously aggressive by their psychiatrists. Significantly more of those who were not aggressive had committed homicide or serious offences. No baseline variables significantly differentiated the serious aggression group. They were no more likely to have committed serious offences previously. More of those who were seriously aggressive had childhood maladjustment and they were younger, more psychopathic and had more previous convictions (of any type); but none of these reached statistical significance.

Follow-up variables

Those who were seriously aggressive had more aggressive episodes and more self-harm. Significantly less of the serious aggression group were living independently at the end of follow-up, and significantly more had been non-compliant with both medication and psychosocial interventions. They were less likely to leave high security and more likely to receive a conviction and serious conviction; but none of these reached statistical significance.

More of those who were not aggressive left high security, lived independently, did not harm themselves, and were compliant with treatment. They had a lower mean SDAS total at follow-up assessment.

The course of psychosis of both aggressive groups was similar, and significantly worse than that of those who were not aggressive. More of those who were not aggressive recovered, whereas more of those who were aggressive had a fluctuating course. There were no differences between the proportions of the three groups who had continuous symptoms.

Clozapine was prescribed more for the non-aggressive, than the minor aggressive group and least for the serious aggression group; although this was not statistically significant.

There were significantly less follow-up interviews conducted with non-aggressive, than aggressive, than seriously aggressive patients (45.9% v 26.3% v 12.5%, Chi-square=9.88, p=0.007).

Table 8.9. Comparison between patients with serious aggression, minor aggression and no aggression during follow-up: categorical baseline variables

	No aggression (n=37)	Minor aggression (n=99)	Serious aggression (n=32)	DF	Chi-square	P
DEMOGRAPHICS						
Male	36 (97.3)	84 (84.8)	29 (90.6)	2	4.31	0.116
Father's socio-economic group non-manual	5 (13.5)	16 (16.2)	5 (15.6)	2	0.15	0.930
LEGAL STATUS						
Civil	7 (18.9)	29 (29.3)	7 (21.9)	2	1.81	0.405
Criminal	23 (62.2)	50 (50.5)	20 (62.5)	2	2.30	0.317
Prison transfer	7 (18.9)	20 (20.2)	5 (15.6)	2	0.33	0.848
Restricted	23 (62.2)	47 (47.5)	17 (53.1)	2	2.36	0.308
PSYCHIATRIC / MEDICAL HISTORY						
Previous State Hospital admission	10 (27.0)	22 (22.2)	11 (34.4)	2	1.93	0.382
Previous deliberate self-harm	16 (43.2)	69 (69.7)	20 (62.5)	2	8.04	0.018
Epilepsy	1 (2.7)	17 (17.2)	5 (15.6)	2	4.90	0.086
FORENSIC HISTORY						
Convictions (either as index or previous offence)						
Any	36 (97.3)	87 (87.9)	27 (84.4)	2	3.49	0.174
Homicide	16 (43.2)	23 (23.2)	7 (21.9)	2	6.03	0.049
Violent	19 (51.4)	47 (47.5)	14 (43.8)	2	0.40	0.819
Sexual	9 (24.3)	15 (15.2)	5 (15.6)	2	1.66	0.436
'Serious'	32 (86.5)	65 (65.7)	20 (62.5)	2	6.48	0.039
Index offence						
Any	22 (59.5)	41 (41.4)	13 (40.6)	2	3.88	0.144
'Serious'	19 (51.4)	25 (25.3)	8 (25.0)	2	9.24	0.010
Stranger victim	7 (18.9)	13 (13.1)	7 (21.9)	2	1.66	0.437
PERSONAL HISTORY						
Early maladjustment	8 (22.9)	31 (33.0)	16 (50.0)	2	5.62	0.060
Employment problems	23 (65.7)	49 (52.7)	17 (56.7)	2	1.76	0.416
Relationship instability	22 (62.9)	62 (65.3)	25 (78.1)	2	2.20	0.333
COMORBIDITY						
Learning disability	1 (2.7)	6 (6.1)	1 (3.1)	2	0.90	0.637
Alcohol or drug dependence	14 (37.8)	44 (44.4)	12 (37.5)	2	0.77	0.682
Antisocial personality disorders	7 (18.9)	35 (35.4)	14 (43.8)	2	5.20	0.074
DSM Personality disorder	12 (34.3)	32 (33.3)	14 (43.8)	2	1.17	0.557

Table 8.9 continued.

	No aggression (n=37)	Minor aggression (n=99)	Serious aggression (n=32)	DF	Chi-square	P
PSYCHIATRIST'S OPINION						
Need high security	7 (18.9)	34 (34.3)	9 (28.1)	6	11.25	0.081
Poor response to treatment	17 (54.8)	58 (63.0)	18 (56.3)	2	0.89	0.642
Non-co-operative with staff	5 (16.1)	18 (19.6)	9 (28.1)	2	1.54	0.462
Persistent aggression	1 (3.2)	21 (22.8)	9 (28.1)	2	7.23	0.027

Table 8.10. Comparison between patients with serious aggression, minor aggression and no aggression during follow-up: continuous baseline variables

	No aggression (n=37)	Minor aggression (n=99)	Serious aggression (n=32)	F	P
DEMOGRAPHICS					
Age (years)	36.9	36.1	32.6	1.86	0.159
PSYCHIATRIC HISTORY					
Age at first contact (years)	21.3	19.7	18.4	1.94	0.146
Time in hospital (years)	8.8	9.7	8.8	0.20	0.816
Time since admission to State Hospital (years)	3.7	4.3	3.4	0.33	0.719
FORENSIC					
Number of convictions	12.3	9.9	15.0	1.92	0.150
PSYCHOPATHY					
PCL-R total	14.3	13.9	16.7	1.99	0.140
PCL-R factor 1	5.2	4.6	5.6	1.19	0.308
PCL-R factor 2	7.5	7.4	9.0	2.20	0.115
RISK INSTRUMENTS					
VRAG	6.1	4.2	6.3	0.22	0.804
H10 (of HCR-20)	13.1	13.1	14.6	2.46	0.089
MENTAL STATE (KRAWIECKA)					
Total	5.9	7.5	7.0	1.17	0.312

Table 8.11. Comparison between patients with serious aggression, minor aggression and no aggression during follow-up: continuous follow-up variables

	No aggression (n=37)	Minor aggression (n=99)	Serious aggression (n=32)	F	P
FORENSIC					
Number of aggressive incidents	0.0	10.2	**35.3**	16.58	0.000
Number of episodes of self-harm	**0.1**	4.4	**8.8**	4.16	0.017
Number of episodes of absconding	0.3	0.8	1.4	2.34	0.100
COURSE OF PSYCHOSIS					
Proportion of years with positive symptoms	**0.48**	**0.64**	0.62	2.93	0.056
Proportion of years with negative symptoms	0.45	0.51	0.53	0.50	0.610
MENTAL STATE / BEHAVIOUR AT FOLLOW-UP					
SDAS total	**1.6**	6.0	9.1	6.64	0.002
BPRS total	29.8	36.5	32.5	2.05	0.133
SANS total	28.0	36.4	37.0	1.19	0.309

Table 8.12. Comparison between patients with serious aggression, minor aggression and no aggression during follow-up: categorical follow-up variables

	No aggression (n=37)	Minor aggression (n=99)	Serious aggression (n=32)	DF	Chi-square	P
LEGAL STATUS						
Informal	7 (18.9)	30 (30.3)	6 (18.8)	2	2.81	0.246
Restricted	25 (67.6)	52 (52.5)	20 (62.5)	2	2.87	0.239
PROGRESS						
Leave high security	34 (91.9)	77 (77.8)	22 (68.8)	2	5.85	0.054
Return to high security	3 (8.1)	13 (13.1)	7 (21.9)	2	2.82	0.245
Reach community	17 (50.0)	35 (46.7)	8 (38.1)	2	0.76	0.684
FORENSIC						
Conviction	1 (3.0)	16 (17.0)	7 (22.6)	2	5.35	0.069
Violent conviction	0 (0.0)	10 (10.6)	5 (15.6)	2	5.03	0.081
SOCIAL FUNCTIONING						
Intimate relationship	8 (21.6)	21 (21.2)	5 (15.6)	2	0.52	0.770
Living independently at end of follow-up	7 (25.9)	11 (13.1)	1 (3.2)	2	6.43	0.040
COURSE OF PSYCHOSIS						
Continuous	12 (32.4)	38 (38.4)	10 (31.3)	4	9.70	0.046
Fluctuating	9 (24.3)	42 (42.4)	15 (46.9)			
Recover	16 (43.2)	19 (19.2)	7 (21.9)			
TREATMENT						
Atypical antipsychotic	25 (67.6)	70 (70.7)	23 (71.9)	2	0.18	0.915
Clozapine	23 (62.2)	40 (40.4)	12 (37.5)	2	5.98	0.050
Lithium	6 (16.7)	22 (22.4)	8 (25.8)	2	0.87	0.647
Anti-convulsant	8 (22.2)	34 (34.7)	18 (45.2)	2	3.98	0.137
Non-compliance with medication	2 (5.4)	19 (19.2)	9 (28.1)	2	6.33	0.042
Non-compliance with psychosocial intervention	5 (14.3)	36 (38.7)	17 (65.4)	2	16.70	0.000

Analysis of associates of serious violence using logistic regression

Baseline and follow-up independent variables

A model using the six baseline variables in table 8.13 was able to correctly classify 80.4% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=2.93, df=8, p=0.939) and explained between 7.3 and 11.8% of the variability in the dependent variable (i.e. whether patients were seriously violent during follow-up). There were no significant variables in this model, with the closest factor to statistical significance the PCL-R score. Adding five follow-up variables to these baseline variables (table 8.14) improved the model to one which correctly classified 85% of cases, was also a good fit (Hosmer and Lemeshow test: chi-square=8.50, df=8, p=0.387) and explained between 17.1 and 27.5% of the variability in the dependent variable. The only significant variable in this model was number of episodes of aggression (of any type) during follow-up; with PCL-R score the next closest factor to statistical significance. Using backward conditional withdrawal of variables, the factors which best predicted serious violence were PCL-R score, number of previous convictions and number of episodes of aggression during follow-up.

Course of psychosis and comorbidity as independent variables

A model using the six variables antisocial personality disorder, PCL-R score, substance dependence, proportion of years with positive symptoms, proportion of years with negative symptoms and psychosis as precipitant to index behaviour (table 8.15) was able to correctly classify 81.1% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=8.20, df=8, p=0.414) and explained between 5.2 and 8.3% of the variability in the dependent variable (i.e. any serious violence during follow-up). The only significant factor in this model was psychopathy.

Table 8.13. Logistic regression using only baseline factors as independent variables; dependent variable is 'serious violence during follow-up'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	-.039	.032	1.552	1	.213	.961	.904	1.023
Male gender	.052	.762	.005	1	.946	1.053	.237	4.687
PCL-R total	.065	.041	2.568	1	.109	1.067	.986	1.155
Time in high security	.014	.047	.084	1	.772	1.014	.924	1.112
Serious convictions	-.680	.520	1.710	1	.191	.507	.183	1.404
Number of convictions	.026	.020	1.598	1	.206	1.026	.986	1.068
Constant	-1.091	1.279	.728	1	.394	.336		

Table 8.14. Logistic regression using both baseline and follow-up factors as independent variables; dependent variable is 'serious violence during follow-up'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	-.023	.034	.473	1	.492	.977	.914	1.044
Male gender	1.474	1.301	1.282	1	.257	4.365	.341	55.93
PCL-R total	.074	.044	2.808	1	.094	1.077	.988	1.174
Time in high security	.013	.050	.065	1	.798	1.013	.918	1.118
Serious convictions	-.560	.591	.898	1	.343	.571	.179	1.819
Number of convictions	.024	.022	1.117	1	.291	1.024	.980	1.070
Number of aggressive incidents	.032	.013	5.961	1	.015	1.033	1.006	1.059
Number of episodes of self-harm	.012	.021	.300	1	.584	1.012	.971	1.054
Non-compliance with medication	.614	.564	1.182	1	.277	1.847	.611	5.584
Proportion of follow-up with positive symptoms	-.431	.845	.260	1	.610	.650	.124	3.409
Prescribed clozapine	.217	.525	.171	1	.679	1.242	.444	3.475
Constant	-3.677	1.993	3.402	1	.065	.025		

Table 8.15. Logistic regression: course of psychosis and comorbid conditions as 'predictors' of any serious violence during follow-up.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
PCL-R score	.084	.037	5.147	1	.023	1.087	1.011	1.169
Antisocial personality disorder	.163	.474	.118	1	.731	1.177	.465	2.981
Proportion of years with positive symptoms	.148	.652	.052	1	.820	1.159	.323	4.159
Proportion of years with negative symptoms	.572	.666	.737	1	.391	1.772	.480	6.539
Substance dependence	-.511	.468	1.191	1	.275	.600	.240	1.502
Psychosis precipitated index behaviour	.612	.501	1.491	1	.222	1.843	.691	4.920
Constant	-3.380	.935	13.076	1	.000	.034		

Comparison between patients who were convicted, those who were aggressive but not convicted, and those who were neither

Patients who were convicted were compared with patients who were aggressive but not convicted and patients who were not aggressive or convicted (tables 8.16, 8.17, 8.18 and 8.19).

Baseline variables

Patients who were convicted during follow-up were significantly younger, and had spent significantly less time in hospital and in the State Hospital. Significantly more of those convicted had histories of deliberate self-harm. Those convicted at follow-up had more previous convictions. They were more likely to have any previous convictions, violent convictions and serious convictions than patients who were aggressive but not convicted. But like the aggressive non-convicted group, they were less likely than those who were neither aggressive nor convicted to have committed homicide, to have an index offence or to have a serious index offence. Significantly more of the convicted group had early maladjustment, employment problems and substance dependence. Antisocial personality disorder was most prevalent in those in the convicted group, intermediate in the aggressive non-convicted group and least prevalent in the non-aggressive non-convicted group, but this was not statistically significant. Those who were convicted had the highest mean totals on the PCL-R, VRAG and H10. Significantly more of the convicted group were described as not needing the State Hospital by their psychiatrists; this was similar to those who were not aggressive or convicted.

Follow-up variables

The convicted group absconded and self-harmed significantly more often than other patients. They were significantly more likely than other patients to leave high security, be re-admitted to high security and to reach the community. They were least likely to have continuous psychosis and most likely to have a fluctuating course compared to the other two groups. The proportion of those who were convicted who had the recovered course was similar to those who were aggressive but not convicted, and significantly less than those who were nether convicted or aggressive. They had the lowest mean totals on the BPRS and SANS, and had the least proportion of follow-up years with negative symptoms; differences with

these variables were particularly marked in comparison to the aggressive non-convicted group. The convicted group had a similar mean SDAS total to the aggressive non-convicted group, both these groups scoring significantly more than the non-convicted non-aggressive group. Significantly less non-aggressive and non-convicted patients were interviewed at follow-up than aggressive or convicted patients.

Table 8.16. Comparison between patients who are convicted, who are aggressive but not convicted, and who are neither: categorical baseline variables

	No conviction or violence	Violent but not convicted	Convicted	DF	Chi-square	P
DEMOGRAPHICS						
Male	31 (96.9)	90 (88.2)	20 (83.3)	2	2.92	0.232
Father's socio-economic group non-manual	4 (12.5)	17 (16.7)	4 (16.7)	2	0.33	0.847
LEGAL STATUS						
Civil	5 (15.6)	31 (30.4)	4 (16.7)	2	3.93	0.140
Criminal	21 (65.6)	53 (52.0)	14 (58.3)	2	1.92	0.382
Prison transfer	6 (18.8)	18 (17.6)	6 (25.0)	2	0.68	0.710
Restricted	21 (65.6)	49 (48.0)	13 (54.2)	2	3.05	0.217
PSYCHIATRIC / MEDICAL HISTORY						
Previous State Hospital admission	9 (28.1)	26 (25.5)	6 (25.0)	2	0.10	0.951
Previous deliberate self-harm	15 (46.9)	65 (63.7)	19 (79.2)	2	6.25	0.044
Epilepsy	1 (3.1)	18 (17.6)	2 (8.3)	2	5.06	0.080
FORENSIC HISTORY						
Convictions (either as index or previous offence)						
Any	32 (100)	86 (84.3)	24 (100)	2	9.77	0.008
Homicide	14 (43.8)	26 (25.5)	3 (12.5)	2	7.19	0.027
Violent	16 (50.0)	42 (41.2)	17 (70.8)	2	6.96	0.013
Sexual	8 (25.0)	19 (18.6)	1 (4.2)	2	4.24	0.120
'Serious'	28 (87.5)	63 (61.8)	19 (79.2)	2	8.847	0.012
Index offence						
Any	20 (62.5)	44 (43.1)	8 (33.3)	2	5.39	0.068
'Serious'	17 (53.1)	27 (26.5)	5 (20.8)	2	9.46	0.009
Stranger victim	6 (18.8)	16 (5.7)	5 (20.8)	2	0.441	0.802
PERSONAL HISTORY						
Early maladjustment	8 (26.7)	32 (32.0)	13 (59.1)	2	6.94	0.031
Employment problems	18 (60.0)	47 (47.5)	17 (81.0)	2	8.27	0.016
Relationship instability	18 (60.0)	71 (71.0)	15 (65.2)	2	1.38	0.502
COMORBIDITY						
Learning disability	1 (3.1)	7 (6.9)	0 (0.0)	2	2.22	0.330
Alcohol or drug dependence	13 (40.6)	38 (37.3)	18 (75.0)	2	11.40	0.003
Antisocial personality disorder	7 (21.9)	34 (33.4)	12 (50.0)	2	4.87	0.088
DSM Personality disorder	11 (36.7)	34 (33.7)	11 (47.8)	2	1.63	0.444

Table 8.16 (continued). Comparison between patients who are convicted, who are aggressive but not convicted, and who are neither: categorical baseline variables

	No conviction or violence	Violent but not convicted	Convicted	DF	Chi-square	P
PSYCHIATRIST'S OPINION						
Need high security	5 (15.6)	39 (38.2)	3 (12.5)	6	24.87	0.000
Poor response to treatment	16 (59.3)	66 (65.3)	8 (42.1)	2	3.69	0.158
Non-co-operative with staff	5 (18.5)	19 (18.8)	5 (26.3)	2	0.60	0.741
Persistent aggression	1 (3.7)	26 (25.7)	3 (15.8)	2	6.66	0.036

Table 8.17. Comparison between patients with who are convicted, who are aggressive but not convicted, and who are neither: continuous baseline variables

	No conviction or violence (n=32)	Violent but not convicted (n=102)	Convicted (n=24)	F	P
DEMOGRAPHICS					
Age (years)	37.3	36.7	**29.1**	7.29	0.001
PSYCHIATRIC HISTORY					
Age at first contact (years)	20.9	20.0	17.6	2.25	0.109
Time in hospital (years)	9.1	**10.9**	**4.8**	4.35	0.015
Time since admission to State Hospital (years)	4.1	**4.8**	**1.4**	3.40	0.036
FORENSIC					
Number of convictions	12.6	**9.7**	**16.4**	3.04	0.051
PSYCHOPATHY					
PCL-R total	14.1	13.7	**19.4**	6.49	0.002
PCL-R factor 1	7.4	7.3	10.3	2.60	0.077
PCL-R factor 2	7.4	7.3	**10.3**	6.72	0.002
RISK INSTRUMENTS					
VRAG	7.2	**2.1**	**13.0**	3.86	0.023
H10 (of HCR-20)	13.1	13.1	**15.4**	4.73	0.010
MENTAL STATE (KRAWIECKA)					
Total	6.1	7.6	5.9	1.61	0.203

Table 8.18. Comparison between patients who are convicted, who are aggressive but not convicted, and who are neither: continuous follow-up variables

	No conviction or violence	Violent but not convicted	Convicted	F	P
FORENSIC					
Number of aggressive incidents	**0.0**	**17.4**	13.2	4.48	0.013
Number of episodes of self-harm	**0.2**	4.6	**9.6**	3.73	0.026
Number of episodes of absconding	0.3	0.7	**2.2**	6.26	0.002
COURSE OF PSYCHOSIS					
Proportion of years with positive symptoms	**0.44**	**0.65**	0.51	5.32	0.006
Proportion of years with negative symptoms	0.44	**0.56**	**0.29**	6.47	0.002
MENTAL STATE / BEHAVIOUR AT FOLLOW-UP					
SDAS total	**1.6**	**7.0**	5.5	4.49	0.013
BPRS total	30.1	**37.0**	**28.5**	3.92	0.023
SANS total	28.5	**39.8**	**20.8**	6.51	0.002

Table 8.19. Comparison between patients who are convicted, who are aggressive but not convicted, and who are neither: categorical follow-up variables

	No conviction or violence	Violent but not convicted	Convicted	DF	Chi-square	P
LEGAL STATUS						
Informal	7 (21.9)	20 (19.6)	16 (66.7)	2	22.30	0.000
Restricted	23 (71.9)	57 (55.9)	13 (54.2)	2	2.83	0.243
PROGRESS						
Leave high security	29 (90.6)	72 (70.6)	22 (91.7)	2	8.80	0.012
Return to high security	2 (6.3)	12 (11.8)	9 (37.5)	2	12.57	0.002
Reach community	15 (50.0)	22 (31.0)	20 (90.9)	2	24.47	0.000
FORENSIC						
Any aggressive incident	0 (0.0)	102 (100.0)	23 (95.8)	2	152.2	0.000
Any serious violence	0 (0.0)	24 (23.5)	7 (29.2)	2	10.19	0.006
SOCIAL FUNCTIONING						
Intimate relationship	7 (21.9)	13 (12.7)	14 (58.3)	2	23.92	0.000
Living independently at end of follow-up	6 (23.1)	9 (9.5)	4 (19.0)	2	3.94	0.139
COURSE OF PSYCHOSIS						
Continuous	9 (28.1)	41 (40.2)	3 (12.5)	4	13.96	0.007
Fluctuating	9 (28.1)	40 (39.2)	15 (62.5)			
Recover	14 (43.8)	21 (20.6)	6 (25.0)			
TREATMENT						
Atypical antipsychotic	24 (75.0)	79 (77.5)	14 (58.3)	2	3.71	0.156
Clozapine	22 (68.8)	48 (47.1)	4 (16.7)	2	14.95	0.001
Lithium	6 (18.8)	26 (25.6)	4 (17.4)	2	1.09	0.579
Anti-convulsant	7 (21.9)	37 (36.3)	9 (39.1)	2	2.61	0.272
Non-compliance with medication	1 (3.1)	17 (16.7)	11 (45.8)	2	17.24	0.000
Non-compliance with psychosocial intervention	5 (16.1)	40 (43.0)	13 (61.9)	2	11.91	0.003

Analysis of associates of conviction using logistic regression

Baseline and follow-up independent variables

A model using the 11 baseline variables in table 8.20 was able to correctly classify 89.1% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=9.23, df=8, p=0.324) and explained between 22.8 and 40.5% of the variability in the dependent variable (i.e. whether patients were convicted during follow-up). The only significant factor in this model was young age, with PCL-R score and substance dependence nearing statistical significance. Adding five follow-up variables to these baseline variables (table 8.21) improved the model to one which correctly classified 92.6% of cases, but was not a good fit (Hosmer and Lemeshow test: chi-square=17.2, df=8, p=0.028), and explained between 35.9 and 63.4% of the variability in the dependent variable. The significant variables in this model were young age and reaching the community; almost significant were less follow-up years with negative symptoms, having continuous positive symptoms and PCL-R score. Using backward conditional withdrawal of variables, the factors that best predicted conviction were these five variables.

Course of psychosis and comorbidity as independent variables

A model using the six variables antisocial personality disorder, PCL-R score, substance dependence, proportion of years with positive symptoms, proportion of years with negative symptoms and psychosis as precipitant to index behaviour (table 8.22) was able to correctly classify 88% of cases, but was a poor fit (Hosmer and Lemeshow test: chi-square=16.35, df=8, p=0.038), and explained between 16.3 and 28.8% of the variability in the dependent variable (i.e. conviction during follow-up). The significant factors in this model were psychopathy and substance dependence.

Table 8.20. Logistic regression using only baseline factors as independent variables; dependent variable is 'conviction during follow-up'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
PCL-R score	.125	.073	2.940	1	.086	1.133	.982	1.306
Age	-.105	.052	4.090	1	.043	.900	.812	.997
Male gender	-.189	.967	.038	1	.845	.828	.125	5.505
Restriction order	-.589	.639	.852	1	.356	.555	.159	1.939
Self-harm	.684	.696	.966	1	.326	1.981	.507	7.743
Number of previous convictions	.021	.026	.648	1	.421	1.021	.970	1.075
Time in high security	-.028	.108	.068	1	.794	.972	.786	1.202
Serious index offence	-.805	.711	1.282	1	.257	.447	.111	1.802
Substance dependence	1.244	.716	3.022	1	.082	3.471	.853	14.11
Employment problems	.885	.722	1.505	1	.220	2.423	.589	9.969
Childhood maladjustment	-.276	.764	.131	1	.718	.759	.170	3.391
Constant	-1.841	2.041	.813	1	.367	.159		

Table 8.21. Logistic regression using both baseline and follow-up factors as independent variables; dependent variable is 'conviction during follow-up'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
PCL-R score	.154	.088	3.013	1	.083	1.166	.980	1.387
Number of convictions	-.022	.035	.387	1	.534	.978	.913	1.048
Time in high security	-.035	.136	.068	1	.794	.965	.739	1.260
Age	-.195	.086	5.140	1	.023	.823	.695	.974
Male gender	1.092	1.260	.751	1	.386	2.979	.252	35.20
Substance dependence	-.069	.931	.005	1	.941	.934	.151	5.786
Serious index offence	-.606	.833	.529	1	.467	.546	.107	2.793
Employment problems	.532	.893	.355	1	.551	1.702	.296	9.799
Childhood maladjustment	.744	.971	.586	1	.444	2.104	.314	14.12
Proportion of years with negative symptoms	-2.829	1.489	3.612	1	.057	.059	.003	1.093
Reached community	5.061	1.663	9.263	1	.002	157.722	6.060	4105
At least one year free of positive symptoms	-2.881	1.479	3.793	1	.051	.056	.003	1.018
Constant	.066	2.861	.001	1	.982	1.068		

Table 8.22. Logistic regression: course of psychosis and comorbid conditions as 'predictors' of conviction during follow-up.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
PCL-R score	.115	.047	5.918	1	.015	1.122	1.023	1.231
Antisocial personality disorder	.132	.536	.061	1	.806	1.141	.399	3.265
Proportion of years with positive symptoms	.365	.893	.167	1	.683	1.440	.250	8.282
Proportion of years with negative symptoms	-1.764	.966	3.337	1	.068	.171	.026	1.137
Substance dependence	1.447	.599	5.831	1	.016	4.248	1.313	13.74
Psychosis precipitated index behaviour	-.026	.569	.002	1	.964	.975	.319	2.973
Constant	-4.116	1.172	12.338	1	.000	.016		

Comparison of patients who were persistently aggressive, who were non-persistently aggressive, and who were not aggressive

Patients who were persistently aggressive (had an aggressive incident during more than 50% of follow-up years) were compared with patients who were aggressive but not persistently and patients who were not aggressive at all (tables 8.23, 8.24, 8.25 and 8.26).

Baseline variables

Persistent aggression during follow-up was significantly associated (compared to both other groups) with: civil legal status (as opposed to criminal disposal or prison transfer) and therefore not being restricted; younger age at first psychiatric contact, previous deliberate self-harm and epilepsy; not having a conviction, not having committed homicide and not having a serious conviction; being described as non-co-operative and persistently aggressive by psychiatrists; and higher mean Krawiecka total score. There were no significant differences between the three groups with respect to antisocial personality disorder, substance dependence or psychopathy; although antisocial personality disorder was more prevalent in the two aggressive groups than in the non-aggressive group.

Follow-up variables

Significantly fewer of the persistent aggression group were informal during follow-up compared with the non-persistently aggressive group, but this outcome was similar in the persistent aggression and not aggressive groups. Persistent aggression was significantly associated with: not leaving high security, not reaching the community, not living independently; serious violence, episodes of deliberate-self harm and higher mean SDAS total. The persistent aggression group were most likely to have a continuous course of psychosis and least likely to recover, compared to the other two groups. They were more likely to have a fluctuating course than the non-aggressive group, but had a similar rate of fluctuating course to the non-persistently aggressive group. The poorer course of psychosis was reflected in significantly higher mean proportion of years with positive symptoms and BPRS total. Although they had a higher mean SANS total and proportion of years with negative symptoms, this did not reach statistical significance. Persistent aggression was significantly associated with not being on clozapine, being on an anti-convulsant, and being non-complaint with medication and psychosocial treatment. Significantly more aggressive

patients (whether persistent or not) were interviewed at follow-up than non-aggressive patients.

The one persistently aggressive patient living independently in the community at follow-up was an individual with a temporal lobe lesion and epilepsy, who was persistently aggressive until he was treated with neuro-surgery which led to a complete remission of seizures, psychosis and violence.

Table 8.23. Comparison between patients who are persistently aggressive, non-persistently aggressive and not aggressive: categorical baseline variables

	Not aggressive	Non-persistently aggressive	Persistently aggressive	DF	Chi-square	P
DEMOGRAPHICS						
Male	36 (97.3)	75 (88.2)	38 (82.6)	2	4.45	0.108
Father's socio-economic group non-manual	5 (13.5)	11 (12.9)	10 (21.7)	2	1.91	0.386
LEGAL STATUS						
Civil	7 (18.9)	16 (18.8)	20 (43.5)	2	10.64	0.005
Criminal	23 (62.2)	50 (58.8)	20 (43.5)	2	3.73	0.155
Prison transfer	7 (18.9)	19 (22.4)	6 (13.0)	2	1.69	0.432
Restricted	23 (62.2)	49 (57.6)	15 (32.6)	2	9.54	0.008
PSYCHIATRIC / MEDICAL HISTORY						
Previous State Hospital admission	10 (27.0)	17 (20.0)	16 (34.8)	2	3.48	0.176
Previous deliberate self-harm	16 (43.2)	58 (68.2)	31 (67.4)	2	7.52	0.023
Epilepsy	1 (2.7)	10 (11.8)	12 (26.1)	2	10.03	0.007
FORENSIC HISTORY						
Convictions (either as index or previous offence)						
Any	36 (97.3)	81 (95.3)	33 (71.7)	2	20.50	0.000
Homicide	16 (43.2)	24 (28.2)	6 (13.0)	2	9.47	0.009
Violent	19 (51.4)	43 (50.6)	18 (39.1)	2	1.84	0.399
Sexual	9 (24.3)	14 (16.5)	6 (13.0)	2	1.90	0.386
'Serious'	32 (86.5)	61 (71.8)	24 (52.2)	2	11.79	0.003
Index offence						
Any	22 (59.5)	39 (45.9)	15 (32.6)	2	6.00	0.050
'Serious'	19 (51.4)	24 (28.2)	9 (19.6)	2	10.29	0.006
Stranger victim	7 (18.9)	14 (16.5)	6 (13.0)	2	0.55	0.761
PERSONAL HISTORY						
Early maladjustment	8 (22.9)	31 (38.3)	16 (35.6)	2	2.64	0.268
Employment problems	23 (65.7)	43 (53.8)	23 (53.5)	2	1.61	0.447
Relationship instability	22 (62.9)	52 (63.4)	35 (77.8)	2	3.12	0.210
COMORBIDITY						
Learning disability	1 (2.7)	3 (3.5)	4 (8.7)	2	2.20	0.333
Alcohol or drug dependence	14 (37.8)	39 (45.9)	17 (37.0)	2	1.27	0.531
Antisocial personality disorder	7 (18.9)	31 (36.5)	18 (39.1)	2	4.53	0.104
DSM Personality disorder	12 (34.3)	31 (37.3)	15 (33.3)	2	0.24	0.888

Table 8.23 (continued). Comparison between patients who are persistently aggressive, non-persistently aggressive and not aggressive: categorical baseline variables

	Not aggressive	Non-persistently aggressive	Persistently aggressive	DF	Chi-square	P
PSYCHIATRIST'S OPINION						
Need high security	7 (18.9)	28 (32.9)	15 (32.6)	6	8.57	0.199
Poor response to treatment	17 (54.8)	46 (56.1)	30 (71.4)	2	3.15	0.207
Non-co-operative with staff	5 (16.1)	12 (14.6)	15 (35.7)	2	8.02	0.018
Persistent aggression	1 (3.2)	12 (14.6)	18 (42.9)	2	20.64	0.000

Table 8.24. Comparison between patients who are persistently aggressive, non-persistently aggressive and not aggressive: continuous baseline variables

	Not aggressive (n=37)	Non-persistently aggressive (n=85)	Persistently aggressive (n=46)	F	P
DEMOGRAPHICS					
Age (years)	36.8	35.4	35.1	0.43	0.650
PSYCHIATRIC HISTORY					
Age at first contact (years)	21.3	20.6	**17.3**	6.05	0.003
Time in hospital (years)	8.8	8.2	11.8	2.39	0.095
Time since admission to State Hospital (years)	3.7	3.8	4.4	0.25	0.780
FORENSIC					
Number of convictions	12.3	10.4	12.7	0.57	0.566
PSYCHOPATHY					
PCL-R total	14.3	14.2	15.4	0.43	0.653
PCL-R factor 1	5.2	4.9	4.9	0.11	0.897
PCL-R factor 2	7.5	7.5	8.3	0.73	0.484
RISK INSTRUMENTS					
VRAG	6.1	4.4	5.2	0.09	0.912
H10 (of HCR-20)	13.1	13.4	13.6	0.22	0.806
MENTAL STATE (KRAWIECKA)					
Total	**5.9**	6.6	**8.8**	3.82	0.024

Table 8.25. Comparison between patients who are persistently aggressive, non-persistently aggressive and not aggressive: continuous follow-up variables

	Not aggressive	Non-persistently aggressive	Persistently aggressive	F	P
FORENSIC					
Number of aggressive incidents	0.0	5.5	**36.5**	29.70	0.000
Number of episodes of self-harm	0.1	3.2	**9.6**	6.69	0.002
Number of episodes of absconding	0.3	0.7	1.3	2.78	0.065
COURSE OF PSYCHOSIS					
Proportion of years with positive symptoms	0.48	0.57	**0.75**	7.05	0.001
Proportion of years with negative symptoms	0.45	0.46	0.60	2.68	0.071
MENTAL STATE / BEHAVIOUR AT FOLLOW-UP					
SDAS total	1.6	5.1	**9.8**	10.47	0.000
BPRS total	**29.8**	33.1	**39.8**	3.92	0.023
SANS total	28.0	33.5	42.1	2.89	0.060

Table 8.26. Comparison between patients who are persistently aggressive, non-persistently aggressive and not aggressive: categorical follow-up variables

	Not aggressive	Non-persistently aggressive	Persistently aggressive	DF	Chi-square	P
LEGAL STATUS						
Informal	7 (18.9)	29 (34.1)	7 (15.2)	2	6.71	0.035
Restricted	25 (67.6)	53 (62.4)	19 (41.3)	2	7.30	0.026
PROGRESS						
Leave high security	34 (91.9)	68 (80.0)	31 (67.4)	2	7.54	0.023
Return to high security	3 (8.1)	10 (11.8)	10 (21.7)	2	3.76	0.152
Reach community	17 (50.0)	36 (52.9)	7 (25.0)	2	6.51	0.039
FORENSIC						
Serious violence	0 (0.0)	12 (14.1)	20 (43.5)	2	27.85	0.000
Conviction	1 (3.0)	15 (18.1)	8 (19.0)	2	4.81	0.090
Violent conviction	0 (0.0)	9 (10.7)	6 (14.3)	2	4.76	0.093
SOCIAL FUNCTIONING						
Intimate relationship	8 (21.6)	19 (22.4)	7 (15.2)	2	1.00	0.607
Living independently at end of follow-up	7 (25.9)	11 (14.3)	1 (2.6)	2	7.51	0.023
COURSE OF PSYCHOSIS						
Continuous	12 (32.4)	27 (31.8)	21 (45.7)	4	12.18	0.016
Fluctuating	9 (24.3)	38 (44.7)	19 (41.3)			
Recover	16 (43.2)	20 (23.5)	6 (13.0)			
TREATMENT						
Atypical antipsychotic	25 (67.6)	58 (68.2)	35 (76.1)	2	1.04	0.594
Clozapine	23 (62.2)	35 (41.2)	17 (37.0)	2	6.12	0.047
Lithium	6 (16.7)	16 (19.3)	14 (30.4)	2	2.88	0.237
Anti-convulsant	8 (22.2)	23 (27.7)	25 (54.3)	2	12.19	0.002
Non-compliance with medication	2 (5.4)	15 (17.6)	13 (28.3)	2	7.31	0.026
Non-compliance with psychosocial intervention	5 (14.3)	33 (41.3)	20 (51.3)	2	11.67	0.003

Analysis of associates of persistent aggression using logistic regression

Baseline and follow-up independent variables

A model using the ten baseline variables in table 8.27 was able to correctly classify 77.2% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=14.73, df=8, p=0.065) and explained between 20.6 and 29.5% of the variability in the dependent variable (i.e. whether patients were violent during 50% or more of follow-up years). The significant factors in this model were having epilepsy and not having a conviction. Adding six follow-up variables to these baseline variables (table 8.28) improved the model to one which correctly classified 84.1% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=11.59, df=8, p=0.170), and explained between 38.2 and 55.1% of the variability in the dependent variable. The significant variables in this model were not having a previous conviction, not reaching the community and serious violence during follow-up; nearing statistical significance were younger age at first psychiatric contact, medication non-compliance, not leaving high security and epilepsy. Using backward conditional withdrawal of variables, the factors which best predicted conviction were young age, young age at first psychiatric contact, not having a conviction, not being prescribed clozapine, not reaching the community and serious violence during follow-up.

Course of psychosis and comorbidity as independent variables

A model using the six variables antisocial personality disorder, PCL-R score, substance dependence, proportion of years with positive symptoms, proportion of years with negative symptoms and psychosis as precipitant to index behaviour (Table 8.29) was able to correctly classify 71.3% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=7.81, df=8, p=0.452) and explained between 12 and 17.3% of the variability in the dependent variable (i.e. violent during at least 50% of follow-up years). The significant factors in this model were persistent positive symptoms and persistent negative symptoms.

Table 8.27. Logistic regression using only baseline factors as independent variables; dependent variable is 'violent during at least 50% of follow-up years'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Male gender	.537	.680	.623	1	.430	1.710	.451	6.484
Normal school	.554	.469	1.391	1	.238	1.740	.693	4.366
Civil detention	-.068	.535	.016	1	.900	.935	.328	2.667
Age	-.031	.024	1.698	1	.193	.969	.925	1.016
Age at first psychiatric contact	-.060	.042	2.052	1	.152	.942	.867	1.022
Self-harm	.011	.433	.001	1	.979	1.011	.433	2.363
Epilepsy	1.271	.536	5.630	1	.018	3.564	1.247	10.18
Conviction	-2.380	.752	10.013	1	.002	.093	.021	.404
Serious index offence	-.306	.502	.371	1	.543	.736	.275	1.972
Krawiecka total	.065	.044	2.162	1	.141	1.067	.979	1.163
Constant	2.125	1.601	1.762	1	.184	8.375		

Table 8.28. Logistic regression using both baseline and follow-up factors as independent variables; dependent variable is 'violent during at least 50% of follow-up years'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Gender male	-.386	.839	.212	1	.645	.679	.131	3.515
Normal school	.423	.564	.563	1	.453	1.527	.506	4.610
Civil detention	.750	.720	1.083	1	.298	2.117	.516	8.687
Age	-.047	.032	2.167	1	.141	.954	.896	1.016
Age at first psychiatric contact	-.097	.057	2.850	1	.091	.908	.811	1.016
Self-harm	-.250	.550	.206	1	.650	.779	.265	2.289
Conviction	-2.338	.940	6.190	1	.013	.097	.015	.609
Serious index offence	-.278	.643	.188	1	.665	.757	.215	2.668
Krawiecka total	.075	.067	1.246	1	.264	1.078	.945	1.229
Epilepsy	1.099	.698	2.483	1	.115	3.002	.765	11.78
Prescribed clozapine	-.794	.568	1.952	1	.162	.452	.148	1.377
Medication non-compliance	1.082	.651	2.767	1	.096	2.951	.825	10.56
At least a year free of positive symptoms	.718	.700	1.052	1	.305	2.050	.520	8.078
Left high security	-1.175	.640	3.367	1	.067	.309	.088	1.083
Reached community	-1.990	.760	6.854	1	.009	.137	.031	.606
Serious violence	2.160	.615	12.352	1	.000	8.668	2.599	28.90
Constant	4.444	2.377	3.494	1	.062	85.095		

Table 8.29. Logistic regression: course of psychosis and comorbid conditions as 'predictors' of violence during at least 50% of follow-up years.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
PCL-R score	.055	.031	3.029	1	.082	1.056	.993	1.124
Antisocial personality disorder	.199	.440	.204	1	.651	1.220	.515	2.890
Proportion of years with positive symptoms	1.862	.652	8.155	1	.004	6.439	1.793	23.11
Proportion of years with negative symptoms	1.253	.634	3.901	1	.048	3.500	1.010	12.13
Substance dependence	.108	.421	.066	1	.797	1.115	.489	2.543
Psychosis precipitated index behaviour	-.460	.423	1.184	1	.277	.631	.276	1.446
Constant	-3.478	.869	16.031	1	.000	.031		

Logistic regression analysis of associates of any violence during follow-up

Baseline and follow-up independent variables

A model using the ten baseline variables in table 8.30 was able to correctly classify 78.1% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=2.91, df=8, p=0.940) and explained between 12 and 18.4% of the variability in the dependent variable (i.e. whether patients were physically violent during follow-up). The significant baseline variables in this model were having a history of self-harm and not having a serious index offence. Adding five follow-up variables to these baseline variables (table 8.31) improved the model to one which correctly classified 86.5% of cases, was also a good fit (Hosmer and Lemeshow test: chi-square=13.81, df=8, p=0.087) and explained between 29.8 and 45.8% of the variability in the dependent variable. Significant variables in this model were baseline history of self-harm, not having a serious index offence, follow-up self-harm and not being prescribed clozapine.

Course of psychosis and comorbidity as independent variables

A model using the six variables antisocial personality disorder, PCL-R score, substance dependence, proportion of years with positive symptoms, proportion of years with negative symptoms and psychosis as precipitant to index behaviour (table 8.32) was able to correctly classify 79.2% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=6.83, df=8, p=0.555) and explained between 7.3 and 11.2% of the variability in the dependent variable (i.e. any physical violence during follow-up). The two significant factors in this model were antisocial personality disorder and persistent positive symptoms.

Table 8.30. Logistic regression using only baseline factors as independent variables; dependent variable is 'any violence during follow-up'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	-.045	.029	2.370	1	.124	.956	.903	1.012
Male gender	-.716	1.116	.412	1	.521	.489	.055	4.357
Substance dependence	.004	.455	.000	1	.993	1.004	.412	2.450
Self-harm	1.095	.436	6.312	1	.012	2.990	1.272	7.028
Previous conviction	-1.470	1.174	1.567	1	.211	.230	.023	2.296
Previous violent conviction	.140	.434	.103	1	.748	1.150	.491	2.693
PCL-R score	.016	.032	.239	1	.625	1.016	.954	1.081
Time in high security	.082	.045	3.231	1	.072	1.085	.993	1.186
Restriction order	.255	.472	.293	1	.588	1.291	.512	3.255
Serious index offence	-1.148	.476	5.818	1	.016	.317	.125	.806
Constant	4.010	1.855	4.675	1	.031	55.161		

Table 8.31. Logistic regression using both baseline and follow-up factors as independent variables; dependent variable is 'any violence during follow-up'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	-.067	.035	3.547	1	.060	.935	.873	1.003
Male gender	-1.078	1.437	.562	1	.453	.340	.020	5.692
Substance dependence	.543	.594	.836	1	.361	1.721	.537	5.515
Self-harm	1.459	.551	7.018	1	.008	4.300	1.461	12.64
Previous conviction	-1.408	1.404	1.005	1	.316	.245	.016	3.837
Previous violent conviction	.737	.567	1.688	1	.194	2.089	.688	6.346
PCL-R score	-.023	.040	.332	1	.565	.977	.903	1.057
Time in high security	.093	.053	3.064	1	.080	1.098	.989	1.219
Restriction order	.101	.576	.031	1	.861	1.106	.358	3.420
Serious index offence	-1.516	.577	6.896	1	.009	.220	.071	.681
Left high security	-2.070	.930	4.954	1	.026	.126	.020	.781
Episodes of self-harm during follow-up	.913	.416	4.820	1	.028	2.492	1.103	5.632
Reached community	-1.174	.610	3.702	1	.054	.309	.094	1.022
At least a year free of positive symptoms	-.737	.681	1.173	1	.279	.478	.126	1.817
Prescribed clozapine	-1.712	.565	9.181	1	.002	.180	.060	.546
Constant	8.421	2.710	9.651	1	.002	4539.77		

Table 8.32. Logistic regression: course of psychosis and comorbid conditions as 'predictors' of any violence during follow-up.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
PCL-R score	-.010	.034	.089	1	.766	.990	.926	1.058
Antisocial personality disorder	1.129	.532	4.495	1	.034	3.091	1.089	8.774
Proportion of years with positive symptoms	1.473	.627	5.523	1	.019	4.363	1.277	14.90
Proportion of years with negative symptoms	.124	.631	.039	1	.844	1.132	.329	3.895
Substance dependence	.191	.442	.186	1	.666	1.210	.509	2.877
Psychosis precipitated index behaviour	-.258	.464	.310	1	.578	.773	.311	1.917
Constant	.334	.741	.204	1	.652	1.397		

Discussion

The nature and frequency of aggression

Aggression of some kind was common during follow-up. Most of this aggression was relatively minor (i.e. did not lead to serious harm to victims), occurred in hospital (particularly in high security), was targeted at other patients and staff, and occurred when patients were actively psychotic (although not always overtly driven by psychotic symptoms). A relatively small number of patients were responsible for a disproportionate number of aggressive incidents. These results accord with findings from studies of in-patient violence (Crichton 1995) and other studies describing violence in high security hospitals (Larkin et al. 1988; Coldwell and Naismith 1989; Maden et al. 1993). Very few incidents, even those leading to injury, led to police involvement or prosecution.

A substantial minority of patients (over a quarter) committed a serious act of aggression and there was one homicide. This led to the patient being charged and returned to high security, but charges were subsequently dropped due to lack of evidence. Of just under 2000 aggressive incidents only 5.5% were serious. Serious violence less often occurred in the context of psychotic symptoms and was only driven by symptoms in a quarter of incidents, compared to over half of minor aggressive episodes. None of the cases of homicide committed in high security care, described by Gordon et al. (1997), occurred in the context of psychosis and 6 out of 7 victims were patients. It is notable that almost 1 in 10 acts of aggression of any type involved weapons. The use of weapons adds potential for serious injury and alarm to victims. Most weapons were things that were to hand (mugs, chairs, pens, cutlery) rather than specific implements of violence.

Sexual aggression was rare, usually minor, and was more often perpetrated against female staff. Non-contact sexual incidents occurred in the context of psychosis and just under half were driven by psychosis, whereas serious sexual aggression was never driven by psychosis. This accords with recent findings on the association between psychosis and sexual offending in the community (Alden et al. 2007). These showed an association between psychosis without comorbid conditions and minor sexual offending, but psychosis was only associated with serious sexual offending if comorbid personality disorder or substance misuse was diagnosed.

Aggression in the community was rare. Only 20 (1%) incidents occurred in the community, only 2 of these were serious, but in both cases victims were strangers. The lack of violence towards strangers was due to episodes occurring in hospital and the general lack of

association between psychosis and violence to strangers (Johnston and Taylor 2003). Either these patients do not pose a risk to the public in the community, or, services prevent this violence. The risk is not primarily to the public, but to staff and other patients. The lack of relative victims is due to violence being perpetrated on those who live with the person. In community studies this is relatives, carers and acquaintances (Böker and Häfner 1973; Lindquist 1986; Gottlieb et al. 1987; Steadman et al. 1998; Estroff and Zimmer 1994; Milton et al. 2001; Arsenealt et al. 2002), in hospital studies patients and staff (Crichton 1995). Violence towards patients and staff in secure settings is important, should be taken seriously and should be prosecuted where appropriate, particularly where serious violence occurs.

Cross-sectionally at follow-up assessment a third of patients were aggressive (verbally or physically) and a tenth had been physically aggressive in the last four weeks. Most of this aggression was minor and did not lead to harm to others. But hostility can be frightening for other patients, staff and relatives, and makes providing care and support more difficult. Cross-sectionally assessed aggression at interview was correlated with case not assessed aggression for that year, indicating convergent validity of the two approaches to assess aggression.

The correlations between different types of aggression and incidents might be understood in terms of the underlying factors of relevance to these behaviours, which will be set out in detail later: impulsivity (probably linked to all types of incident), anti-sociality (particularly linked to criminal offending and non-psychotic violence), irritability/hostility (linked to aggressive incidents), and emotional dysregulation (linked to aggression and self-harm). A number of studies have found an association between deliberate-self harm and aggression.

Associates of violence

Most patients who were violent at least once during follow-up manifested violence in in-patient settings, primarily high security. These patients were younger but had spent longer in high security. They had more frequent histories of self-harm, but were less 'criminal' than non-violent patients (less likely to have serious index offences, previous convictions, homicide convictions and serious convictions). They had higher rates of antisocial personality disorder, but not psychopathy, with more childhood maladjustment. They had a more chronic course of psychotic symptoms, ongoing self-harm during follow-up, were less complaint with treatment and were less likely to be treated with clozapine. They were less likely to leave high security, reach the community or live independently. They were more likely to be convicted during follow-up. Factors from the literature on schizophrenia and violence (see Chapter 2) which tie in with the factors identified in the current study include:

young age, psychotic symptoms, non-compliance, personality disorder, childhood conduct disorder, not being treated with atypical medication and perhaps violence related to being in close proximity with others due to institutional care. The clinical features, which differentiated patients who were violent at least once during follow-up, were antisocial personality disorder (according to Feighner criteria), but not psychopathy, and chronic psychosis (specifically chronic positive symptoms rather than negative symptoms). This group may represent individuals where pre-morbid conduct disorder is aetiologically related to the development of psychosis. Some of these patients were persistently aggressive, caused serious harm or were convicted, but 61 (46.6%) were not. These specific groups are discussed further below, but when they were excluded, the associates of being violent at least once during follow-up remained the same.

Associates of serious violence

The patients who caused serious harm to others were younger in keeping with general findings on aggression and offending. There were indicators of psychopathy and associated features: higher scores on risk scales, early maladjustment and non-compliance. This was born out by the regression analysis using psychosis and comorbid conditions, where the only significant factor, adjusting for the others, was psychopathy. The higher rates of hostility at follow-up interview may indicate a generally more hostile group. At follow-up they were more likely to be persistently aggressive; emphasizing that although most aggressive patients were not seriously violent, most seriously violent patients were aggressive in other ways. They also displayed more self-harm, perhaps reflecting more general behavioural disturbance, affective instability and/or problems with anger/frustration. Unsurprisingly they were more likely to be re-admitted to high security and spent less time in open settings, probably due to a cautious approach to rehabilitation following further serious violence.

This may not have been a homogeneous group. Although their illnesses were no worse, in terms of symptoms, they were not much better. This does not fit with the finding regarding psychopathy, which as will be shown later was related to a much better course of symptoms. There may have therefore been two groups amongst those who were seriously violent: a psychopathic group and a psychotic group, although the latter group was not identified in the regression analysis. Rather than a persistently psychotic group, this may have been a group that relapsed.

The finding regarding psychopathy is in keeping with studies which have examined serious/grave reconvictions in patients discharged from medium security and high security in the UK (see Chapter 3), findings from other countries (Bonta et al. 1998; Quinsey et al.

2006), the general literature on psychopathy (Hare 2006) and the literature on schizophrenia and violence (see Chapter 2). Other factors associated with serious/grave reconviction in studies of secure hospitals (such as ethnicity, previous serious offences, direct discharge to community and not being restricted) were not associated with serious harm in the current study. Ethnic groups in secure hospitals in England and Wales were not represented in this Scottish cohort. Also other studies have looked at serious/grave conviction rather than seriously harmful violence (whether leading to conviction or not). Most of the seriously harmful violence in the current study occurred in hospital and did not lead to conviction.

Associates of persistent violence

As would be expected this group showed a continuity of aggression through their background histories, baseline assessments, longitudinal follow-up data and cross-sectional assessments at the end of the study. These were patients whose aggression was manifest mainly in hospital and who had not committed the most serious acts of violence previously. This was reflected in high rates of civil detention at admission, lack of indicators of criminality, lack of serious convictions, unrestricted status and longer spent in hospital. They were a group with chronic psychotic symptoms, both positive and negative symptoms. But comorbid psychopathy, antisocial personality disorder and substance dependence were not features of this group.

The association with epilepsy may indicate a greater likelihood of brain pathology in certain areas, perhaps temporal regions, or more overt neuro-developmental pathology in aggressive patients with schizophrenia. Affective aggression has been reported in patients with schizophrenia and epilepsy (MacMurray 1973) and in patients with temporal-lobe epilepsy, inter-ictally rather than associated directly with seizures (van Elst et al. 2000). Although in general there is no direct association between having epilepsy and being more likely to commit acts of violence. Anticonvulsants were more likely to be prescribed in the persistently aggressive perhaps due to the higher prevalence of epilepsy, to treat persistent aggression and/or to treat treatment-resistant chronic psychosis with behavioural disturbance.

They were a generally behaviourally disturbed group with higher rates of deliberate self-harm. Their chronic aggression meant they were less likely to leave high security, they were more likely to be readmitted if they did leave and they were not discharged to the community. As highlighted for patients who displayed any aggression above, there may be a two way interaction, so being in hospital near others increases the likelihood of aggression. They had higher levels of unmet needs due to chronic disabling illness and aggression.

Despite chronic treatment resistant psychosis and aggression, they were least likely to have received treatment with clozapine. This may reflect that clozapine reduced aggression in patients prescribed it (Ratey et al. 1993;Volavka et al. 1993; Buckley et al. 1995; Menditto et al. 1996; Rabinowitz et al. 1996; Spivak et al. 1997, 1999; Chengappa et al. 1999; Volavka, 1999; Swinton and Haddock 2000; Chengappa et al. 2001; Citrome et al. 2001), or that due to aggression, behavioural disturbance and non-compliance, they were less likely to be prescribed a treatment taken orally and requiring haematological monitoring.

Overall this group were chronically psychotic but not specifically pre-morbidly aggressive. They had treatment-resistant debilitating illnesses with high levels of deficits in multiple areas. Their illnesses started early, and damaged their personalities and ability to function socially. However they were not a 'criminal', personality disordered or substance misusing group.

Conviction

By contrast with aggressive incidents generally, a minority of patients received a conviction during follow-up, most convictions were for relatively serious offences involving sexual or non-sexual violence and the great majority of offences leading to conviction occurred in the community. This was perhaps partly due to the opportunity to offended, but reaching the community was associated with factors related to antisociality and criminality (see Chapter 7). The re-conviction rate in the sample (12.6% for any offence and 9.5% for a serious offence) is less than that described in patients discharged from the English special hospitals followed up for 5 or 10 years (see Chapter 3), and less than that found in large longer-term studies of patients discharged from English medium secure units (e.g. Coid et al. 2007b Davies et al. 2007), but similar to that described in smaller shorter-term studies of English medium secure units (e.g. Maden et al. 1999a; Maden et al. 1999b; Castro et al. 2002; Edwards et al. 2002; Coid et al. 2007b). The ratio of serious to non-serious offences was higher than in medium or high security studies, but in keeping with the higher proportion of serious offences in high security cohorts compared to medium security ones. The average amount of follow-up out with high security in the current sample was 4-5 years (range 0 -10 years). Direct comparisons require some caution. Different studies have defined 'serious' or 'grave' offending in different ways; follow-up periods have varied; the current study is not of an incident discharge cohort but a resident cross-sectional cohort; and, various studies have included different types of patients, some with substantial proportions of patients with primary personality disorder who have a higher rate of re-offending. Thomson and Allen (2000) in a study of 171 patients discharged from the State Hospital followed-up for 10-13

years found that 31% of their cohort were convicted and19% committed a serious offence, figures which are similar to the high security and large long-term medium security studies cited above. The discrepancy with the current study is largely due to the methodological issues noted above, particularly the shorter follow-up time out with high security, but may also be due to the focus of the current study on patients with psychotic illness. Follow-up studies of violent mentally disordered offenders have consistently shown an inverse relationship between schizophrenia/psychosis and re-conviction (Bonta et al. 1998; Quinsey et al. 2006). The different nature of convicted offending compared with aggressive incidents is highlighted by the lack of correlation between the two.

Associates of conviction

Those who gained convictions had evidence of early onset and enduring antisociality not related to psychosis, as indicated by psychopathy, early maladjustment, substance dependence, previous convictions and higher scores on risk scales. Regression analysis indicated that the significant clinical factors in this group were psychopathy (rather than antisocial personality disorder) and substance dependence. Associated impulsivity may have been reflected in the histories of deliberate self-harm. Unlike the aggressive patients, described above, there were no indicators that pre-morbid antisocial conduct was associated developmentally with psychosis. They were younger, as would be expected in individuals who re-offend.

The lack of homicide or sexual offences, may reflect a cautious approach to the rehabilitation of such patients, diminishing the opportunity to re-offend, but may also reflect the generally lower rates of re-offending in these two groups compared to other offenders (Home Office 2001).

They were judged ready to leave high security, reflecting the better course of symptoms in the group. They were more likely to leave high security, reach the community and become informal, due to their better functioning and providing them with the opportunity to re-offend. Although it should be noted that factors associated with antisociality/criminality (such as psychopathy and substance dependence) were associated with reaching the community and better course of psychosis.

Their better illness course and functioning was reflected in their ability to form intimate relationships, the lower levels of psychopathology and particularly less negative symptoms. The higher levels of non-compliance, relationship breakdown, aggression, absconding and

self-harm probably reflect impulsivity and antisociality in the patients who re-offended. Re-offending meant they were more likely to return to high security.

Re-offending was therefore primarily associated with factors indicating life-long antisociality, criminality and impulsivity, and with better outcome in terms of illness factors and ability to function. In the many studies that have looked at rates of re-offending in former high security patients, the most important factors have been psychopathy/personality disorder, previous convictions, young age and lack of legally sanctioned supervision (see Chapter 3). These were found in this study, despite the fact that all the patients in the current study had schizophrenia, and there were no patients with primary personality disorders. This accords with replicated findings that the strongest associates of re-offending in individuals with mental illness are the same as those in those without (Bonta et al. 1998; Quinsey et al. 2006).

Absconding and self-harm

Absconding was not uncommon, but very rarely led to aggression. Most absconding incidents involved patients not returning from authorised leave either within hospital grounds or out with. The picture is similar to that described in other studies (Dolan and Snowden 1994; Brook et al. 1999; Castro et al. 2002; Gow et al. 2010). Before being allowed such leave clinicians should assess both the risk of absconding and the risk of violence. The latter is the most important factor. Patients must be gradually tested out, and a certain degree of absconding, not leading to aggression or offending, is a sign that services are testing out patients appropriately (Exworthy and Wilson 2010).

Self-harm was associated with minor aggression, occurred in about a third of patients, was generally not serious, and reduced with time. The self-harm rate cannot be compared with other secure hospital samples as none have reported a long-term follow-up. The one suicide is lower than would be expected in patients with schizophrenia (Palmer et al. 2005) and lower than that reported in other secure hospital studies (Maden et al. 1999; Coid et al. 2007b; Davies et al 2007)

Violence and offending: a complex relationship between determinants, outcomes and associated factors

Although the factors found to be associated with offending were very similar to those found in other studies, the factors associated with actual aggression (usually in in-patient settings), serious violence and persistent aggression were significantly different. This highlights that different factors are important in different types of aggression and antisocial conduct, in looking at severity of violence and when looking at persistence. In the literature review in Chapter 2 I highlighted the various factors that have been found to be associated with violence and offending in patients with schizophrenia, including substance misuse, personality disorder, psychotic symptoms, social environment, treatment response, treatment adherence and legal compulsion. All these factors came into play in different ways with these different violent and offending outcomes. Factors positively associated with one outcome were negatively associated with others. When looking at studies of offending and violence in patients with schizophrenia it is important to bear in mind whether the study looked at officially recorded offending, serious violence or persistent aggression. It is also important to consider the setting of the study, particularly in-patient aggression as opposed to offending in the community.

An important aspect to remember in the current study is these outcomes were recurrence of aggression and antisocial behaviour in individuals who had already been seriously aggressive. The factors that lead to such behaviour in the first place may or may not be the same factors that predict recurrence. This was also a managed and treated group, so if clinicians were concerned about risk they should have acted to reduce its likelihood, and perhaps did reduce its likelihood. This would have affected the strength of association between some factors and subsequent aggression and violence.

To summarise the main findings:

- Any aggression at follow-up was associated with pre-morbid antisocial personality disorder (but not psychopathy) and chronic positive (but not negative symptoms). Conduct disorder may have been developmentally associated with the risk of psychosis, and these patients had some indicators of poorer illness outcomes.
- Serious aggression was associated with psychopathy and hostility in a group of individuals who had no worse an illness course than those who were not seriously aggressive.

- Persistent aggression was associated with chronic, debilitating, treatment resistant psychosis (with ongoing positive and negative symptoms), but not pre-morbid antisocial conduct (as indicated by either antisocial personality disorder or psychopathy). This group may be aggressive due to behavioural disorganisation, behavioural instability, and poor interpersonal functioning due to the effect of chronic psychosis on personality functioning, alongside the potential role of positive symptoms.
- Criminal conviction was associated with factors indicating life-long criminality, impulsivity and antisociality (as indicated by psychopathy), substance dependence, and with better course of illness and functional outcome. These patients were more likely to reach the community due to their better illness course, giving them the opportunity to offend, but offending was not just down to opportunity.

CHAPTER 9
Clinical and social outcomes

Description of psychopathological outcomes

Symptoms ascertained from case records

Many patients had positive and negative symptoms during follow-up (tables 9.1 and 9.2). There was a reduction in the positive symptoms (hallucinations, delusions and thought disorder) year on year, but negative symptoms remained fairly constant and were present in two-thirds of patients each year. Depression, suicidal ideation, elation and anxiety were less prevalent. Suicidal ideation seemed to reduce year on year. On average patients were affected by positive symptoms for about two-thirds of the follow-up period, negative symptoms for a half of the follow-up period and affective symptoms for less than a tenth of the follow-up period. Most patients still had positive symptoms at the end of follow-up.

Over a third of patients had continuous positive symptoms, with few having long periods free of such symptoms (figures 9.1 and 9.2). Looking at the three potential types of symptom course, 60 (35.5%) had continuous positive symptoms, 67 (39.6%) had episodic relapsing and remitting symptoms and 42 (24.9%) had no recurrence following remission of positive symptoms (figure 9.3). Survival analysis (figure 9.4) showed the mean time to achieve a year without positive symptoms was 4.7 years (C.I. 4.2 – 5.3). Year-on-year the chances of achieving remission diminished.

Symptoms ascertained from interviews

Detailed tables for individual items of psychopathology rating scales at first and second follow-up interviews will be found in Appendix E.

Krawieka scale

At first follow-up interview 31 (33.3%) patients had "reality distortion", 7 (7.3%) "disorganization" and 27 (28.4%) "psychomotor poverty". The average total score was 6.0, median 5.0 , range (0 – 22). In terms of specific psychotic symptoms 22.4% had hallucinations, 29.8% delusions and 6.8% incoherence (table E1 in Appendix E).

At second follow-up interview 36 (29.8%) patients had "reality distortion", 9 (10.3%) "disorganization" and 36 (42.9%) "psychomotor poverty". The average total score was 7.3,

median 6.5, range 0 – 22. In terms of specific psychotic symptoms 28.9% had hallucinations, 32.3% delusions and 11.4% incoherence (table E2 in Appendix E). There were no significant differences between symptoms rated at the two follow-up interviews.

BPRS

At first follow-up 40 (41.2%) patients had "reality distortion", 11 (11.1%) "disorganization" and 79 (78.2%) "psychomotor poverty". The average total score was 30.9, median 28.0, range 17 – 61. See table E3 in Appendix E.

At second follow-up 36 (41.9%) patients had "reality distortion", 12 (14.3%) "disorganization" and 80 (93.0%) "psychomotor poverty". The average total score was 32.2, median 29.0, range 3 – 59. There were no significant differences between symptoms rated at the two follow-up interviews. See table E4 in Appendix E.

Comparing these results with the Krawieka results, it is apparent that the Krawieka definitions under estimated the prevalence of "reality distortion" and "psychomotor poverty" relative to the BPRS.

SANS

At first follow-up the number of patients with affective flattening was 51 (39.5%), alogia was 22 (17.1%), avolition-apathy was 38 (29.5%), anhedonia-asociality was 54 (41.9%), and inattentiveness was 39 (30.2%). At second follow-up the number of patients with affective flattening was 49 (38.3), alogia was 18 (14.1), avolition-apathy was 42 (32.8), anhedonia-asociality was 59 (46.1), and inattentiveness was 29 (22.7). There were no significant differences between symptoms rated at the two follow-up interviews. See tables E5 and E6 in Appendix E.

Correlation between interview rated and case record psychopathology

The correlation between psychopathology as rated in case notes in a particular year and psychopathology assessed at interview that year was ascertained separately. The case note determined items of psychopathology had been assessed on a four-point scale (absent, possibly present, probably present, definitely present in a particular year). Relevant items from interview using the BPRS, Krawiecka, CPRS and SANS were correlated with case not determined psychopathology, as shown in table 9.4. Ratings of positive symptoms correlated

well. Ratings of other symptoms were generally significantly correlated, but not as strongly as positive symptoms. Correlations for depression and suicidal ideation were poor.

Table 9.1. Psychopathology during follow-up from case records.

Psychopathology	Definite or probable symptoms each year - N above, *% in italics below*										Any symptoms during follow-up
	1992 (n=154)	1993 (n=165)	1994 (n=159)	1995 (n=158)	1996 (n=153)	1997 (n=155)	1998 (n=152)	1999 (n=151)	2000 (n=144)	2001 (n=143)	
Positive symptoms	**119**	**114**	**99**	**94**	**90**	**84**	**83**	**80**	**65**	**84**	**159**
	77.3	***69.1***	***62.3***	***59.5***	***58.8***	***54.5***	***54.6***	***53.0***	***45.1***	***58.7***	***94.1***
Delusions	109	104	91	85	81	72	75	77	57	80	155
	71.2	*63.4*	*57.6*	*53.8*	*52.9*	*46.5*	*49.3*	*51.3*	*39.9*	*55.9*	*92.3*
Hallucinations	86	89	81	71	70	63	63	55	52	53	137
	56.2	*53.9*	*50.9*	*45.5*	*45.8*	*41.4*	*41.4*	*36.7*	*36.4*	*37.3*	*81.1*
Thought disorder	43	41	42	37	35	31	31	28	21	35	91
	29.3	*25.9*	*27.5*	*24.5*	*24.0*	*20.8*	*20.8*	*18.8*	*15.0*	*24.8*	*54.5*
Negative symptoms	61	83	101	89	81	75	73	72	69	69	147
	67.0	*69.2*	*73.2*	*67.4*	*68.1*	*64.7*	*64.0*	*63.2*	*68.3*	*59.0*	*88.6*
Affective symptoms	43	40	31	33	27	24	26	25	24	45	102
	27.7	*24.7*	*19.7*	*21.2*	*17.8*	*15.8*	*17.3*	*16.9*	*17.1*	*31.9*	*60.4*
Depression	23	27	13	19	11	10	18	12	10	23	73
	14.9	*16.7*	*8.3*	*12.3*	*7.2*	*6.6*	*12.1*	*8.2*	*7.1*	*16.4*	*43.2*
Suicidal ideation	18	18	16	9	7	8	14	6	5	20	56
	11.7	*11.2*	*10.2*	*5.8*	*4.6*	*5.2*	*9.4*	*4.1*	*3.6*	*14.3*	*33.1*
Elation	7	6	12	15	9	6	7	8	8	17	39
	4.6	*3.7*	*7.7*	*9.7*	*5.9*	*3.9*	*4.7*	*5.4*	*5.7*	*12.1*	*23.1*
Anxiety	16	16	12	13	11	9	11	13	13	14	57
	11.3	*10.5*	*7.8*	*8.6*	*7.4*	*6.0*	*7.4*	*8.8*	*9.4*	*14.0*	*33.7*

Table 9.2. Summary of psychopathology during the follow-up period.

Psychopathology	Any during follow-up-period N (%)	Mean number of years with symptoms	Mean proportion of follow-up with symptoms	Mean number of years symptom free
Positive symptoms	159 (94.1)	5.4	0.61	3.7
Delusions	155 (91.7)	4.9	0.55	4.2
Hallucinations	137 (81.0)	4.0	0.45	5.1
Thought disorder	91 (53.8)	2.0	0.23	7.1
Negative symptoms	147 (87.0)	4.6	0.50	4.5
Affective symptoms	102 (60.4)	1.9	0.21	7.2
Depression	73 (43.2)	1.0	0.10	8.1
Suicidal ideation	56 (33.1)	0.7	0.08	8.4
Elation	39 (21.3)	0.6	0.06	8.6
Anxiety	57 (33.7)	0.8	0.09	8.4

Figure 9.1. Proportion of valid follow-up period with positive symptoms.

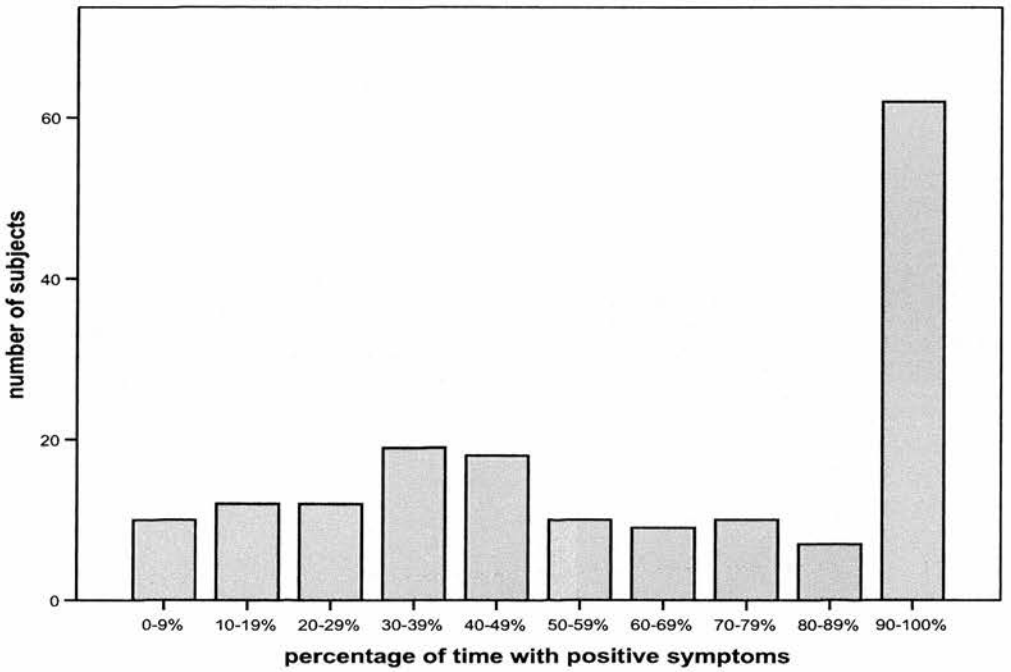


Figure 9.2. Longest continuous period during follow-up without positive symptoms.

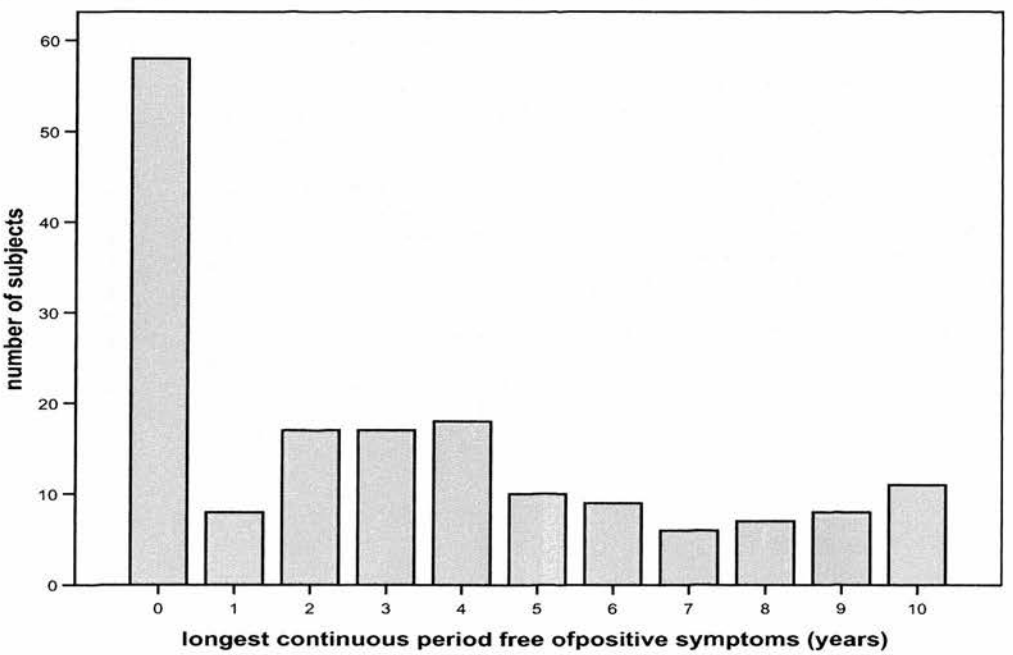


Figure 9.3. Numbers of subjects during follow-up with three different courses with respect to continuity of positive symptoms.

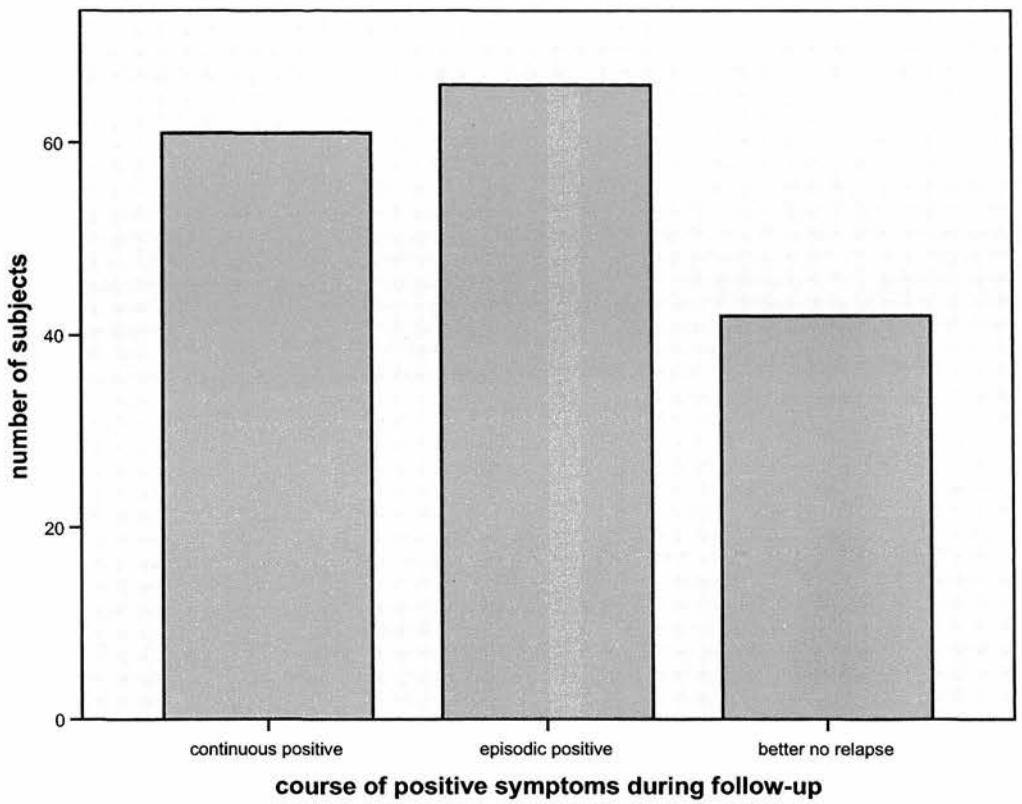


Figure 9.4. Kaplan-Meier survival curve: time to achieve one year free of positive symptoms.

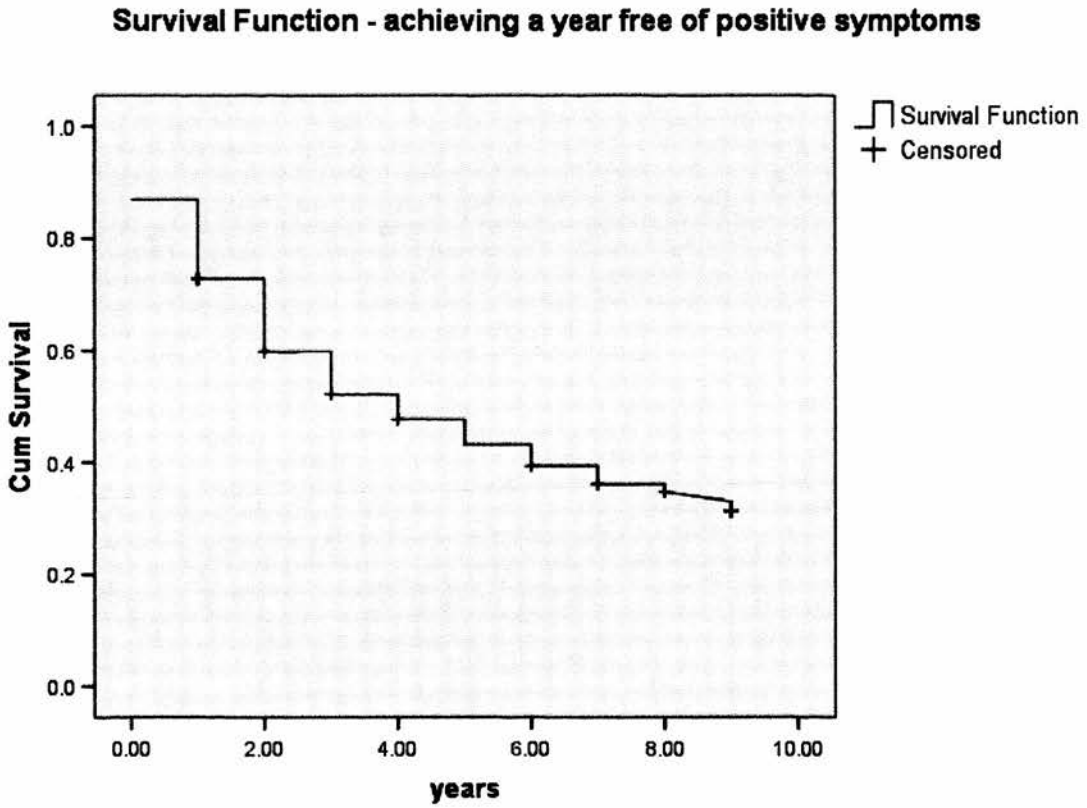


Table 9.4. Pearson correlations between interview rated items of psychopathology and case note determined items of psychopathology.

	First follow-up				Second follow-up			
	BPRS	Krawiecka	CPRS	SANS	BPRS	Krawiecka	CPRS	SANS
Anxiety	Anxiety	Anxious			Anxiety	Anxious		
	0.48**	0.45**			0.34**	0.34**		
Delusions	Unusual thought content	Coherent delusions			Unusual thought content	Coherent delusions		
	0.74**	0.71**			0.74**	0.73**		
Hallucinations	Hallucinatory behaviour	Hallucinations			Hallucinatory behaviour	Hallucinations		
	0.56**	0.56**			0.71**	0.77**		
Thought disorder	Conceptual disorg	Incoherence			Conceptual disorg	Incoherence		
	0.63**	0.72**			0.63**	0.78**		
Depression	Depressive mood	Depression			Depressive mood	Depression		
	0.20	0.04			0.37**	0.38**		
Suicidal			Suicidal thoughts				Suicidal thoughts	
			0.15				0.36**	
Elation	Excitement		Elated mood		Excitement		Elated mood	
	0.35**		0.54**		0.25*		0.23*	
Negative				Global affective flattening				Global affective flattening
				0.35**				0.47**
				Global alogia				Global alogia
				0.43**				0.39**
				Global avolition-apathy				Global avolition-apathy
				0.48**				0.48**
				Global anhedonia asociality				Global anhedonia asociality
				0.32**				0.46**

Change in psychopathology ratings from baseline to follow-up

Changes in the ratings of individual items of the Krawiecka from baseline to follow-up interview are shown in table 9.5. There was a significant decrease in depression and delusions, and a non-significant decrease in hallucinations. There was no change in incoherence or anxiety. There was a significant increase in negative symptoms (flatness/incongruity of affect, psychomotor retardation and muteness). The average total Krawiecka score had not changed significantly from baseline to follow-up, reflecting that although some areas of psychopathology improved (positive and affective symptoms), others worsened (negative symptoms) and others stayed the same (thought disorder). It should be noted that the mean score for the individual psychopathology items was low; less than one for all but three items (flattened/incongruous affect, delusions, hallucinations) at baseline and at follow-up.

Table 9.5. Paired samples t-test comparing scores on individual Krawiecka items at baseline and follow-up interviews.

Krawiecka item	N	Baseline mean score on item	Follow-up mean score on item	t	P
Depression	111	0.82	0.37	4.52	0.000
Anxiety	111	0.49	0.48	0.09	0.931
Delusions	111	2.10	1.54	2.76	0.007
Hallucinations	112	1.28	1.06	1.27	0.206
Incoherence	112	0.41	0.50	-0.87	0.386
Flat/incongruous affect	112	1.10	2.02	-6.38	0.000
Psychomotor retardation	112	0.28	0.62	-3.38	0.001
Muteness	112	0.06	0.54	-3.97	0.000

Comparison of patients by course of psychosis

Three groups of patients with respect to course of psychosis were compared: those with continuous positive symptoms (i.e. had no year without symptoms), those with episodic symptoms (i.e. had at least a year free of symptoms followed by at least a year with symptoms), and those who 'recovered' (i.e. achieved a year without symptoms not followed by any further years with symptoms). The results of this comparison are set out in tables 9.6, 9.7, 9.8 and 9.9.

Baseline variables

There were few differences between patients who had episodic symptoms and those who recovered, but there were a number of significant differences between patients with continuous symptoms compared to other patients (tables 9.6 and 9.7).

Those with continuous symptoms were significantly older. They were significantly more likely to be under civil rather than criminal legislation, less likely to have been transferred from prison and significantly less likely to be restricted. They had spent more time in hospital and more time in the State Hospital. In terms of forensic histories, they were less likely to have a conviction, a violent conviction, a serious conviction and to have attacked strangers. They were significantly less likely to have had childhood maladjustment and employment problems. They had less substance dependence, were less psychopathic and had less antisocial personality disorder, although the latter did not reach statistical significance. They had a significantly lower mean H10 total. They had more psychopathology at baseline as indicated by a significantly higher mean Krawiecka total and psychiatrist's describing poor response to treatment.

Those who recovered were more likely to have had stranger victims and were older at first contact with psychiatric services, but were other wise similar to those with an episodic course,

Follow-up variables

Again, there were few differences between patients with an episodic course compared with patients who recovered, but there were a number of significant differences between patients with a continuous course compared with other patients (tables 9.8 and 9.9).

Those with continuous symptoms had more aggressive incidents but were less likely to be convicted. They were less likely to reach the community, to form an intimate relationship or

to live independently. They were less likely to leave high security, but this did not reach statistical significance. They had more psychopathology and behavioural problems at follow-up assessment as indicated by higher mean totals on the BPRS, SANS and SDAS. They were significantly more likely to have received clozapine.

Those with an episodic course were most likely to be convicted and were just as likely to be aggressive as the continuous course patients, but their aggression was less persistent as indicated by a similar mean number of aggressive incidents as the recovered group. Those who recovered were most likely to be living independently and were least likely to receive atypical antipsychotics.

There were no significant differences between the three groups with respect to serious violence or violent convictions, although the episodic group were more likely to achieve these outcomes.

Table 9.6. Comparison between patients by course of psychosis: categorical baseline variables

	Continuous (n=61)	Episodic (n=66)	Recover (n=42)	DF	Chi-square	P
DEMOGRAPHICS						
Male	51 (83.6)	61 (92.4)	38 (90.5)	2	2.64	0.268
Father's socio-economic group non-manual	12 (19.7)	8 (12.1)	6 (14.3)	2	1.44	0.487
LEGAL STATUS						
Civil	27 (44.3)	9 (13.6)	7 (16.7)	2	17.95	0.000
Criminal	32 (52.5)	38 (57.6)	24 (57.1)	2	0.39	0.823
Prison transfer	2 (3.3)	19 (28.8)	11 (26.2)	2	15.36	0.000
Restricted	20 (32.8)	44 (66.7)	24 (57.1)	2	15.16	0.001
PSYCHIATRIC / MEDICAL HISTORY						
Previous State Hospital admission	16 (26.2)	18 (27.3)	9 (21.4)	2	0.49	0.781
Previous deliberate self-harm	34 (55.7)	44 (66.7)	28 (66.7)	2	1.99	0.369
Epilepsy	8 (13.1)	7 (10.6)	8 (19.0)	2	1.58	0.455
FORENSIC HISTORY						
Convictions (either as index or previous offence)						
Any	45 (73.8)	66 (100.0)	40 (95.2)	2	24.96	0.000
Homicide	12 (19.7)	19 (28.8)	16 (38.1)	2	4.26	0.119
Violent	13 (21.3)	41 (62.1)	26 (61.9)	2	25.94	0.000
Sexual	9 (14.8)	11 (16.7)	9 (21.4)	2	0.798	0.671
'Serious'	30 (49.2)	55 (83.3)	33 (78.6)	2	19.58	0.000
Index offence						
Any	24 (39.3)	31 (47.0)	22 (52.4)	2	1.79	0.408
'Serious'	17 (27.9)	21 (31.8)	15 (35.7)	2	0.72	0.697
Stranger victim	6 (9.8)	9 (13.6)	12 (28.6)	2	6.95	0.031
PERSONAL HISTORY						
Early maladjustment	10 (17.5)	32 (50.0)	13 (31.7)	2	14.29	0.001
Employment problems	24 (41.4)	39 (62.9)	26 (66.7)	2	8.03	0.018
Relationship instability	40 (70.2)	45 (69.2)	25 (61.0)	2	1.07	0.586
COMORBIDITY						
Learning disability	4 (6.6)	4 (6.1)	0 (0.0)	2	2.79	0.247
Alcohol or drug dependence	14 (23.0)	36 (54.5)	20 (47.6)	2	13.93	0.001
Antisocial personality disorder	14 (23.0)	28 (42.4)	14 (33.3)	2	5.43	0.066
DSM Personality disorder	15 (25.9)	29 (44.6)	14 (34.1)	2	4.75	0.093

Table 9.6 (continued). Comparison between patients by course of psychosis: categorical baseline variables

	Continuous (n=61)	Episodic (n=66)	Recover (n=42)	DF	Chi-square	P
PSYCHIATRIST'S OPINION						
Need high security	20 (32.8)	17 (25.8(	13 (31.0)	6	2.63	0.854
Poor response to treatment	50 (87.7)	25 (40.3)	19 (51.4)	2	29.46	0.000
Non-co-operative with staff	15 (26.3)	11 (17.7)	6 (16.2)	2	1.89	0.389
Persistent aggression	17 (29.8)	10 (16.1)	5 (13.5)	2	4.87	0.087
MENTAL STATE (Krawiecka)						
Reality distortion	48 (80.0)	30 (48.4)	18 (47.4)	2	16.01	0.000
Disorganisation	14 (23.3)	3 (4.8)	0 (0.0)	2	16.91	0.000
Psychomotor poverty	28 (46.7)	16 (25.8)	7 (18.4)	2	10.27	0.006

Table 9.7. Comparison between patients by course of psychosis: continuous baseline variables

	Continuous (n=61)	Episodic (n=66)	Recover (n=42)	F	P
DEMOGRAPHICS					
Age (years)	**38.9**	**33.2**	35.0	6.57	0.002
PSYCHIATRIC HISTORY					
Age at first contact (years)	18.7	19.2	**22.4**	4.93	0.008
Time in hospital (years)	**13.0**	7.5	7.4	7.50	0.001
Time since admission to State Hospital (years)	**5.8**	**2.8**	3.3	4.84	0.009
FORENSIC					
Number of convictions	**7.8**	12.0	**15.0**	3.98	0.21
PSYCHOPATHY					
PCL-R total	**11.8**	**16.8**	14.6	8.62	0.000
PCL-R factor 1	**4.1**	**5.7**	4.9	3.69	0.027
PCL-R factor 2	**6.5**	**8.8**	7.8	5.91	0.003
RISK INSTRUMENTS					
VRAG	2.3	7.1	5.1	0.95	0.388
H10 (of HCR-20)	**12.0**	14.5	13.6	9.91	0.000
MENTAL STATE (KRAWIECKA)					
Total	**10.0**	5.2	5.4	19.45	0.000

Table 9.8. Comparison between patients by course of psychosis: continuous follow-up variables

	Continuous (n=61)	Episodic (n=66)	Recover (n=42)	F	P
FORENSIC					
Number of aggressive incidents	**20.2**	9.3	7.5	3.29	0.040
Number of episodes of self-harm	4.6	3.7	4.9	0.13	0.878
Number of episodes of absconding	0.8	0.8	0.8	0.00	0.998
MENTAL STATE / BEHAVIOUR AT FOLLOW-UP					
SDAS total	**9.3**	4.0	4.5	7.59	0.001
BPRS total	**48.0**	30.4	25.1	40.86	0.000
SANS total	**51.9**	27.3	23.9	24.14	0.000

Table 9.9. Comparison between patients by course of psychosis: categorical follow-up variables

	Continuous (n=61)	Episodic (n=66)	Recover (n=42)	DF	Chi-square	P
LEGAL STATUS						
Informal	9 (14.8)	21 (31.8)	13 (31.0)	2	5.76	0.056
Restricted	27 (44.3)	44 (66.7)	27 (64.3)	2	7.44	0.024
PROGRESS						
Leave high security	44 (72.1)	55 (83.3)	35 (83.3)	2	2.98	0.225
Return to high security	8 (13.1)	15 (22.7)	5 (11.9)	2	3.00	0.223
Reach community	10 (25.0)	27 (51.9)	23 (60.5)	2	11.06	0.004
FORENSIC						
Any aggressive incident	48 (80.0)	57 (86.4)	**26 (61.9)**	2	9.17	0.010
Serious violence	10 (16.7)	15 (22.7)	7 (16.7)	2	0.955	0.620
Conviction	3 (5.7)	**15 (23.4)**	6 (14.6)	2	7.13	0.028
Violent conviction	2 (3.8)	10 (15.4)	3 (7.3)	2	4.90	0.086
SOCIAL FUNCTIONING						
Intimate relationship	**3 (4.9)**	22 (33.3)	9 (21.4)	2	15.99	0.000
Living independently at end of follow-up	**1 (2.1)**	9 (15.3)	9 (25.7)	2	10.06	0.007
TREATMENT						
Atypical antipsychotic	48 (78.7)	48 (72.7)	23 (54.8)	2	7.11	0.029
Clozapine	38 (62.3)	23 (34.8)	15 (35.7)	2	11.59	0.003
Lithium	15 (24.6)	13 (20.3)	8 (19.5)	2	0.488	0.783
Anti-convulsant	23 (37.7)	22 (34.4)	11 (26.8)	2	1.32	0.518
Non-compliance with medication	12 (19.7)	13 (19.7)	5 (11.9)	2	1.31	0.520
Non-compliance with psychosocial intervention	23 (41.8)	21 (35.0)	14 (35.0)	2	0.70	0.703

Analysis of associates of not having continuous positive symptoms using logistic regression

Baseline and follow-up independent variables

A model using the 11 baseline variables in table 9.10 was able to correctly classify 77.7% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=10.99, df=8, p=0.202) and explained between 32.3 and 44.3% of the variability in the dependent variable (i.e. whether patients achieved a year free of positive symptoms). The significant baseline variables in this model were childhood maladjustment and a lower Krawiecka total score. Adding five follow-up variables to these baseline variables (table 9.11) improved the model to one which correctly classified 85.4% of cases, was also a good fit (Hosmer and Lemeshow test: chi-square=6.61, df=8, p=0.579) and explained between 45.2 and 62.6% of the variability in the dependent variable. Significant variables in this model were younger age, lower Krawiecka total at baseline and not being prescribed clozapine during follow-up. Using backward conditional withdrawal of variables, the factors which best predicted remission of positive symptoms were young age, lower PCL-R score, more serious previous offending, employment problems, lower Krawiecka total at baseline, not being prescribed clozapine during follow-up, less chronic negative symptoms, reaching the community, not being convicted during follow-up and less aggressive incidents during follow-up.

Comorbidity and psychotic precipitant as independent variables

A model using the five variables antisocial personality disorder, PCL-R score, substance dependence, proportion of years with negative symptoms and psychosis as precipitant to index behaviour was a poor fit (Hosmer Lemeshow test: chi-square=19.99, df=8, p=0.010). Dropping 'proportion of years with negative symptoms', the four remaining independent variables (antisocial personality disorder, PCL-R score, substance dependence, proportion and psychosis as precipitant to index behaviour; table 9.12) produced a model which was a good fit (Hosmer and Lemeshow test: chi-square=6.65, df=8, p=0.575), correctly classified 71.9% of cases, and explained between 14.2 and 19.7% of the variability in the dependent variable (i.e. one year free of positive symptoms). The significant factors in this model were psychopathy and substance dependence.

Table 9.10. Logistic regression using only baseline factors as independent variables; dependent variable is 'at least a year without positive symptoms'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	-.014	.037	.140	1	.708	.986	.916	1.061
PCL-R total	-.001	.043	.001	1	.978	.999	.917	1.087
Time in psychiatric hospitals	-.029	.037	.606	1	.436	.971	.903	1.045
Gender male	-.416	.731	.324	1	.569	.660	.157	2.762
Civil detention	.197	.565	.121	1	.728	1.217	.402	3.683
Serious conviction	.659	.538	1.500	1	.221	1.932	.673	5.544
Stanger victim	.120	.672	.032	1	.859	1.127	.302	4.210
Childhood maladjustment	1.315	.626	4.419	1	.036	3.725	1.093	12.69
Employment problems	.033	.504	.004	1	.948	1.033	.385	2.775
Substance dependence	.770	.507	2.307	1	.129	2.159	.800	5.832
Krawiecka total	-.221	.052	18.380	1	.000	.802	.724	.887
Constant	2.282	1.528	2.230	1	.135	9.800		

Table 9.11. Logistic regression using both baseline and follow-up factors as independent variables; dependent variable is 'at least a year without positive symptoms'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	-.120	.056	4.497	1	.034	.887	.794	.991
PCL-R total	-.043	.056	.605	1	.437	.958	.859	1.068
Time in psychiatric hospitals	.003	.055	.004	1	.952	1.003	.902	1.117
Gender male	.075	1.020	.005	1	.941	1.078	.146	7.961
Civil detention	.212	.736	.083	1	.773	1.237	.292	5.234
Serious conviction	.343	.668	.263	1	.608	1.409	.381	5.214
Stanger victim	.167	.808	.043	1	.836	1.182	.243	5.756
Childhood maladjustment	.479	.826	.336	1	.562	1.614	.320	8.149
Employment problems	.797	.645	1.526	1	.217	2.218	.627	7.847
Substance dependence	.233	.630	.136	1	.712	1.262	.367	4.341
Krawiecka total	-.248	.071	12.115	1	.001	.780	.678	.897
Prescribed clozapine	-2.278	.701	10.567	1	.001	.103	.026	.405
Proportion of years with negative symptoms	-.843	.977	.744	1	.389	.431	.063	2.923
Reached community	1.137	.762	2.228	1	.136	3.119	.700	13.88
Convicted	-1.994	1.206	2.733	1	.098	.136	.013	1.448
Number of aggressive incidents	-.031	.019	2.765	1	.096	.969	.934	1.006
Constant	8.645	2.673	10.460	1	.001	5683.19		

Table 9.12. Logistic regression: comorbid conditions and psychosis as precipitant to index behaviour as 'predictors' of achieving one year free of positive symptoms during follow-up.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
PCL-R score	.082	.030	7.527	1	.006	1.086	1.024	1.151
Antisocial personality disorder	-.216	.447	.234	1	.628	.806	.336	1.933
Substance dependence	1.182	.406	8.498	1	.004	3.261	1.473	7.220
Psychosis precipitated index behaviour	-.528	.409	1.666	1	.197	.590	.264	1.315
Constant	-.454	.530	.732	1	.392	.635		

Other clinical and social outcomes

Treatment

Pharmacological treatment and side-effects

Table 9.13 sets out the changing trends in prescribing during follow-up. Treatment with typical anti-psychotics reduced from almost every patient to under half of patients, atypical drugs increased from about 1 in 8 to two-thirds, depot medication reduced from over a half to less than a third coinciding with increased use of atypical drugs, clozapine increased from 1 in 8 to over a third, and high dose prescribing reduced from almost two-thirds to a third of cases. Some patients were on extremely high doses of medication throughout the follow-up period. The range of medications prescribed, including drugs other than anti-psychotics is set out in table 9.14. Twenty-two (28.9%) of the 76 patients who were on clozapine during the follow-up period stopped taking it for various reasons including side-effects, lack of efficacy and non-compliance. Eighty two patients (49.1%) met the criteria for 'treatment resistance' (Kane et al. 1988; Kane 1996) in terms of the medication prescribed during the follow-up period. Combining baseline and follow-up data the life-time rates of prescription were calculated (table 9.15). All patients had been on an anti-psychotic, a third lithium, over half an anti-depressant, a third an anti-convulsant, a half a benzodiazepine and 9 in 10 an anti-cholinergic.

Of all the subjects 70 (41.4%) had at least a year free of positive symptoms without receiving clozapine. The rest, 99 (58.6%) subjects, could be said to have treatment resistant schizophrenia. Of the 61 patients with continuous positive symptoms throughout follow-up 38 (62.3%) were prescribed clozapine at some point. Thirty-eight (50%) of the 76 patients prescribed clozapine at some point during follow-up had continuous positive symptoms.

Appendix E (tables E7 – E11) sets out the detailed results of follow-up assessments using the AIMS, TAKE and Barnes rating scales for tardive dyskinesia, parkinsonism and akathisia. At first follow-up 1 (0.8%) patient had tardive dyskinesia as defined by severity or incapacity more than 2 (mild) using the AIMS (table E7); 6 (6.8%) patients had parkinsonism defined as bradykinesia, rigidity or tremor more than 2 (mild) using the TAKE (table E9); 7 (7.3%) patients had akathisia defined as global rating more than 2 (mild) using the Barnes (table E10). At second follow-up 1 (1.1%) patient had tardive dyskinesia (table E8); 7 (7.7%) patients had parkinsonism (table E9); 1 (1.1%) patient had akathisia (Table E11). Compared with the baseline assessments there was a marked and significant decrease in the prevalence of extra-pyramidal symptoms (see Appendix F for a detailed comparison of

AIMS and TAKE items at baseline and follow-up using paired samples t-tests). At baseline (see tables C1.3 and C1.4 in Appendix C1) 13 patients (8.1%) had tardive dyskinesia, 135 (84.4%) had parkinsonism and 83 (51.9%) had akathisia. These improvements were most likely due to the reduction in the prescription of high doses of typical anti-psychotics.

Table 9.13. Regular antipsychotic prescription in the first week of each follow-up year. Numbers with percentage in italics, except for average dose in mg chlorpromazine equivalence.

	1992 (n=118)	1993 (n=147)	1994 (n=154)	1995 (n=152)	1996 (n=148)	1997 (n=142)	1998 (n=142)	1999 (n=145)	2000 (n=142)	2001 (n=138)
Any antipsychotic	115	145	151	149	146	140	136	139	140	136
	97.5	*98.6*	*98.1*	*98.0*	*98.6*	*98.6*	*95.8*	*95.9*	*98.6*	*98.6*
Typical antipsychotic	110	136	138	133	117	102	91	78	67	63
	93.2	*92.5*	*89.6*	*87.5*	*79.1*	*71.8*	*64.1*	*53.8*	*47.2*	*45.7*
Atypical antipsychotic	15	26	36	33	55	65	70	85	94	91
	12.7	*17.7*	*23.4*	*21.7*	*37.2*	*45.8*	*49.3*	*58.6*	*66.2*	*65.9*
Depot antipsychotic	70	89	104	108	88	81	68	53	50	44
	59.3	*60.5*	*67.5*	*71.1*	*59.5*	*57.0*	*47.9*	*36.6*	*35.2*	*31.9*
Clozapine	15	26	27	24	37	39	38	45	50	52
	12.7	*17.7*	*17.5*	*15.8*	*25.0*	*27.5*	*26.8*	*31.0*	*35.2*	*37.7*
High dose antipsychotics	73	90	110	110	95	86	72	55	49	43
	61.9	*61.2*	*71.4*	*72.4*	*64.2*	*60.6*	*50.7*	*37.9*	*34.5*	*31.2*
Chlorpromazine equivalence of daily prescription - **mean (in bold)**, median & *maximum (in italics)*	**2892** 900	**3378** 1575	**3989** 2175	**4166** 2350	**3280** 1540	**2955** 1187	**2510** 775	**2012** 699	**2071** 750	**1943** 700
	33265	*31292*	*29492*	*28992*	*22494*	*28420*	*28891*	*28792*	*63981*	*63731*

Table 9.14. *Psychotropic medication prescribed on a regular basis during the whole follow-up period.*

Drug	N	%	Mean duration of longest continuous treatment (years)	Range
Antipsychotics				
Phenothiazines (e.g. chlorpromazine)	154	90.6	3.4	2 wk – 10 yr
Butyrophenones (e.g. haloperidol)	80	47.1	1.7	1 wk – 10 yr
Thioxanthines (e.g. flupenthixol)	112	65.9	4.0	1 wk – 10 yr
Substituted benzamides (e.g. sulpiride)	42	24.7	1.4	1 wk – 10 yr
Risperidone	60	35.3	1.6	1 wk – 6.7 yr
Clozapine	76	44.7	4.5	1 wk – 10 yr
Olanzepine	60	35.3	2.0	1wk – 5.1 yr
Quetiapine	14	8.2	1.4	1 wk – 3.8 yr
Other psychotropics				
Anti-depressant	*81*	*48.5*		
Tricyclic	58	34.7		
SSRI or other "new" drug	57	34.1		
Anticonvulsant	*56*	*33.5*		
Carbamazapine	44	26.3		
Sodium valproate	28	16.8		
Lithium	37	22.2		
Benzodiazepine	58	34.7		
Anticholinergic	125	74.9		
Propranolol	13	7.8		

Table 9.15. Life-time prescription of psychotropic medication, either before baseline or during follow-up.

Drug	**N**	**%**
Anti-psychotic	169	100.0
Lithium	57	34.3
Anti-depressant	96	58.4
Anti-convulsant	63	38.0
Benzodiazepine	88	53.0
Anti-cholinergic	147	88.6

Contact with clinical services

All 169 patients had had some contact with both a psychiatrist and a hospital based psychiatric nurse during the follow-up period; 124 (73.4%) patients had contact with a psychologist, 129 (76.3%) with a social worker and 124 (73.4%) with an occupational therapist. Six (3.6%) patients had contact with a communication therapist, 8 (4.7%) with a creative therapist, 31 (18.3%) with social care staff, 31(18.3%) with a voluntary agency and 41 (24.3%) with any other agency. 14 (8.3%) patients had contact with advocacy during the follow-up period, 7 (4.1%) with a probation officer and 59 (34.9%) patients had contact with a general practitioner. All those who had been within the community (N = 57, 33.7%) had some contact with a community psychiatric nurse.

Interventions

All but 1 of the 169 patients (99.4%) were offered medication. Thirty were not fully compliant with this at some point, but all had at least one year where they were fully compliant. Whether patients were offered, and accepted, therapeutic interventions are shown in table 9.16. Other interventions included three (1.8%) patients who received electro-convulsive therapy (ECT).

Few patients were offered specific psychological therapies although half were offered some form of individual therapy. Participation in offending behaviour programmes occurred in about 1 in 10 cases. Most patients were involved in occupational therapy, an almost all had been offered other recreational or vocational activities (e.g. attendance at off ward placements in the Patient Activity and Rehabilitation Service (PARS) at the State Hospital).

Year on year very few patients were non-compliant with medication and less than one in ten were non-compliant with psychosocial interventions. Non-compliance with any treatment occurred at some point with about 4 in ten patients (table 9.17).

Table 9.16. Interventions offered during follow-up period.

Intervention	Not offered	Any non-compliance during follow-up period				Compliance during follow-up period	
		Offered but refused	Offered, not accepted, & did not attend	Offered, accepted, but did not attend	Offered, accepted, but did not attend fully	Offered, accepted, & attended fully	Any year where was fully compliant
Medication	1 (0.6%)	30 (17.8%)	-	-	6 (3.6%)	132 (78.1%)	168 (99.4%)
Individual CBT	149 (88.2%)	2 (1.2%)	-	1 (0.6%)	3 (1.8%)	16 (9.5%)	16 (9.5%)
Individual dynamic	158 (93.5)	-	-	-	-	11 (6.5%)	11 (6.5%)
Individual other	81 (47.9%)	14 (8.3%)	1 (0.6%)	-	2 (1.2%)	71 (42.0%)	86 (50.9%)
Group CBT	155 (91.7%)	2 (1.2%)	-	-	2 (1.2%)	10 (5.9%)	13 (7.7%)
Group dynamic	169 (100%)	-	-	-	-	-	-
Group other	149 (88.2%)	2 (1.2%)	-	-	-	18 (10.6%)	19 (11.2%)
Anger management	136 (80.5%)	5 (3.0%)	-	1 (0.6%)	3 (1.8%)	28 (16.6%)	32 (18.9%)
Alcohol/ drugs	128 (75.7%)	4 (2.4%)	1 (0.6%)	3 (1.8%)	-	33 (19.5%)	35 (20.7%)
Family therapy	169 (100%)	-	-	-	-	-	-
Couples therapy	169 (100%)	-	-	-	-	-	-
Occupational therapy	39 (23.1%)	12 (7.1%)	2 (1.2%)	3 (1.8%)	10 (5.9%)	102 (60.4%)	124 (73.4%)
Other recreational and vocational activities	2 (1.2%)	21 (12.4%)	5 (3.0%)	5 (3.0%)	18 (10.6%)	118 (69.8%)	165 (97.6%)
Music therapy	166 (98.2%)	-	1 (0.6%)	-	-	2 (1.2%)	2 (1.2%)
Art therapy	158 (93.5%)	-	-	-	-	11 (6.5%)	11 (6.5%)
Drama therapy	168 (99.4)	1 (0.6%)	-	-	-	-	-
Day hospital	150 (88.8%)	2 (1.2%)	1 (0.6%)	-	-	16 (9.5%)	16 (9.5%)
Other day centre	164 (97.0%)	1 (0.6%)	-	-	1 (0.6%)	3 (1.8%)	4 (2.4%)
Supported employment	166 (98.2%)	-	-	-	-	3 (1.8%)	3 (1.8%)
Other intervention	160 (94.7%)	1 (0.6%)	-	-	-	8 (4.7%)	8 (4.7%)

Table 9.17. Compliance with treatment during follow-up. Non-compliance defined as refused at least one treatment offered that year.

Treatment	Non-compliance in each year - N above, *% in italics below*										At any point during whole follow-up period
	1992 (n=154)	1993 (n=165)	1994 (n=159)	1995 (n=158)	1996 (n=153)	1997 (n=155)	1998 (n=152)	1999 (n=151)	2000 (n=144)	2001 (n=143)	
Medication	1	9	3	4	2	1	6	10	4	0	30
	0.6	*5.5*	*1.9*	*2.5*	*1.3*	*0.6*	*3.9*	*6.6*	*2.8*	*0.0*	*17.8*
Psychosocial treatment	4	6	12	13	14	13	12	15	19	9	58
	2.6	*3.6*	*7.5*	*8.2*	*9.2*	*8.4*	*7.9*	*9.9*	*13.2*	*6.3*	*37.4*
Any treatment	5	15	15	16	15	13	18	20	22	9	66
	3.2	*9.1*	*9.4*	*10.1*	*9.8*	*8.4*	*11.8*	*13.2*	*15.3*	*6.3*	*42.61*

Alcohol and drug use

Eight patients had misused drugs and three were dependent on or abusing alcohol at follow-up (table 9.18). This was ascertained using a relatively low threshold of any drug use or alcohol abuse. There were a total of 11 patients with either, and no patient was misusing both alcohol and drugs.

Table 9.18. Alcohol and drug use in the last month at first follow-up interview – ascertained from patient or third party.

	Number	**Percentage**
Alcohol		
Any alcohol use	32	24.6
Excessive alcohol use	2	1.5
Alcohol withdrawal symptoms	1	0.8
Alcohol dependence	1	0.8
Drugs		
Drug use	8	6.2
Drug withdrawal symptoms	1	0.8
Drug dependence	1	0.8
Cannabis	6	4,6
Amphetamine	2	1.5
Ecstasy	1	0.8
Heroin	2	1.5
Intravenous drug use	0	0.0
Alcohol or drug misuse (Either alcohol excess or dependence, or drug use)	**11**	**8.5**

Mortality and physical ill health

Eleven (6.5%) patients died during the follow-up period (table 9.19). Only one committed suicide. Ninety-three (55.0%) patients experienced a new physical illness and 42 (24.9%) experienced an exacerbation of a pre-existing physical illness. Thirty-six (21.3%) required in-patient care for a physical illness.

Table 9.19. The 11 subjects who died during follow-up.

Patient	Year	Age	Cause	Place
1	1993	61	Pneumonia secondary to lung carcinoma	State Hospital
2	1993	45	Acute cardiac failure secondary to hypertrophic cardiomyopathy	State Hospital
3	1993	36	Peritonitis secondary to pancreatitis	General hospital (on leave from State Hospital due to illness)
4	1995	31	Suicide – suffocated self	Low security unit
5	1997	33	Unknown – not suicide	Community
6	1999	66	Myocardial infarction	Open rehabilitation ward
7	1999	44	Leukaemia	General hospital (on leave from open psychiatric ward)
8	1999	35	Cardiac arrhythmia secondary to seizure	State Hospital
9	2000	37	Unknown – not suicide	Low security unit
10	2001	68	Cerebro-vascular accident secondary to cerebro-vascular disease	Open rehabilitation ward
11	2001	51	Pneumonia secondary to chronic obstructive airways disease	Open rehabilitation ward

Work, marriage and intimate relationships

Ten (5.9%) patients had supported work at some point over the follow-up period, while 2 (1.2%) had paid unsupported work. But of the 141 subjects alive and with data available at the end of 2001, one had supported work and none were in paid unsupported work.

Four (2.4%) patients were married at the start of the case note data collection period. This compares with 6 who were still married (but 4 separated) at the State Hospital Survey. In the State Hospital Survey 23 had been married at some point before admission, but 17 were divorced. Five (3.0%) patients got married at some point during the follow-up period, so there were 9 (5.4%) patients married during the follow-up period. Of these nine, 7 separated and 4 divorced during follow-up.

Eight (4.7%) patients were in intimate relationships at the start of the case note data collection period. During follow-up 26 (15.4%) were in an intimate relationship at some point. For eighteen of these subjects relationships ended.

Of the 141 subjects alive and with data available at the end of 2001, 10 (7.1%) were in a relationship of whom 2 (2.4%) were married.

Living circumstances

Of the 142 subjects alive and with data available at the end of 2001, only 18 (12.7%) were living independently in their own accommodation in the community (table 9.20).

Table 9.20. Living circumstances at the end of the study (n=142).

Accommodation	Number	Percentage
Hospital	96	67.6
Prison	2	1.4
Supported accommodation	16	11.3
Own accommodation	18	12.7
Family accommodation	4	2.8
Hostel	2	1.4
No fixed abode	1	0.7
Nursing home	3	2.1

Discussion

Course of psychosis

The psychopathological outcomes of the patients, both from case records and from interviews were similar to those reported in non-forensic patients with schizophrenia (Hegarty et al. 1994; Mason et al. 1995; Mason et al. 1996; Harrison et al. 2001; Modestin et al. 2003, Harrow et al. 2005; Jablensky 2009). Over a third had continuous positive symptoms, two-fifths had an episodic illness and a quarter had no recurrence following remission. Affective symptoms were uncommon. At follow-up four-fifths had 'reality distortion', a tenth 'disorganization' and 80-90% had 'psychomotor poverty' using the BPRS, and about two-fifths had at least one negative symptom. The rate of persistent positive symptoms was similar to that reported by Mason et al. (1995), and the levels of positive and negative symptoms at follow-up interview are similar to those reported in other studies, although levels of negative symptoms may be higher. It is difficult to extrapolate directly to other studies as measures of symptoms used vary, and different definitions of persistence and recovery or improvement have been used. As would be expected positive symptoms reduced with time, but negative symptoms and disorganisation persisted. The number of patients in remission using the remission criteria of Andreasen et al. (2005) was 30%, similar to that reported in other samples (Mortimer 2007).

The correlations between interview and case note assessed ratings of psychopathology, and the stability of ratings at interview between first and second follow-up interviews, gives some indication convergent validity and reliability in the assessments.

Overall therefore the patients in this sample had an illness course and levels of symptoms similar to, or perhaps slightly worse, than in other samples of patients with schizophrenia. Without direct comparison with a contemporary matched cohort this conclusion is reached with some caution. The apparent similarity with non-forensic samples may seem surprising given the extreme behaviours displayed by those in this cohort and the perception that treatment resistant psychosis is more common in forensic settings (Taylor et al. 1996). This emphasises that factors other than the psychopathology of schizophrenia are important in forensic settings. As shown in Chapter 8, there is a complex relationship between the onset and course of schizophrenia and offending and violence in these patients. They are heterogeneous when it comes to the relative contribution of illness factors, personality factors and substance misuse to both clinical course and offending and violence outcomes.

Associates of continuous positive symptoms

The patients with persistent positive symptoms tended to be those who were unmanageable in local hospitals rather than patients admitted due to criminal proceedings. They had less convictions and less serious convictions probably reflecting a less criminal profile, but also perhaps reflecting lack of opportunity to offend due to hospitalisation. They were less likely to have attacked strangers reflecting less psychopathy, less offending, chronic psychosis and chronic hospitalisation.

Lack of substance dependence in those with persistent symptoms may reflect lack of opportunity in patients who have been chronically hospitalised, lack of impulsivity and antisociality, and the course of the illness. Substance misuse has been found to be associated with treatment resistance and worse outcome of symptoms (Soyka 2000). But in community samples ongoing substance misuse is likely to occur whereas in this sample secure care prevented ongoing alcohol or drug use. In this sample alcohol or drug use was not related to treatment resistance. The intrinsic course of symptoms in substance dependent patients was actually better than in non-dependent patients. This will be explored in more details in Chapter 10.

At baseline those with persistent symptoms already had worse symptoms, indicators of treatment resistance and chronicity, with younger age of onset of psychosis. They had less deprived and abusive childhoods, less evidence of criminality and delinquency, and less employment problems. So there was evidence of better premorbid adjustment and less conduct disorder in the chronically unwell. There was less evidence of personality disorder and psychopathy than in those who achieved some remission in symptoms. They were therefore less delinquent, antisocial and impulsive. They were older, reflecting their longer psychiatric histories, but also as would be expected in individuals with less impulsivity, less substance misuse and less anti-social behaviour.

They had chronic symptoms in all areas not just positive symptoms, but also negative symptoms and disorganisation. Treatment resistance and chronic disability was reflected in higher rates of unmet need. As a consequence of their illnesses and chronic disability they were less likely to leave high security, less likely to reach the community, did not achieve independent living and did not form intimate relationships. Chronic hospitalisation may have played a role in the latter. They more often received clozapine, in an attempt to treat their resistant symptoms. This contrasts with the finding in Chapter 8 that clozapine use was

associated with less persistent violence. Although clozapine did not fully ameliorate positive symptoms it may nevertheless have reduced aggression (Ratey et al. 1993;Volavka et al. 1993; Buckley et al. 1995; Menditto et al. 1996; Rabinowitz et al. 1996; Spivak et al. 1997, 1999; Chengappa et al. 1999; Volavka, 1999; Chengappa et al. 2001; Citrome et al. 2001).

There was more frequent relatively minor aggression and verbal aggression as a consequence of being chronically unwell, but they were no more likely to be aggressive and were no more likely to be seriously aggressive. Chronic psychotic symptoms seemed to play a role in relatively minor aggression, although the relationship between chronic psychosis and aggression in this group may have been mediated by other factors, such as poor social and interpersonal functioning or disorganisation, and by forced proximity with others through ongoing hospitalisation.

Associates of episodic course and recovery

Patients with an episodic course and remission of positive symptoms were very similar, but differed from the continuously psychotic patients as set out above. Those whose symptoms remitted were older at first psychiatric contact and had more stranger victims. Their good illness outcome meant they were more likely to live independently and did not require atypical antipsychotics. Patients with an episodic course were most likely to be convicted, were as likely to be violent as continuously ill patients, but, like patients whose symptoms remitted, they were less persistently aggressive. Serious violence during follow-up did not differentiate the groups, indicating that non-illness factors were important in determining serious aggression.

Treatment

As might be expected there was a shift from the prescription of typical to atypical anti-psychotics, reflecting practice more generally. The size of this shift in forensic patients is perhaps surprising given the lack of availability of a depot atypical preparation at the time and the risk of non-compliance. A substantial minority (a third) did remain on depot medication. Atypical anti-psychotics appear to be better at reducing aggression than typical antipsychotics (e.g. Swanson et al. 2004). Almost half the patients had been on clozapine at some point, but this was stopped in about a third of cases who received it. A substantial number of patients were not only treatment resistant, but also clozapine resistant. However, the fact that clozapine or any other antipsychotic, did not reduce positive symptoms may hide other improvements in mental state, for example decreased hostility or irritability, which may be important in these patients. The estimated rate of treatment resistance of 60%

is higher than the 10-30% usually reported (American Psychiatric Association 2004), but if the 30% of partial responders are included, then this may be in keeping with general findings. If there is a high rate of treatment resistance, then this would not be in keeping with the finding that the course of illness was probably similar to that reported in non-forensic samples.

High dose medication can be hazardous, and, as might be expected, was prescribed less frequently during the follow-up period. However there were still patients on very high doses of medication at the end of the study. Surveys of forensic units have found higher rates of use of high dose antipsychotics (Royal College of Psychiatrists 2006). There appears to be little empirical evidence to support this approach.

There was a marked reduction in extra-pyramidal symptoms from baseline, and few patients had such symptoms at follow-up. There was a particularly marked reduction in parkinsonism and akathisia. This reflects the decrease in use of high potency high does typical medication and the increased use of atypical antipsychotics.

As might be expected multidisciplinary care involving psychiatrist, psychologists, nurses, occupational therapists and social workers happened at some point in all cases. However the availability of a full range of multi-disciplinary interventions was less in local services than the State Hospital. Occupational therapy, recreation and vocational activities are important and were provided, more often in the State Hospital than elsewhere. Although some psychological input was given in most cases, few patients were offered evidence based treatments to address offending behaviour (McGuire, 2003). There is a greater availability of such programmes now, particularly at the State Hospital, but in general the resourcing of forensic services is inverse to the level of security.

Although two fifths of patients were non-compliant with some aspect of treatment at some point, the year on year levels of non-compliance were low (Argawal et al. 1998; Lacro et al. 2002). This group have a number of risk factors associated with non-compliance such as substance misuse, antisocial personality disorder and treatment-resistance. However these were clearly offset by the high rates of in-patient care, legal compulsion and well organized care packages. It is of note that despite the increasing use of oral anti-psychotics (rather than depot medication) and despite the move to less restrictive settings (i.e. the community and open units) rates of non-compliance did not increase.

Mortality

The mortality rate of 6.5% was less than that described in longer follow-up studies of non-forensic samples (Harrison et al. 2001), less than the 10% found in a follow-up study of medium secure unit patients in England (Davies et al. 2007), less than the 14% found in a follow-up of discharged special hospital patients (Jamieson and Taylor 2002), and less than reported in most follow-up studies of UK secure hospital patients (see Chapter 3). But it was still high for a group of individuals who were, on average, in their 30s at the start of the study. Only one patient committed suicide, lower than the rates found in other samples. High mortality rates in mentally disordered offenders (Lidberg et al. 1989; Björk and Lindqvist 2005) and offenders more generally (Sailas et al. 2006) have been described. Davies et al. (2007) emphasized the various factors that increased mortality in mentally disordered offenders, such as psychiatric illness, treatment and life-style. They emphasized that all these need to be addressed alongside risk to others.

Substance misuse

Levels of substance misuse at follow-up were low considering the high rates in the sample at baseline. This may have been due to the passage of time (substance misuse decreases with age and long periods of abstinence), being in secure settings where substances are relatively difficult to access (MacIntyre et al. 2004; Kendrick et al. 2002), improvement in illness, education or treatment, and/or the restrictions and conditions placed on patients subject to ongoing compulsory measures. The relative lack of substance misuse at follow-up may be important with respect to the course of symptoms, risk of offending and aggression, and social functioning (see Chapter 10).

Relationships, employment and accommodation

Very few patients were working, in intimate relationships or living independently during or at the end of the follow-up period. These very poor social out-comes are far worse than described in non-forensic samples (Mason et al. 1995; Kooyman et al. 2007) and far worse than described for a cohort of patients discharged from a secure hospital in New Zealand (Simpson et al. 2006). These may reflect the course of the illness, the high rate of comorbid personality disorder, the high rates of childhood under achievement and problems, lack of opportunity while detained in secure settings, disruption to relationships and activities whilst in secure care, double stigmatisation due to forensic and mental illness labels, unwillingness of services to allow such patients to act independently in these areas, and/or institutionalisation with decreased opportunity to practice and develop skills of relevance. As

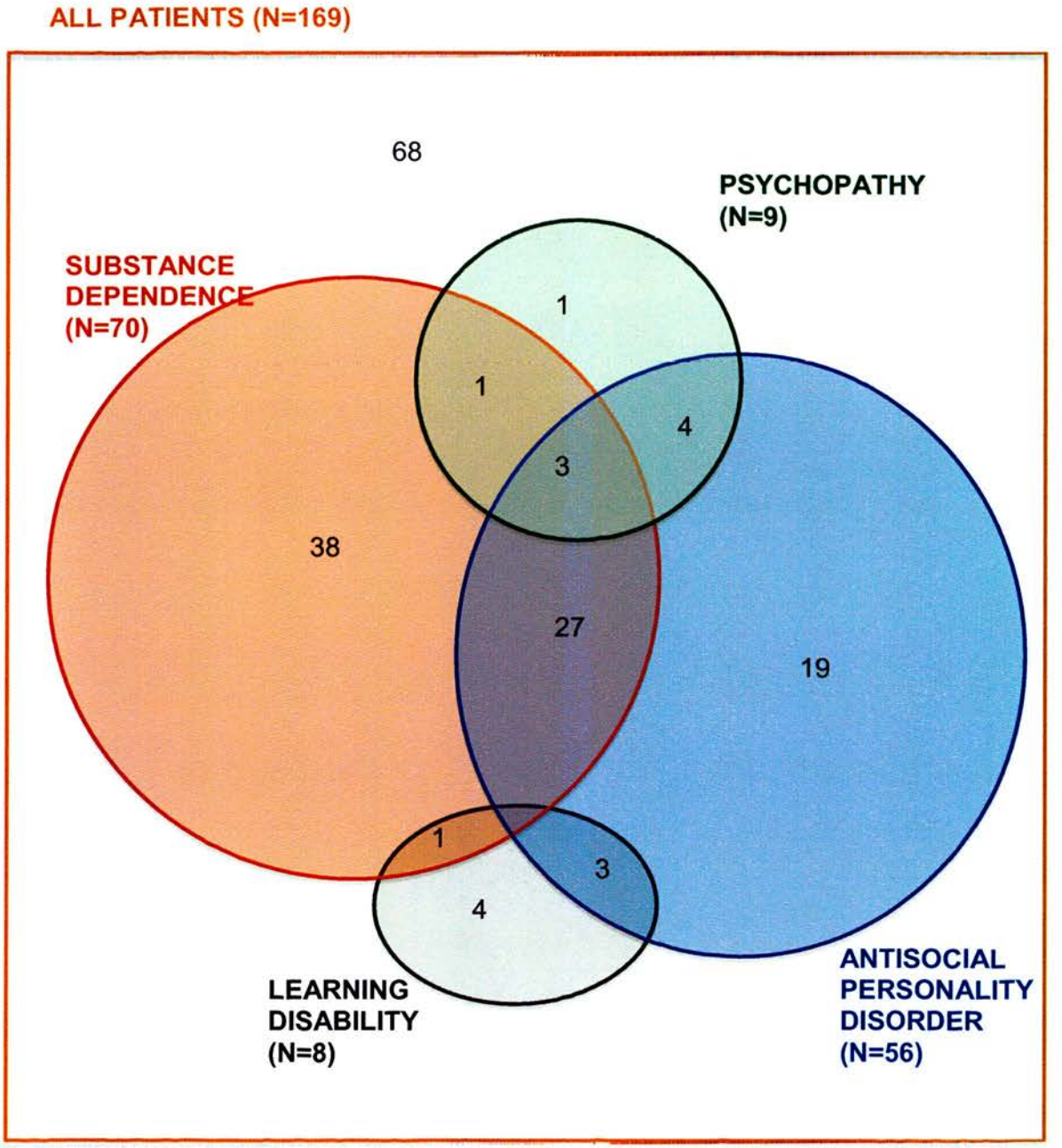
indicated above, the course of psychosis in these patients does not appear to be worse than in non-forensic samples, so other factors were probably more important in determining these appalling social outcomes.

CHAPTER 10
Comorbid substance dependence and personality disorder

The extent and overlap of comorbid disorders

Figure 10.1 demonstrates the extent and overlap of comorbid disorders in the cohort. Most patients (101; 59.8%) had at least one comorbid disorder. Substance dependence was the most common comorbid disorder followed by antisocial personality disorder. There was substantial overlap between these two conditions, but although most patients with antisocial personality disorder had substance dependence, most substance dependent patients did not have antisocial personality disorder. Of the small number of patients who were psychopathic (as defined by a PCL-R score of 25 or above), all but one had comorbid alcohol dependence or antisocial personality disorder. Of the small number of patients with learning disability, half had comorbid antisocial personality disorder or substance dependence. This chapter will examine the associates of comorbid substance dependence, antisocial personality disorder and psychopathy.

Figure 10.1. Venn diagram showing the overlap of comorbid disorders in the 169 patients with schizophrenia. All diagnoses are according to Feighner criteria, except psychopathy which is defined as a PCL-R score of 25 or above.



Substance dependence

The 70 patients with substance dependence (alcohol or substance dependence according to Feighner criteria) were compared to 99 patients without (tables 10.1, 10.2, 10.3 and 10.4).

Baseline variables

Substance dependence was significantly associated with: younger age, less time in hospital and less time in the State Hospital; not being detained under civil legislation (as opposed to a criminal disposal or prison transfer), any previous conviction and number of previous convictions; early maladjustment, antisocial personality disorder, higher PCL-R, higher H10; and (non-significantly) not being described as needing high security by psychiatrists.

Follow-up variables

Substance dependence was significantly associated with: leaving high security, reaching the community and becoming informal; conviction and serious conviction, but not number or severity of aggressive incidents (substance dependent patients had non-significantly less episodes of aggression than other patients); having an intimate relationship. Substance dependent patients had a better course of psychosis. Less were continuously psychotic, more recovered and more had a fluctuating course compared to non-substance dependent patients (figure 10.2); substance dependent patients had less mean years with positive and negative symptoms and a lower mean SANS total. Although they had lower mean SDAS and BPRS totals, these were not statistically significantly different from non-dependent patients.

The better outcomes in terms of time to leaving high security (from baseline and from admission to high security), time from leaving high security to reaching the community and time from baseline to remission of positive symptoms are illustrated in figures 10.3, 10.4, 10.5 and 10.6 using survival curves.

Table 10.1. Comparison between patients with comorbid substance dependence and those without: categorical baseline variables

	No substance dependence (n=99)	Substance dependence (n=70)	DF	Chi-square	P
DEMOGRAPHICS					
Male	88 (88.9)	62 (88.6)	1	0.00	0.949
Father's socio-economic group non-manual	17 (17.2)	9 (12.9)	1	0.59	0.444
LEGAL STATUS					
Civil	31 (31.3)	12 (17.1)	1	4.34	0.037
Criminal	53 (53.5)	41 (58.6)	1	0.42	0.516
Prison transfer	15 (15.2)	17 (24.3)	1	2.23	0.135
Restricted	47 (47.5)	41 (58.6)	1	2.02	0.155
PSYCHIATRIC / MEDICAL HISTORY					
Previous State Hospital admission	24 (24.2)	19 (27.1)	1	0.18	0.670
Previous deliberate self-harm	57 (57.6)	49 (70.0)	1	2.71	0.100
Epilepsy	17 (17.2)	6 (8.6)	1	2.58	0.108
FORENSIC HISTORY					
Convictions (either as index or previous offence)					
Any	81 (81.8(	70 (100)	1	14.24	0.000
Homicide	24 (24.2)	23 (32.9)	1	1.52	0.218
Violent	44 (44.4)	36 (51.4)	1	0.80	0.370
Sexual	16 (16.2)	13 (18.6)	1	0.17	0.682
'Serious'	65 (65.7)	53 (75.7)	1	1.97	0.161
Index offence					
Any	43 (43.4)	34 (48.6)	1	0.44	0.509
'Serious'	31 (31.3)	22 (31.4)	1	0.00	0.987
Psychosis precipitated	65 (65.7)	56 (72.5)	1	0.87	0.350
Stranger victim	14 (14.1)	13 (18.6)	1	0.60	0.439
PERSONAL HISTORY					
Early maladjustment	26 (27.7)	29 (42.6)	1	3.95	0.047
Employment problems	51 (55.4)	38 (56.7)	1	0.03	0.872
Relationship instability	64 (67.4)	46 (67.6)	1	0.00	0.970
COMORBIDITY					
Learning disability	7 (7.1)	1 (1.4)	1	2.90	0.089
Antisocial personality disorder	26 (26.3)	30 (42.9)	1	5.10	0.024
PSYCHIATRIST'S OPINION					
Need high security	37 (37.4)	13 (18.6)	3	7.54	0.057
Poor response to treatment	60 (64.5)	34 (54.0)	1	1.75	0.187
Non-co-operative with staff	18 (19.4)	14 (22.2)	1	0.19	0.663
Persistent aggression	19 (20.4)	13 (20.6)	1	0.00	0.975

Table 10.2. Comparison between patients with comorbid substance dependence and those without: categorical follow-up variables

	No substance dependence (n=99)	Substance dependence (n=70)	DF	Chi-square	P
LEGAL STATUS					
Informal	17 (17.2)	26 (37.1)	1	8.62	0.003
Restricted	54 (54.5)	44 (62.9)	1	1.16	0.281
PROGRESS					
Leave high security	72 (72.7)	62 (88.6)	1	6.27	0.012
Re-admitted to high security	15 (15.2)	13 (18.6)	1	0.35	0.556
Reach community	22 (31.9)	38 (62.3)	1	12.05	0.001
FORENSIC					
Any aggressive incident	75 (76.5)	56 (80.0)	1	0.29	0.593
Serious violence	20 (20.4)	12 (17.1)	1	0.28	0.595
Conviction	6 (6.7)	18 (26.1)	1	11.29	0.001
Violent conviction	4 (4.4)	11 (15.9)	1	6.04	0.014
SOCIAL FUNCTIONING					
Intimate relationship	12 (12.1)	22 (31.4)	1	9.51	0.002
Living independently at end of follow-up	8 (9.9)	11 (18.0)	1	2.00	0.158
COURSE OF PSYCHOSIS					
Continuous	47 (47.5)	14 (20.0)	2	13.93	0.001
Fluctuating	30 (30.3)	36 (51.4)			
Recover	22 (22.2)	20 (28.6)			
TREATMENT					
Atypical antipsychotic	72 (72.7)	47 (67.1)	1	0.61	0.433
Clozapine	47 (47.5)	29 (41.4)	1	0.61	0.436
Lithium	24 (24.7)	12 (17.4)	1	1.28	0.257
Anti-convulsant	34 (35.1)	22 (31.9)	1	0.18	0.671
Non-compliance with medication	13 (13.1)	17 (24.3)	1	3.49	0.062
Non-compliance with psychosocial intervention	30 (33.0)	28 (43.8)	1	1.87	0.172

Table 10.3. Comparison between patients with comorbid substance dependence and those without: continuous baseline variables

	No substance dependence (n=99)	Substance dependence (n=70)	DF	t	P
DEMOGRAPHICS					
Age (years)	38.5	31.7	167	5.05	0.000
FORENSIC					
Number of convictions	9.8	13.3			
PSYCHIATRIC HISTORY					
Age at first contact (years)	20.0	19.5	165	0.44	0.659
Time in hospital (years)	12.5	5.1	150.5	6.20	0.000
Time since admission to State Hospital (years)	5.4	2.1	157.3	4.23	0.000
PSYCHOPATHY					
PCL-R total	13.3	16.3	155.4	-2.89	0.004
PCL-R factor 1	5.0	4.8	162	0.39	0.698
PCL-R factor 2	6.9	8.9	160	-3.47	0.001
RISK INSTRUMENTS					
VRAG	3.4	7.1	167	-1.22	0.224
H10 (of HCR-20)	12.4	14.8	161.2	-5.03	0.000
MENTAL STATE (KRAWIECKA)					
Total	7.6	6.3	158	1.64	0.104

Table 10.4. Comparison between patients with comorbid substance dependence and those without: continuous follow-up variables

	No substance dependence (n=99)	Substance dependence (n=70)	DF	t	P
FORENSIC					
Number of aggressive incidents	15.3	9.2	141.4	1.54	0.127
Number of episodes of self-harm	3.9	4.8	166	-0.46	0.645
Number of episodes of absconding	0.8	0.8	166	0.03	0.976
COURSE OF PSYCHOSIS					
Proportion of years with positive symptoms	0.67	0.50	161.0	3.27	0.001
Proportion of years with negative symptoms	0.58	0.39	167	3.53	0.001
MENTAL STATE / BEHAVIOUR AT FOLLOW-UP					
SDAS total	7.1	4.6	114.8	1.90	0.060
BPRS total	36.7	31.9	104.0	1.87	0.064
SANS total	39.8	29.3	118	2.55	0.012

Figure 10.2. Course of positive symptoms.

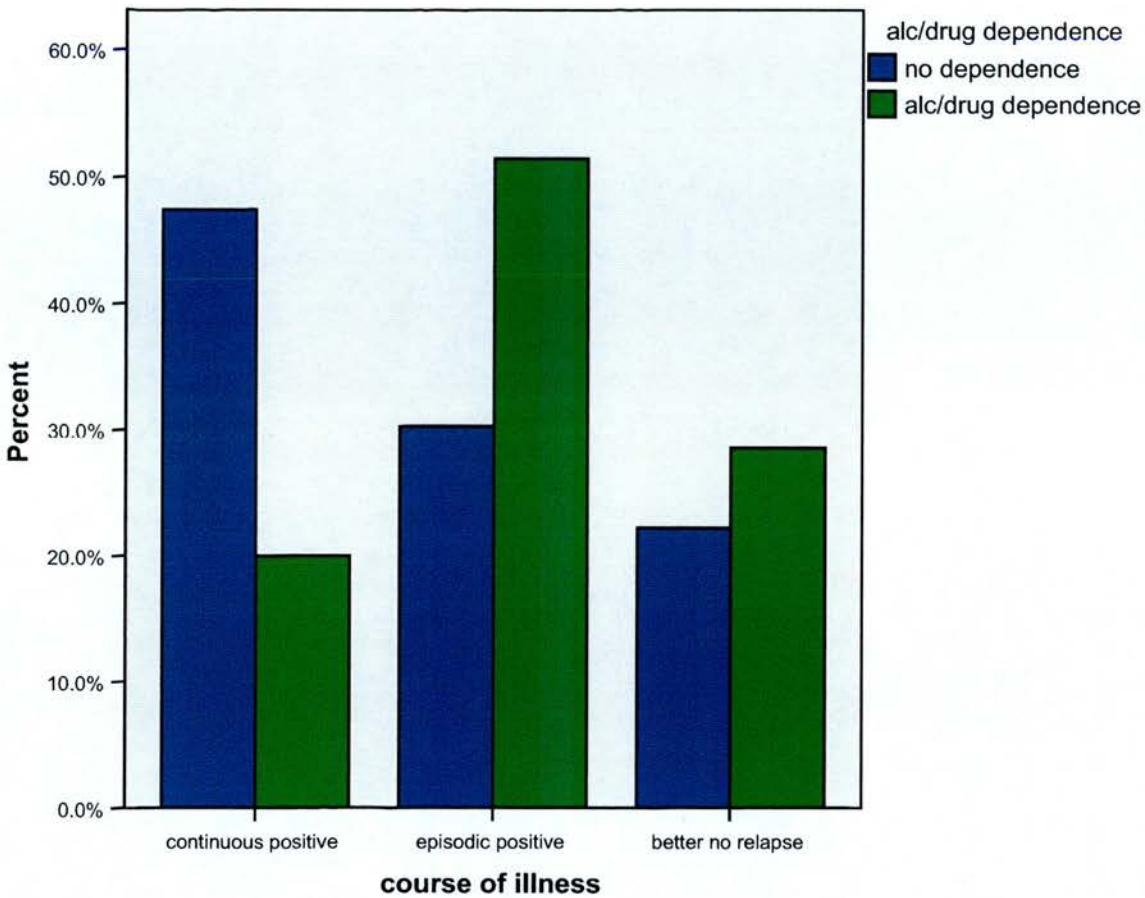


Figure 10.3. Survival analysis for leaving high security: time from baseline.

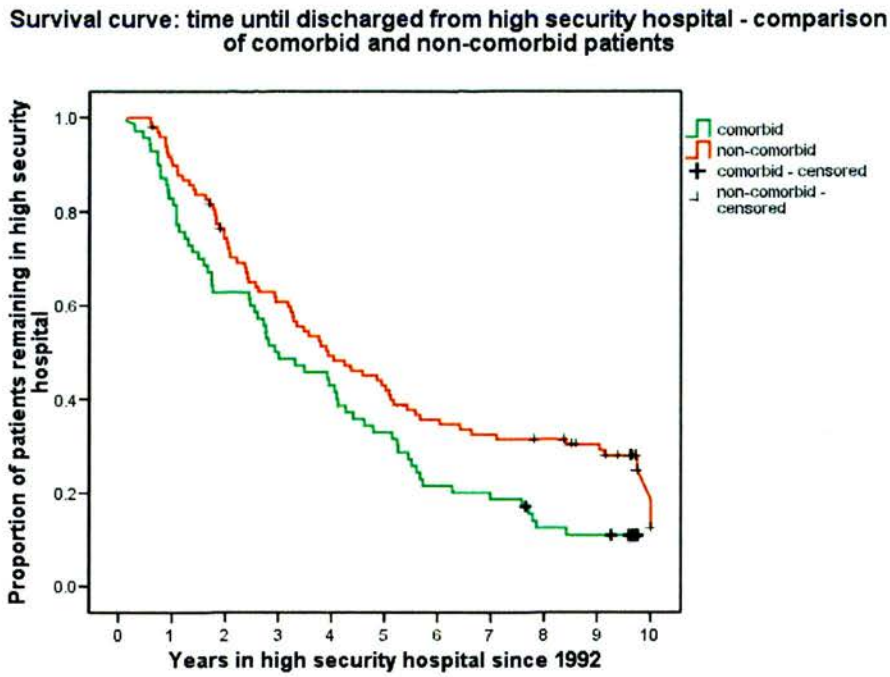


Figure 10.4. Survival analysis for leaving high security: time from admission.

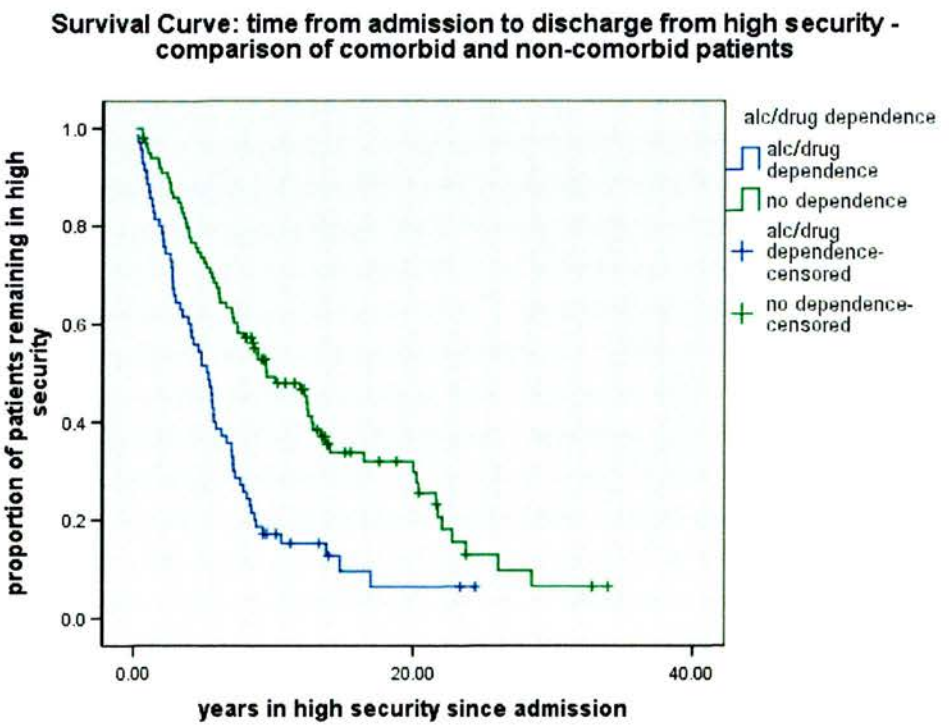


Figure 10.5. Survival analysis for reaching the community: time since left high security.

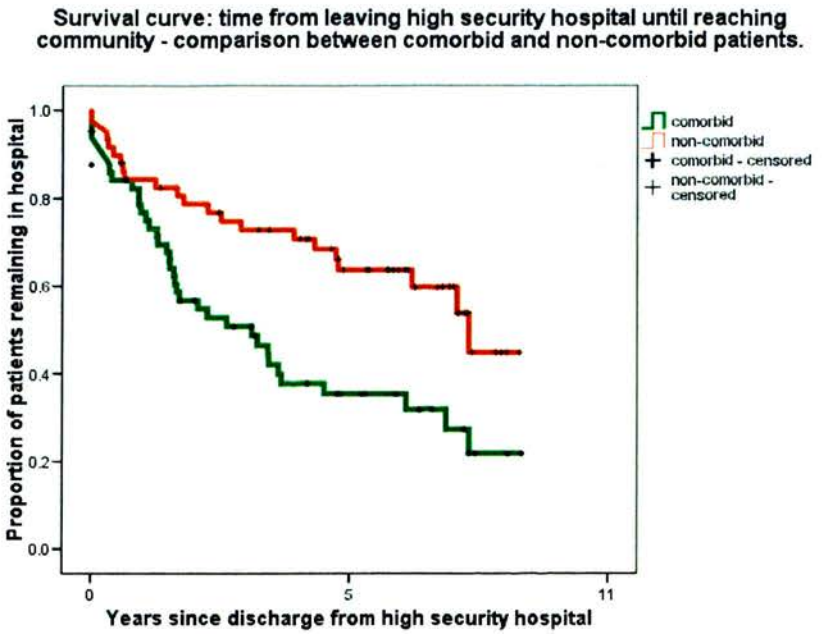
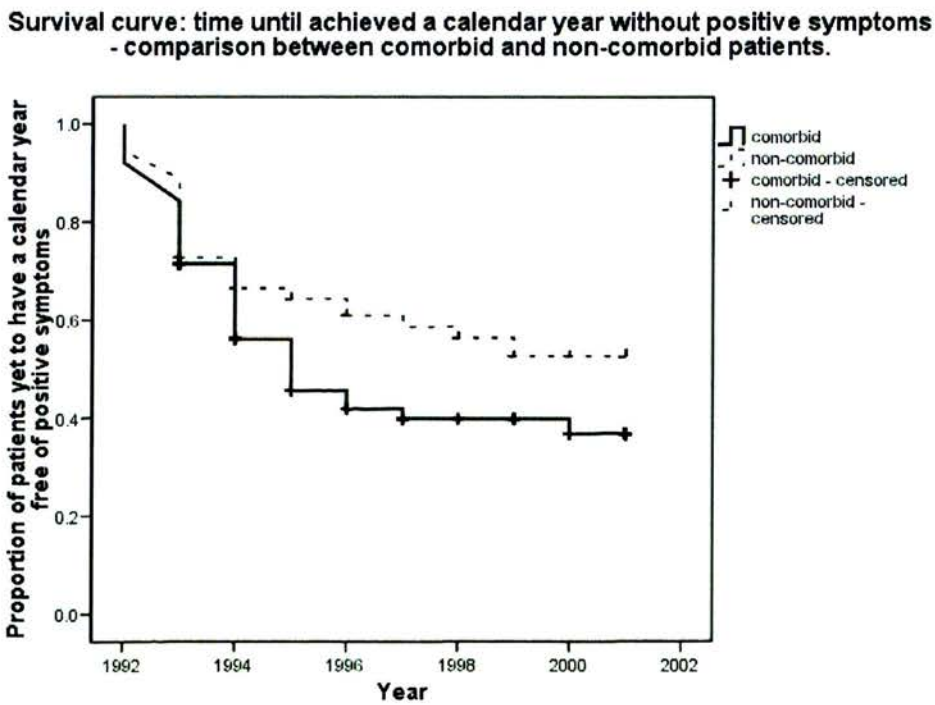


Figure 10.6. Survival analysis for achieving a year without positive symptoms: time since baseline.



Analysis of baseline and follow-up associates of substance dependence using logistic regression

A model using the eight baseline variables in table 10.5 was able to correctly classify 72.7% of cases, was a good fit (Hosmer and Lemeshow test: chi-square=4.72, df=8, p=0.787) and explained between 24.1 and 32.5% of the variability in the dependent variable (i.e. whether patients had a diagnosis of substance dependence). The only significant factor in this model was younger age. Adding five follow-up variables to these baseline variables (table 10.6) did not improve the classification; this model correctly classified 71.8% of cases, was a better fit (Hosmer and Lemeshow test: chi-square=2.07, df=8, p=0.979), and explained betwecn 28.8 and 38.6% of the variability in the dependent variable. There were no statistically significant variables in this model, the closest to significance being reached the community. Using backward conditional withdrawal of variables (without reaching the community as a variable) the factors which best 'predicted' substance dependence were young age, less time in high security, previous conviction, non-continuous positive symptoms and not having chronic negative symptoms.

Table 10.5. Logistic regression using only baseline factors as independent variables; dependent variable is 'substance dependence'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	-.059	.026	5.217	1	.022	.943	.896	.992
Male gender	-.627	.764	.674	1	.412	.534	.119	2.388
PCL-R score	.043	.035	1.468	1	.226	1.044	.974	1.119
Time in high security	-.062	.044	2.034	1	.154	.940	.863	1.024
Civil detention	-.039	.482	.006	1	.936	.962	.374	2.477
Conviction	20.183	8824.8	.000	1	.998	5.825E8	.000	.
Childhood maladjustment	-.148	.456	.105	1	.745	.862	.352	2.109
At least a year free of positive symptoms	.597	.438	1.859	1	.173	1.816	.770	4.283
Constant	-18.529	8824.8	.000	1	.998	.000		

Table 10.6. Logistic regression using both baseline and follow-up factors as independent variables; dependent variable is 'substance dependence'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	-.044	.029	2.271	1	.132	.957	.904	1.013
Male gender	-.220	.844	.068	1	.794	.803	.154	4.195
PCL-R score	.031	.038	.664	1	.415	1.032	.957	1.113
Time in high security	-.059	.046	1.621	1	.203	.943	.860	1.032
Civil detention	-.283	.525	.292	1	.589	.753	.269	2.106
Conviction	19.915	9477.22	.000	1	.998	4.457E8	.000	.
Childhood maladjustment	-.102	.502	.041	1	.839	.903	.338	2.414
Reached community	.979	.501	3.817	1	.051	2.663	.997	7.113
Convicted	.323	.664	.237	1	.626	1.382	.376	5.080
Intimate relationship	-.349	.550	.403	1	.526	.706	.240	2.072
At least a year free of positive symptoms	.225	.490	.211	1	.646	1.252	.479	3.273
Proportion of years with negative symptoms	-.844	.642	1.727	1	.189	.430	.122	1.514
Constant	-18.528	9477.22	.000	1	.998	.000		

Antisocial personality disorder

The 56 patients with antisocial personality disorder (according to Feighner criteria) were compared to 113 patients without (tables 10.7, 10.8, 10.9 and 10.10).

Baseline variables

Antisocial personality disorder was significantly associated with: younger age at first contact with psychiatric services, previous admission to the State Hospital, history of deliberate self-harm; number of convictions, having any conviction and having a violent conviction; lack of psychosis as precipitant to index offence; early maladjustment and employment problems; substance dependence, higher mean PCL-R; higher mean VRAG and H10 totals.

Follow-up variables

Few follow-up variables were significantly associated with antisocial personality disorder. Those with antisocial personality disorder were significantly more likely to be aggressive, but they did not commit significantly more episodes of aggression. Even though more of the antisocial personality disorder patients received convictions and serious convictions, this did not reach statistical significance. There were no significant differences in progress from high security towards the community. Patients with antisocial personality disorder had significantly less chronic negative symptoms, but were no different in relation to course of positive symptoms from other patients. There were no significant differences in psychopathology or behaviour (as rated by the BPRS, SANS and SDAS) at follow-up.

Table 10.7. Comparison between patients with comorbid antisocial personality disorder (ASPD) and those without: categorical baseline variables

	No ASPD (n=113)	ASPD (n=56)	DF	Chi-square	P
DEMOGRAPHICS					
Male	100 (88.5)	50 (89.3)	1	0.02	0.878
Father's socio-economic group non-manual	18 (15.9)	8 (14.3)	1	0.08	0.780
LEGAL STATUS					
Civil	31 (27.4)	12 (21.4)	1	0.71	0.399
Criminal	60 (53.1)	34 (60.7)	1	0.88	0.348
Prison transfer	22 (19.5)	10 (17.9)	1	0.06	0.801
Restricted	56 (49.6)	32 (57.1)	1	0.86	0.353
PSYCHIATRIC / MEDICAL HISTORY					
Previous State Hospital admission	23 (20.4)	20 (35.7)	1	4.66	0.031
Previous deliberate self-harm	64 (56.6)	42 (75.0)	1	5.40	0.020
Epilepsy	12 (10.6)	11 (19.6)	1	2.59	0.107
FORENSIC HISTORY					
Convictions (either as index or previous offence)					
Any	95 (84.1)	56 (100)	1	9.98	0.002
Homicide	29 (25.7)	18 (32.1)	1	0.78	0.376
Violent	47 (41.6)	33 (58.9)	1	4.51	0.034
Sexual	19 (16.8)	10 (17.9)	1	0.03	0.866
'Serious'	74 (65.5)	44 (78.6)	1	3.04	0.081
Index offence					
Any	53 (46.9)	24 (42.9)	1	0.25	0.619
'Serious'	35 (31.0)	18 (32.1)	1	0.02	0.877
Psychosis precipitant	83 (74.1)	32 (57.1)	1	5.00	0.026
Stranger victim	18 (15.9)	9 (16.1)	1	0.00	0.981
PERSONAL HISTORY					
Early maladjustment	27 (24.8)	28 (52.8)	1	12.52	0.000
Employment problems	52 (48.6)	37 (71.2)	1	7.23	0.007
Relationship instability	74 (67.3_	36 (67.9)	1	0.01	0.934
COMORBIDITY					
Alcohol or drug dependence	40 (35.4)	30 (53.6)	1	5.10	0.024
Learning disability	5 (4.4)	3 (5.4)	1	0.072	0.788
PSYCHIATRIST'S OPINION					
Need high security	34 (30.1)	16 (28.6)	3	0.51	0.916
Poor response to treatment	66 (62.9)	28 (54.9)	1	0.91	0.341
Non-co-operative with staff	22 (21.0)	10 (19.6)	1	0.04	0.845
Persistent aggression	21 (20.0)	11 (21.6)	1	0.05	0.820

Table 10.8. Comparison between patients with comorbid antisocial personality disorder (ASPD) and those without: categorical follow-up variables

	No ASPD (n=113)	ASPD (n=56)	DF	Chi-square	P
LEGAL STATUS					
Informal	31 (27.4)	12 (21.4)	1	0.26	0.613
Restricted	64 (56.6)	34 (60.7)	1	0.71	0.399
PROGRESS					
Leave high security	89 (78.8)	45 (80.4)	1	0.06	0.810
Readmitted to high security	15 (13.3)	13 (23.2)	1	2.68	0.102
Reach community	36 (42.4)	24 (53.3)	1	1.43	0.232
FORENSIC					
Any aggressive incident	82 (73.2)	49 (87.5)	1	4.43	0.035
Serious violence	18 (16.1)	14 (25.0)	1	1.93	0.165
Conviction	12 (11.4)	12 (22.6)	1	3.44	0.064
Violent conviction	7 (6.6)	8 (15.1)	1	2.98	0.084
SOCIAL FUNCTIONING					
Intimate relationship	18 (15.9)	16 (28.6)	1	3.72	0.054
Living independently at end of follow-up	12 (12.6)	7 (14.9)	1	0.14	0.709
COURSE OF PSYCHOSIS					
Continuous	47 (41.6)	14 (25.0)	2	5.43	0.066
Fluctuating	38 (33.6)	28 (50.0)			
Recover	28 (24.8)	14 (25.0)			
TREATMENT					
Atypical antipsychotic	81 (71.7)	38 (67.9)	1	0.26	0.608
Clozapine	56 (49.6)	20 (35.7)	1	2.90	0.089
Lithium	24 (21.8)	12 (21.4)	1	0.00	0.954
Anti-convulsant	34 (30.9)	22 (39.3)	1	1.17	0.280
Non-compliance with medication	17 (15.0)	13 (23.2)	1	1.71	0.191
Non-compliance with psychosocial intervention	37 (35.2)	21 (42.0)	1	0.66	0.416

Table 10.9. Comparison between patients with antisocial personality disorder (ASPD) and those without: continuous baseline variables

	No ASPD (n=113)	ASPD (n=56)	DF	t	P
DEMOGRAPHICS					
Age (years)	35.7	35.6	167	0.084	0.933
FORENSIC					
Number of convictions	9.0	15.6	154	-3.21	0.002
PSYCHIATRIC HISTORY					
Age at first contact (years)	20.6	18.1	165	2.49	0.014
Time in hospital (years)	9.1	10.2	164	-0.76	0.449
Time since admission to State Hospital (years)	3.9	4.2	167	-0.23	0.816
PSYCHOPATHY					
PCL-R total	12.7	18.4	159	-5.37	0.000
PCL-R factor 1	4.4	6.0	162	-2.89	0.004
PCL-R factor 2	6.7	9.9	160	-5.72	0.000
RISK INSTRUMENTS					
VRAG	0.4	14.0	167	-4.48	0.000
H10 (of HCR-20)	12.4	15.5	162	-6.26	0.000
MENTAL STATE (KRAWIECKA)					
Total	7.2	6.9	158	0.37	0.714

Table 10.10. Comparison between patients with antisocial personality disorder (ASPD) and those without: continuous follow-up variables

	No ASPD (n=113)	ASPD (n=56)	DF	t	P
FORENSIC					
Number of aggressive incidents	11.8	14.7	166	-0.63	0.528
Number of episodes of self-harm	2.9	7.1	70.7	-1.68	0.097
Number of episodes of absconding	0.5	1.3	64.4	-1.81	0.076
COURSE OF PSYCHOSIS					
Proportion of years with positive symptoms	0.63	0.54	167	1.47	0.143
Proportion of years with negative symptoms	0.55	0.40	122.8	2.79	0.006
MENTAL STATE / BEHAVIOUR AT FOLLOW-UP					
SDAS total	6.4	5.2	117	0.80	0.424
BPRS total	33.9	35.6	105	-0.65	0.519
SANS total	36.4	32.8	118	0.82	0.416

Analysis of baseline and follow-up associates of antisocial personality disorder using logistic regression

A model using the nine baseline variables in table 10.11 was able to correctly classify 80% of cases, but was not a good fit (Hosmer and Lemeshow test: chi-square=19.94, df=8, p=0.011), and explained between 25.2 and 35.2% of the variability in the dependent variable (i.e. whether patients had a diagnosis of antisocial personality disorder). The significant factors in this model were young age at first psychiatric contact and deliberate self-harm; approaching significance were older age and employment problems. Adding two follow-up variables to these baseline variables (table 10.12) did not improve the classification; this model correctly classified 78.8% of cases, but was a good fit (Hosmer and Lemeshow test: chi-square=8.74, df=8, p=0.365), and explained between 27.7 and 38.5% of the variability in the dependent variable. Significant variables in this model were younger age at first psychiatric contact, violence during follow-up, employment problems; almost reaching significance were older age and substance dependence. Using backward conditional withdrawal of variables the factors which best 'predicted' antisocial personality disorder were these five variables along with having a previous conviction and deliberate self-harm.

Table 10.11. Logistic regression using only baseline factors as independent variables; dependent variable is 'antisocial personality disorder'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	.047	.026	3.336	1	.068	1.048	.997	1.103
Male gender	-.464	.801	.335	1	.563	.629	.131	3.023
Substance dependence	.633	.442	2.055	1	.152	1.884	.792	4.480
Childhood maladjustment	.641	.440	2.118	1	.146	1.898	.801	4.496
Age at first psychiatric contact	-.100	.040	6.324	1	.012	.905	.838	.978
Self-harm	.912	.442	4.253	1	.039	2.491	1.046	5.928
Conviction	20.978	8978.3	.000	1	.998	1.290E9	.000	.
Psychosis precipitated index behaviour	-.369	.438	.712	1	.399	.691	.293	1.630
Employment problems	.835	.456	3.355	1	.067	2.304	.943	5.628
Constant	-22.198	8978.3	.000	1	.998	.000		

Table 10.12. Logistic regression using both baseline and follow-up factors as independent variables; dependent variable is 'antisocial personality disorder'.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Age	.051	.028	3.380	1	.066	1.052	.997	1.110
Male gender	-.389	.847	.211	1	.646	.677	.129	3.563
Substance dependence	.810	.474	2.921	1	.087	2.248	.888	5.693
Childhood maladjustment	.434	.462	.883	1	.347	1.544	.624	3.819
Age at first psychiatric contact	-.119	.043	7.683	1	.006	.887	.816	.966
Self-harm	.700	.465	2.265	1	.132	2.014	.809	5.010
Conviction	21.280	9378.8	.000	1	.998	1.746E9	.000	.
Psychosis precipitated index behaviour	-.489	.459	1.137	1	.286	.613	.249	1.507
Employment problems	.973	.490	3.940	1	.047	2.647	1.012	6.922
Violence	1.515	.629	5.803	1	.016	4.550	1.326	15.61
Convicted	-.017	.605	.001	1	.978	.983	.300	3.218
Constant	-23.419	9378.8	.000	1	.998	.000		

Psychopathy

The PCL-R was used as a dimensional variable rather than to define categories of non-psychopathic and psychopathic patients. So for categorical variables the mean PCL-R total was compared between groups, and for continuous variables the correlation between the PCL-R total and the relevant continuous variable was calculated (tables 10.13, 10.14, 10.15 and 10.16).

Baseline variables

The PCL-R total was significantly associated with: father having lower socioeconomic status, younger age; not being detained under civil procedure; number of convictions, having any conviction, violent conviction, serious conviction, not having an index offence precipitated by psychosis, having a stranger victim; early maladjustment, employment problems; substance dependence, antisocial personality disorder; higher VRAG and H10 totals; and lower Krawiecka total.

Follow-up variables

The PCL-R total was associated with: readmission to high security, reaching the community (not statistically significant), and being in an intimate relationship. It was significantly associated with serious violence, conviction, violent conviction and episodes of absconding; but not with whether a patient was aggressive or not, number of episodes of aggression or SDAS total. A higher PCL-R total was associated with a better outcome of psychosis: not having a continuous course, lower SANS total, lower BPRS total, lower proportion of years with positive symptoms and lower proportion of years with negative symptoms.

Table 10.13. Comparison between mean PCL-R scores in patients with and without each categorical baseline variable

	Without variable Mean PCL-R score (N)	With variable Mean PCL-R score (N)	DF	t	P
DEMOGRAPHICS					
Male	11.7 (145)	14.8 (16)	159	1.76	0.080
Father's socio-economic group non-manual	15.1 (136)	11.4 (25)	29.5	2.07	0.047
LEGAL STATUS					
Civil	15.2 (119)	12.7 (42)	159	2.007	0.046
Criminal	14.0 (72)	14.9 (89)	159	-0.85	0.396
Prison transfer	14.2 (131)	15.8 (30)	159	-1.16	0.250
Restricted	13.8 (78)	15.2 (83)	159	-1.34	0.182
PSYCHIATRIC / MEDICAL HISTORY					
Previous State Hospital admission	14.0 (121)	16.2 (40)	159	-1.77	0.079
Previous deliberate self-harm	15.0 (61)	14.2 (100)	159	0.76	0.448
Epilepsy	14.3 (139)	15.9 (22)	159	-1.05	0.298
FORENSIC HISTORY					
Convictions (either as index or previous offence)					
Any	8.8 (18)	143 (15.2)	159	-3.90	0.000
Homicide	14.3 (117)	15.2 (44)	159	-0.78	0.439
Violent	12.8 (84)	16.3 (77)	159	-3.32	0.001
Sexual	14.2 (132)	15.9 (29)	47.8	-1.31	0.198
'Serious'	12.2 (49)	15.5 (112)	159	-2.87	0.005
Index offence					
Any	14.2 (86)	14.8 (75)	159	-0.53	0.598
'Serious'	14.3 (109)	14.9 (52)	159	-0.48	0.631
Psychosis precipitant	16.2 (51)	13.7 (109)	158	2.15	0.034
Stranger victim	13.7 (135)	18.5 (26)	159	-3.33	0.001
PERSONAL HISTORY					
Early maladjustment	11.7 (106)	19.9 (55)	129.0	-9.14	0.000
Employment problems	11.2 (69)	17.1 (89)	156	-5.85	0.000
Relationship instability	13.2 (52)	109 (15.1)	159	-1.71	0.090
COMORBIDITY					
Alcohol or drug dependence	13.3 (94)	16.3 (67)	155.4	-2.89	0.004
Learning disability	14.4 (153)	15.9 (8)	9.8	-1.00	0.343
Antisocial personality disorder	12.7 (109)	18.4 (52)	159	-5.37	0.000
PSYCHIATRIST'S OPINION					
Need high security	14.2 (90)	15.8 (46)	134	-1.34	0.181
Poor response to treatment	15.5 (62)	14.0 (89)	149	1.27	0.206
Non-co-operative with staff	14.1 (121)	16.6 (30)	149	-1.79	0.076
Persistent aggression	14.9 (120)	13.6 (31)	149	0.92	0.358

Table 10.14. Comparison between mean PCL-R scores in patients with and without each categorical follow-up variable

	Without variable Mean PCL-R score (N)	With variable Mean PCL-R score (N)	DF	t	P
LEGAL STATUS					
Informal	119 (14.3)	42 (15.2)	159	-0.788	0.432
Restricted	14.2 (66)	14.7 (95)	159	-0.52	0.605
PROGRESS					
Leave high security	14.7 (33)	14.5 (128)	43.0	0.17	0.868
Readmitted to high security	13.9 (135)	17.8 (26)	159	-2.74	0.007
Reach community	13.7 (102)	15.9 (59)	159	-1.94	0.054
FORENSIC					
Any aggressive incident	14.3 (35)	14.6 (125)	158	-0.29	0.772
Serious violence	14.0 (129)	16.7 (31)	158	-1.99	0.049
Conviction	13.8 (129)	19.4 (22)	149	-3.60	0.000
Violent conviction	14.1 (139)	19.8 (13)	150	-2.92	0.004
SOCIAL FUNCTIONING					
Intimate relationship	13.7 (127)	17.5 (34)	159	-2.88	0.005
Living independently at end of follow-up	14.6 (119)	13.1 (19)	136	0.87	0.389
COURSE OF PSYCHOSIS*					
Continuous	-	11.8 (57)	160	8.62	0.000
Fluctuating	-	16.8 (64)			
Recover	-	14.6 (40)			
TREATMENT					
Atypical antipsychotic	15.3 (47)	14.2 (114)	159	0.90	0.372
Clozapine	15.4 (88)	13.4 (73)	159	1.87	0.064
Lithium	14.2 (124)	15.7 (34)	44.9	-1.00	0.323
Anti-convulsant	13.9 (104)	15.6 (54)	156	-1.45	0.149
Non-compliance with medication	14.4 (133)	14.9 (28)	159	-0.30	0.765
Non-compliance with psychosocial intervention	14.0 (91)	15.2 (57)	146	-1.01	0.314

* For 'course of psychosis' analysis was undertaken using one way ANOVA comparing the three groups with different courses.

Table 10.15. Correlation between PCL-R score and continuous baseline variables

	r	P	N
DEMOGRAPHICS			
Age (years)	-0.190	0.016	161
FORENSIC			
Number of convictions	0.452	0.000	148
PSYCHIATRIC HISTORY			
Age at first contact (years)	-0.126	0.107	159
Time in hospital (years)	-0.128	0.137	158
Time since admission to State Hospital (years)	-.063	0.430	161
RISK INSTRUMENTS			
VRAG	0.726	0.000	161
H10 (of HCR-20)	0.820	0.000	161
MENTAL STATE (KRAWIECKA)			
Total	-0.260	0.000	153

Table 10.16. Correlation between PCL-R score and continuous follow-up variables

	r	P	N
FORENSIC			
Number of aggressive incidents	-0.062	0.305	160
Number of episodes of self-harm	0.056	0.479	160
Number of episodes of absconding	0.169	0.033	160
COURSE OF PSYCHOSIS			
Proportion of years with positive symptoms	-0.197	0.012	161
Proportion of years with negative symptoms	-0.292	0.000	161
MENTAL STATE / BEHAVIOUR AT FOLLOW-UP			
SDAS total	0.012	0.898	116
BPRS total	-0.349	0.000	104
SANS total	-0.257	0.005	117

Discussion

Substance dependence

Substance dependence, schizophrenia and violence

As set out in Chapter 2, many studies have reported an association between alcohol and/or drug misuse and violence and/or offending. Virtually every study that has examined the relationship between substance misuse or dependence, psychosis or schizophrenia, and violence or offending, has found a strong positive relationship between substance dependence and offending/violence. This association has been described in various settings (community, general inpatients and forensic settings), with various types of violence and offending (ranging from inpatient aggression to homicide), and for alcohol and drugs separately and together.

The associates of substance dependence in schizophrenia

Schizophrenia is associated with higher rates of substance misuse than in the general population (Soyka et al. 1993), and the rate of substance misuse appears to be increasing over time (Soyka 2000). Reviews (Mueser et al. 1998; Scheller-Gilkey et al. 1999; Soyka 2000) have highlighted various other associations with comorbid substance dependence in individuals with schizophrenia. They tend to consume lower quantities of drugs than other psychiatric patients and show less physical symptoms; they have high rates of re-hospitalisation; their prognoses are usually poor; they may have better premorbid function and less severe negative symptoms; they may have less brain abnormalities. They are more likely to be male, younger and homeless. They have been found to have more positive and less negative symptoms, more affective disturbance, higher suicide rates, higher rates of treatment-resistance, and higher rates of non-adherence with medication. Higher rates of tardive dyskinesia, higher doses of anti-psychotics prescribed, higher rates of hospital admission, higher rates of discharge against advice, and younger age at time of first hospitalisation have all been reported. However, apart from gender and age, other findings have been replicated less often, and some findings have been in the opposite direction from the trends listed. For example some studies have shown less symptoms or no differences in level of symptoms in patients with comorbid substance misuse (Mueser et al. 1998).

Substance dependence in patients in high security hospitals

Despite the extensive literature on schizophrenia and violence or offending, until recently there was a dearth of research on substance misuse in high security hospital patients. In the

English special hospitals, Thomas and McMurran (1993) found 11 out of 61 male special hospital patients had alcohol-related problems prior to admission; Corbett et al. (1998) found 15% of patients with schizophrenia and 18% of those with personality disorder admitted to the special hospitals between 1972 and 1995 had a history of substance misuse; Taylor et al. (1998), studying the 1,741 patients resident in the special hospitals in 1993, found 13.1% of patients with schizophrenia and 38.6% of patients with personality disorder had a substance misuse disorder using ICD-10 criteria; and, D'Silva and Ferriter (2003) found rates of substance use at the time of index offences and over the 12 months prior to detention had increased from 12% and 26.9% respectively in 1972 – 4 to 33.8% and 57.5% respectively in 1996 – 8. In the State Hospital, Thomson et al. (1997) found that of patients in the hospital in 1992 – 3, 21.2% were intoxicated at the time of the index offence or behaviour leading to admission, 48.5% had a history of alcohol misuse, 46.9% had used illicit substances, and 54.8% had a substance dependence diagnosis; Wilson and Thomson (personal communication) found 80% of 42 male patients admitted in 1998 had a substance misuse diagnosis; and Ritchie et al. (2004) found that of 86 male patients admitted in 2000 and 2001, 81% had misused alcohol and 75% had misused drugs. Taylor et al. (2008) compared the sample used in the current study to a contemporaneous cohort of English special hospital patients with psychosis, and found higher rates of alcohol and drug misuse and dependence in the Scottish cohort. There have been no detailed, long-term follow-up studies looking at the role of substance misuse or dependence in determining outcome in forensic settings in the UK.

The associates of substance dependence in the current study

The baseline characteristics were in keeping with those reported in other studies: younger age, more criminality, higher rates of self-harm, more affective symptoms, more childhood maladjustment, more parental substance misuse, more personality disorder (particularly antisocial personality disorder and factor 2 psychopathy), previous supervision problems, non-compliance, and perhaps less negative symptoms and disorganization but no difference in positive symptoms. Relatively low levels of opiate abuse (see Chapter 6) are in keeping with findings reported in other studies of substance misuse in schizophrenia.

They had been admitted more recently, so perhaps had had more exposure to substances in the community than patients admitted in previous years. Alternatively this may reflect the relatively good prognoses of their illness as indicated by the follow-up findings. The level of positive symptoms at baseline was no more or less than in the non-dependent group. Symptoms were not just due to intoxication with substances or short-term drug induced

effects. However the higher rate of life-time visual hallucinations may have been more directly related to periods of alcohol or drug intoxication or withdrawal. It is important to note that even in non-dependent patients intoxication or periods of substance misuse occurred, which has implications for potential risk at time of intoxication. The findings of lower rates of epilepsy may reflect a more neurologically intact group.

Apart from the higher rate of criminal convictions, the outcomes of the substance dependent group were significantly better than the non-substance dependent group. They were more likely to leave high security, they were no more likely to return to high security, they were more likely to reach the community and become informal patients. Their illnesses took a less malignant course in terms of positive symptoms, negative symptoms and disorganization. They were more likely to have episodic rather than continuous symptoms. They were no more violent, but they did abscond more often. They had more affective symptoms and were more able to form intimate relationships.

So the comorbid group had a less malignant illness with less impaired ability to function, but had pre-morbid personality problems that were linked to early behavioural problems, juvenile delinquency and adult criminality. They were very similar to the group defined by the presence of criminal convictions at follow-up in Chapter 8. The behaviours displayed indicate life-long impulsivity and antisociality. The better illness outcome seems to have been due to an intrinsically less malignant illness combined with response to enforced treatment and enforced abstinence from alcohol and substances in a secure setting. The previous reports of higher rates of treatment-resistance probably reflect ongoing substance use and non-compliance in these studies. The good course of illness in substance dependent patients fits with findings of better pre-morbid adjustment and less brain abnormalities in other studies. The antisociality and impulsivity displayed in childhood by the comorbid patients, is different from the pre-morbid impaired cognitive and social functioning associated with non-substance dependence and poor outcome in other studies.

These findings suggest that it is important to address substance misuse in such patients to treat and improve the outcome of their illnesses. But with good treatment of psychosis, the risk of re-offending is not addressed. Treatments aimed at offending behaviour are needed to address underlying antisociality and impulsivity. Such interventions may also improve compliance with treatment generally.

Personality disorder

As set out in Chapter 2, pre-morbid personality disorder is more prevalent in patients with schizophrenia than in the general population. This applies to various types of personality disorder, including antisocial traits. Certain personality disorders, particularly antisocial personality disorder and psychopathy, are associated with violence and offending; and studies have found this association in individuals with schizophrenia (see Chapter 2). Most follow-up studies of patients in high security hospitals have looked at mentally ill and personality disordered patients as two different groups rather than studying the effect of comorbid personality disorder. The main outcome that has been studied is re-offending, which has been found to be associated with personality disorder and psychopathy (see Chapter 3).

Similarities and differences between associates of antisocial personality disorder and psychopathy

Both antisocial personality disorder and psychopathy were associated with previous convictions and violent convictions; early maladjustment and employment problems; substance dependence, each other and higher scores on risk scales; and not having index behaviours precipitated by psychotic symptoms. Unlike psychopathy, antisocial personality disorder was associated with younger age at first psychiatric contact, previous admission to high security and deliberate-self-harm. Unlike antisocial personality disorder, psychopathy was associated with younger age, lower socioeconomic status, not being on civil detention and stranger victims. The only forensic follow-up outcome significantly associated with antisocial personality disorder was any violence (but not persistent violence or serious violence). This was confirmed in the logistic regression analysis associates of forensic outcomes (see Chapter 8). Course of positive symptoms was unrelated to antisocial personality disorder, but there was a better course of negative symptoms. Psychopathy was associated with a number of follow-up outcomes: not leaving high security, readmission to high security (see also regression analysis in Chapter 7) and perhaps reaching the community; conviction, serious conviction and serious violence (see also regression analysis in Chapter 8); better course of psychosis for both positive and negative symptoms (see also regression analysis in Chapter 9); absconding and having an intimate relationship. But it was not associated with whether patients were aggressive or not, persistent aggression, or level of aggression at follow-up interview.

The nature of antisocial personality disorder and psychopathy

Before exploring these associations, it is worth considering the nature of antisocial personality disorder and psychopathy. The terms are often used synonymously in clinical practice, but in this study there were clearly marked differences between the two. Antisocial personality disorder defined by criteria from the 1970s (such as Feighner criteria or DSM-III) is different from psychopathy (as defined in the PCL-R) and dissocial personality as defined in ICD-10, and is different from DSM-IV anti-social personality disorder. The Feighner criteria emphasize behaviour and do not really look at personality characteristics. Individuals with chronic antisocial behaviour starting in childhood and continuing into adulthood may have various underlying personality, developmental and social difficulties. Underlying traits may be one or more of the following: poor self-control/impulsivity, antisocial/pro-criminal attitudes, emotional instability, hostility/aggressiveness, suspiciousness/mistrust, sensation-seeking, entitlement/narcissim, cruelty/sadism, callousness/lack of empathy. In terms of the five-factor model of personality these traits map onto neuroticism, antagonism (the converse of agreeableness), extraversion and lack of conscientiousness (Widiger and Lynam 2003; Skeem et al. 2005). Such traits, rather than behaviour, are going to be more important in DSM-5 (Widiger 2011). Psychopathy assessed using the PCL-R taps into all of these traits. So psychopathy in the current study is a dimension covering these dissocial traits, whereas antisocial personality disorder was a heterogeneous category. As other personality disorders were not assessed, the overlap with other aspects of personality pathology cannot be quantified, but we know from other studies that antisocial personality disorder overlaps with other personality disorders (particularly paranoid, borderline and narcissistic disorders) in serious offenders (Blackburn and Coid 1999).

Findings considered in light of other studies

The findings that patients with comorbid antisocial personality disorder had earlier contact with psychiatric services and were less likely to have index offences precipitated by psychosis match the findings on patients with pychosis and comorbid personality disorders in English special hospitals (Taylor et al. 1998; Taylor et al. 2008). The earlier contact with services was probably due to pre-morbid conduct disorder and not early onset psychosis. Psychopathy was also associated with not having a psychotic precipitant to index offence, emphasizing that in those with comorbid personality disorders psychosis plays a less prominent or peripheral role in violence and offending. The association between psychopathy and violence towards strangers has been reported in non-psychotic offenders

(Williamson et al. 1987). The common associations of antisocial personality disorder and psychopathy in terms of offending histories, childhood and employment problems, substance dependence and higher risk scores mirror findings in non-psychotic samples (Hare 2006). It has been suggested that substance misuse may be a proxy measure for personality disorder when trying to understand the relationship between psychosis and substance misuse (Tiihonen and Swartz 2000). Personality disorder, particularly borderline and antisocial types, is associated with self-harm (Dahl 2003) as found in this sample for antisocial personality disorder, but not psychopathy.

The association between psychopathy in the current sample and convictions, serious convictions, serious violence, absconding and forming intimate relationships is in keeping with other studies of psychopathy in psychotic and non-psychotic samples (Hill et al. 1996; Hemphill et al. 1998; Heilbrun et al. 1998; Grann et al. 1999; Hare 2006). However, in terms of forensic outcomes, antisocial personality disorder was only associated with whether a patient was physically violent or not (unlike psychopathy), but not with serious, persistent or convicted violence. Psychopathy seemed 'protective' in relation to the course and outcome of psychosis both for negative and positive symptoms. Antisocial personality disorder was not 'protective' in relation to course of positive symptoms, but was with negative symptoms. There are no other studies that I have been able to identify on the impact of psychopathy on the outcome of schizophrenia. It may be that there is something intrinsically protective about having psychopathic traits; alternatively factors associated with a good outcome of psychosis (e.g. better pre-morbid functioning, substance dependence) may lead to items of the PCL-R being scored positive. The antisocial personality disorder group had much in common with the aggressive (but non-serious harm, non-persistent and non-convicted) patients described in Chapter 8. It is interesting to note that antisocial personality disorder made no difference to administrative outcomes, but psychopathy (perhaps due to the nature of the serious offences with more stranger victims) was associated with not leaving high security. Psychopathy was then associated with readmission (through re-offending, serious violence and non-compliance), but having left high security psychopathy did not prevent patients reaching the community.

The interaction between psychopathy, antisocial personality and schizophrenia

In considering these results, it is important to note that the antisocial personality disorder group was likely to include a heterogeneous mixture of individuals, including cases where pre-morbid conduct disorder was neuro-developmentally related to the development of

psychosis, cases with other personality disorders (particularly borderline personality disorder) and cases with psychopathy. Psychopathy was a relatively homogenous dimensional measure.

Hodgins (2008) described a group of patients with schizophrenia who seemed to develop features of factor 1 psychopathy which fluctuated with their psychotic symptoms and may have been related to very serious but isolated violent episodes. Psychopathy in the current study was not like this. Psychopathic patients in the current study were pre-morbidly psychopathic and, unlike the group described by Hodgins, had less negative symptoms and histories of conduct problems and substance misuse. It seems that the group described by Hodgins were 'pseudo-psychopathic' when psychotic, whereas the group described in the current study were 'true psychopaths' whose personality traits were independent of psychosis.

Hodgins (2008) suggested there were three types of patients with schizophrenia who were violent mainly determined by evidence of pre-morbid antisocial behaviour, the course of psychosis and the relationship between psychosis and violence. The three types were: (1) a pre-morbidly aggressive group who remained aggressive and antisocial when unwell; (2) a group who were chronically aggressive after the onset of psychosis; and (3) a group who committed serious violence, including homicide, mostly against relatives, in their late thirties, with no previous history of violence (this is the group who had 'pseudo-psychopathic' episodes). Based on the research conducted for this thesis it is suggested that a more complex typology may be required, and this will be set out in Chapter 11.

It is important that personality is assessed in forensic patients with schizophrenia. The various facets of personality function that might be relevant to risk of violence, engagement in treatment and response to treatment need to be elucidated. In any patient there will be an interaction between pre-morbid personality and the direct and indirect effects of psychosis on interpersonal and emotional functioning. Unfortunately personality is too often poorly assessed by clinicians and not properly taken into account in treatment and management. There are approaches to the treatment and management of personality disordered offenders which may be effective in reducing risk, helping staff and improving functioning (Dowsett and Craissati 2008). These should be borne in mind and used where appropriate in offenders with schizophrenia who have marked personality dysfunction.

CHAPTER 11
Conclusions

Summary of main findings

The literature on schizophrenia and violence

Epidemiological cross-sectional community studies, national birth cohort studies and studies of offenders indicate that there is a significant, but modest, relationship between schizophrenia and violence. Follow-up studies of managed patients, in general and forensic samples, have found no association or a negative association. When compared to the general population people with schizophrenia are more violent, but when compared with other violent offenders, particularly those with personality disorders, they are less likely to be violent. People with schizophrenia commit between 5-10% of homicides, but most violence and offending is minor, and most victims are relatives and those in the person's immediate environment. Factors found to be associated with violence in people with schizophrenia include: substance misuse, personality disorder, psychotic symptoms, social disadvantage, victimisation, non-compliance with treatment, and living circumstances. Certain treatments and legally mandated treatment may decrease risk. There is a complex interaction between these associates. Personality disorder and substance abuse appear to be key factors, and psychotic symptoms seem to be of less importance. People with schizophrenia who are violent are heterogeneous, but there may be particular underlying patterns or pathways. These pathways are differentiated by pre-morbid personality disorder, the onset and course of psychosis and the onset and course of violence.

The outcomes of UK security hospital patients

Seventy-two studies of the outcomes of secure hospital patients in the UK were identified, 39 from high security, 29 from medium secure units and 4 from mixes settings. Most included mixed diagnostic groups, schizophrenia was the most common diagnosis, but few looked specifically at mentally ill or psychotic patients, and there were only 3 studies that focussed on patients with schizophrenia. Most long-term studies (i.e. those following up patients for 2 years or more) used a pseudo-prospective design, where baseline data were gathered retrospectively and outcomes were ascertained from more readily available records. No long-term follow-up studies involved interviews with patients at follow-up. Thirteen studies had a similar follow-up length to the current study (5-10 years), 7 were longer, 34

were shorter and 17 looked at outcomes not requiring longitudinal follow-up. Fourteen studies had a similar sample size (100-200) to the current study, 25 were smaller and 32 were larger. The most common outcome reported (in over half of studies) was officially recorded conviction. In 15-25% of studies readmission, length of stay, institutional violence, the discharge process, discharge destination or mortality was reported. Clinical (other than mortality) and social outcomes were reported in few studies.

Length of stay in high security was 5-10 years, with no apparent change over time, and perhaps longer in patients with mental illness. Most patients in the 1990s did not require high security care. Most patients moved from high security to less secure hospitals and discharge directly to the community has become less common. Over 5-10 years following discharge from high security a half to three-quarters of patients reach the community, but a significant minority, amongst whom the mentally ill are over-represented, never achieve community living. About 20-30% of patients were re-admitted to high security care after discharge, usually within a few years.

For high security patients, conviction rates (combining data from relevant studies) at about 5 years were any conviction 30.5%, violent conviction 10%, and serious conviction 15.5%; and at about 10 years were any 41.4%, violent 17.6%, serious 19.9%. For medium security patients conviction rates at 2 years were any 20.8%, violent 6.9%, serious 6.3%; and at about 5 years any 34.4%, violent 16%, serious 11.4%. A greater proportion of the convictions of high security patients were for serious offences. Associates of conviction and serious conviction included psychopathic disorder/personality disorder, young age, male gender, previous convictions (previous serious convictions for serious re-convictions), higher scores on risk assessment instruments, not having a mental illness, lack of legal compulsion, low IQ (for conviction but not serious conviction), shorter admission and substance misuse. These are in keeping with findings from other samples of mentally disordered offenders and from non-mentally ill samples (Bonta et al. 1998; Quinsey et al. 2006; Andrews and Bonta 2010). I identified no studies reporting actual (whether convicted or not) violence in patients after they leave high security. Medium secure studies show actual violence/offending is under-estimated by convictions by a factor of 4-5. High rates of violence in high and medium secure settings, towards other patients and staff, have been reported.

Mortality rates in secure hospital patients are high (3-22%), with high rates of unnatural deaths and suicide. But we know little about clinical and social outcomes in this population. There has been no published research on the clinical course of psychosis, very little on

treatment received and nothing on the relationship between course of psychosis and other outcomes. It is doubtful that the few studies of social outcomes (relationships, employment, accommodation, substance use) are of relevance to patients currently in high security.

Baseline characteristics of sample

The sample was all patients with schizophrenia detained in high security psychiatric care in Scotland (including patients from Northern Ireland) during a year from 25 August 1992 to 13 August 1993. Most were male, unmarried and from socially disadvantaged backgrounds. The average patient was in their mid thirties. Most had been admitted from criminal courts having committed serious offences, but a substantial minority had been admitted under civil procedure due to aggression in less secure hospitals and another group had been transferred from prison. About half were subject to restriction orders. Most had a criminal conviction and a quarter had a conviction for homicide. Most had had psychiatric treatment before admission to the State Hospital. Comorbid substance dependence and personality disorder were common. Childhood disadvantage and educational failure was not uncommon. Employment and relationship problems were common. Life-time psychotic symptoms, psychotic symptoms at baseline interview and extra-pyramidal side-effects due to high doses of typical anti-psychotics were common. The majority did not need the security of the State Hospital, but were not able to move on due to lack of appropriate local services. The sample had much in common with samples from the English special hospitals and from medium secure units in England, but alcohol and substance dependence and comorbid personality disorder were more common, and ethnic minority patients less common.

Administrative outcomes

During the subsequent decade most patients left high security (78.7%), but a minority reached the community (48% of patients who left high security). These figures are in keeping with those reported for English special hospital patients (Butwell et al. 2000), but the proportion reaching the community is at the lower end of the range of 50-80% in these studies (Gathercole 1968, Reiss et al. 1996, Steels et al. 1998, Jamieson and Taylor 2002 and 2005). A minority of those who left (17%) returned to high security; the range in most studies of UK high security hospitals has been about 20-30% (Tong and McKay 1959; Gathercole 1968; Black 1982; Cope and Ward 1993; Dolan et al. 1993; Quinn and Ward 2000; Duncan et al. 2002; Jamieson and Taylor 2002; Jamieson and Taylor 2005). All readmissions occurred within 3 years of leaving. The final known destinations of the cohort members were about a quarter in each of high security, other secure hospital, open hospital,

and the community; very few were in prison.

Not leaving high security was independently associated with psychopathy and chronic psychosis. Those who remained in high security had committed more serious index offences, including offences against strangers, and during follow-up they were more persistently and seriously violent. Substance dependence, associated with better course of psychosis and despite its association with psychopathy, was associated with leaving high security. Chronic psychosis associated with ongoing violence, as identified by Shaw et al. (1994b) and (Murray et al. 1994), and psychopathy associated with serious index offences, like the severe personality disorder group identified by Murray et al. (1994), were the key factors. Reaching the community was independently associated with not having chronic psychosis, psychosis as precipitant to index offence and substance dependence. Those who reached the community were more functionally able with more previous convictions, more factor 2 psychopathy, but less ongoing violence. Those who reached the community gained more convictions, but this was not just due to opportunity, as they had a number of features associated with re-offending. The associates of not reaching the community were in keeping with those identified by Jamieson and Taylor (2002), except in the current study having a serious index offence correlated with not achieving community living. Readmission to high security was associated with psychopathy, non-compliance, and conviction or serious violence during follow-up. It was not associated with not reaching the community, unlike Jamieson and Taylor's finding (2002), and was associated with being restricted, unlike Duncan et al.'s (2002) finding. The former discrepancy may reflect that in the current study some patients reached the community, then offended and then were re-admitted.

Forensic outcomes

About three-quarters of the sample committed at least one act of aggression during the follow-up period, but less than a quarter committed an act of serious violence. There were almost two thousand incidents of aggression during follow-up. The vast majority were in the State Hospital, and the numbers diminished moving to less secure settings, open units and the community. Violence in the community was rare. Most victims were patients and staff. There were only 10 attacks on strangers; two of these were serious. Most aggression occurred when patients were psychotic, but more serious violence and sexual violence was less likely to be associated with psychotic symptoms. These findings accord with those from studies of in-patient violence (Crichton 1995), studies describing violence in high security hospitals (Larkin et al. 1988; Coldwell and Naismith 1989; Maden et al. 1993) and studies describing violence in medium secure units (Gudjonnsen et al. 2000; Rutter et al. 2004). The

rate of violence is very similar to that described in patients with schizophrenia from a medium secure unit followed up for 10 years by Baxter et al. (1998). Deliberate-self harm occurred in a third of patients and diminished with time, and only one incident led to death by suicide. The suicide rate is low compared to other samples (Maden et al. 1999, Coid et al. 2007b, Davies et al 2007), but the self-harm rate cannot be compared with other secure hospital samples as none have reported long-term follow-up. Absconding was not uncommon (1 in 3 patients) but very rarely led to aggression, as found in other studies (Dolan and Snowden 1994; Brook et al. 1999; Castro et al. 2002; Gow et al. 2010). The rate of criminal conviction during follow-up was 12.6% for any offence and 9.5% for serious offences. In contrast to aggressive incidents, offending usually occurred in the community, and many offences were serious. The patients in the current study had an average of 4-5 years out with high security. Rates of conviction were slightly lower than those reported in analogous studies (as set out in Chapter 3), perhaps reflecting a cross-sectional resident cohort rather than a discharge cohort, and only mentally ill patients. The proportion of serious offences was high, as found in high security versus medium security studies.

Any physical violence during follow-up was associated with pre-morbid antisocial personality disorder (but not psychopathy) and chronic positive (but not negative symptoms). Conduct disorder may have been developmentally associated with the risk of psychosis, and these patients had some indicators of poorer illness outcomes. Serious aggression was associated with psychopathy and hostility in a group of individuals who had no worse an illness course than those who were not seriously aggressive. Persistent aggression was associated with chronic, debilitating, treatment resistant psychosis (with ongoing positive and negative symptoms), but not pre-morbid antisocial conduct (as indicated by either antisocial personality disorder or psychopathy). Criminal conviction was associated with factors indicating life-long criminality, impulsivity and antisociality (as indicated by psychopathy), substance dependence, and with better course of illness and functional outcome. These patients were more likely to reach the community due to their better illness course, giving them the opportunity to offend, but offending was not just down to opportunity. The associates of criminal conviction were very similar to those identified in other UK secure hospital studies (Chapter 3), secure hospital studies outside the UK (Quinsey et al. 2006), studies of mentally disordered offenders (Bonta et al. 1998) and studies of offenders (Andrews and Bonta 2010). The different findings with respect to different types of violence/offending highlight that different factors are of relevance to serious harm, persistent aggression and convicted offending.

Clinical and social outcomes

A third had episodic symptoms, a quarter had continuous symptoms and a fifth had no recurrence of symptoms. These were similar to symptom courses reported in other cohorts of patients with schizophrenia, particularly prevalence cohorts (Hegarty et al. 1994; Mason et al. 1995; Mason et al. 1996; Harrison et al. 2001; Modestin et al. 2003; Harrow et al. 2005; Mortimer 2007; Jablensky 2009). Positive symptoms tended to diminish, but negative symptoms and disorganisation persisted. Very few patients had extra-pyramidal symptoms at follow-up, as there was a shift towards the use of atypical anti-psychotics.

Patients with persistent positive symptoms were those who were unmanageable in local hospitals. They had less substance dependence, fewer indicators of childhood conduct problems, and fewer indicators of antisociality and criminality than patients without persistent symptoms. They were therefore less antisocial, and there was less evidence of personality disorder and psychopathy than in those who achieved some remission in symptoms. They were chronically disabled, functioned poorly and remained in institutional care. There was more frequent relatively minor aggression and verbal aggression, as a consequence of being chronically unwell, but they were no more likely to be aggressive and were no more likely to be seriously aggressive. In general psychotic symptoms seemed to play a role in relatively minor aggression, although the relationship between chronic psychosis and aggression in this group may have been mediated by other factors, such as poor social and interpersonal functioning or disorganisation.

Non-compliance with treatment was less frequent than reported in non-forensic samples (Argawal et al. 1998; Lacro et al. 2002). Most patients received treatment from various disciplines, but the use of offending behaviour programmes was rare. Eleven patients died, all but one from natural causes. The high mortality rate is reflected in other UK secure hospital studies (e.g. Davies et al. 2007, Jamieson and Taylor 2002), other studies of mentally disordered offenders (Björk and Lindqvist 2005), studies of offenders (Sailas et al. 2005) and non-forensic samples of patients with schizophrenia (Harrison et al. 2001). In most other studies there have been higher rates of death from unnatural causes including suicide.

Social outcomes were very poor. Patients very rarely attained work of any type, few were in intimate relationships, and very few were living independently in the community. These outcomes were worse than described in non-forensic cohorts (Mason et al. 1995; Kooyman et al. 2007). It is unlikely that these poor social outcomes were determined by the course of

psychosis alone, as this did not appear worse than in non-forensic samples. The interaction of illness, comorbid disorders, long-term institutionalisation, violence and being forensic patients probably played a role. Given the high rates of alcohol and substance use, misuse and dependence in the sample, rates of alcohol and substance use and misuse were very low at follow-up.

Comorbid substance dependence and personality disorder

The characteristics of substance dependent patients were in keeping with those reported in other studies (Mueser et al. 1998; Scheller-Gilkey et al. 1999; Soyka 2000): younger age, more criminality, higher rates of self-harm, more affective symptoms, more childhood maladjustment, more parental substance misuse, more personality disorder (particularly antisocial personality disorder and factor 2 psychopathy, previous supervision problems, non-compliance and perhaps less negative symptoms and disorganization but no difference in positive symptoms. Apart from the higher rate of criminal convictions, the outcomes of the substance dependent group were significantly better than the non-substance dependent group. They were more likely to leave high security, they were no more likely to return to high security, they were more likely to reach the community and become informal patients. Their illnesses took a less malignant course in terms of positive symptoms, negative symptoms and disorganization. They were more likely to have episodic rather than continuous symptoms. They were no more violent, but they did abscond more often. They had more affective symptoms and were more able to form intimate relationships. The better illness outcome seems to have been due to an intrinsically less malignant illness combined with response to enforced treatment and enforced abstinence from alcohol and substances in a secure setting. Few patients were using or misusing alcohol or substances at follow-up. The previous reports of higher rates of treatment-resistance in this group probably reflect ongoing substance use and non-compliance in these studies.

The findings that patients with comorbid antisocial personality disorder had earlier contact with psychiatric services and were less likely to have index offences precipitated by psychosis match the findings on patients with pychosis and comorbid personality disorders in English special hospitals (Taylor et al. 1998; Taylor et al. 2008). The earlier contact with services was probably due to pre-morbid conduct disorder and not early onset psychosis. Psychopathy was also associated with not having a psychotic precipitant to index offence, emphasizing that in those with comorbid personality disorders psychosis plays a less prominent or peripheral role in violence and offending. The association between psychopathy and violence towards strangers has been reported in non-psychotic offenders

(Williamson et al. 1987). The common associations of antisocial personality disorder and psychopathy in terms of offending histories, childhood and employment problems, substance dependence and higher risk scores mirror findings in non-psychotic samples (Hare 2006). Personality disorder, particularly borderline and antisocial types, is associated with self-harm (Dahl 2003) as found in this sample for antisocial personality disorder, but not psychopathy.

The association between psychopathy in the current sample and convictions, serious convictions, serious violence, absconding and forming intimate relationships is in keeping with other studies of psychopathy in non-psychotic samples (Hare 2006). Antisocial personality disorder was only associated with whether a patient was physically violent or not (unlike psychopathy), but not with serious, persistent or convicted violence. Psychopathy seemed 'protective' in relation to the course and outcome of psychosis both for negative and positive symptoms. Antisocial personality disorder was not 'protective' in relation to course of positive symptoms, but was with negative symptoms. It may be that there is something intrinsically protective about having psychopathic traits; alternatively factors associated with a good outcome of psychosis (e.g. better pre-morbid functioning, substance dependence) may lead to items of the PCL-R being scored positive. The antisocial personality disorder group had much in common with the aggressive (but non-serious harm, non-persistent and non-convicted) patients described in Chapter 8. It is interesting to note that antisocial personality disorder made no difference to administrative outcomes, but psychopathy (perhaps due to the nature of the serious offences with more stranger victims) was associated with not leaving high security. Psychopathy was then associated with readmission (through re-offending, serious violence and non-compliance), but having left high security psychopathy did not prevent patients reaching the community. The antisocial personality disorder group, identified in the current study using Feighner criteria similar to the 'antisocial behaviour' criteria of DSM III, are not analogous to individuals with psychopathy according to the PCL-R, dissocial personality disorder in ICD 10 or antisocial personality disorder in DSM IV, although the latter is probably closest. Those identified as having antisocial personality disorder were probably a heterogeneous group with regard to personality dysfunction.

Did patients have good outcomes?

Considering the various outcomes ascertained in the cohort a "good" outcome may be defined in various ways, and different people with different points of view (e.g. clinicians, patients, the public, politicians) may emphasize different types of outcomes (tables 11.1, 11.2 and 11.2). In terms of offending and violence, few patients had offended or been violent in the last year. But looking at forensic outcomes over the whole follow-up period violence was common, although convicted offending, persistent violence and serious violence occurred in a minority of patients. Violence in the community or towards strangers was very rare. Non-compliance was uncommon. Alcohol and substance misuse was uncommon, and troubling neurological side-effects of medication were infrequent.

In terms of residence things were less good, half were still in a secure ward or hospital (or were in prison) and just over a quarter were not in hospital (or prison). In terms of symptoms, a minority were free of symptoms according to case notes, and less than a third were in "remission" when assessed at interview. A number had unmet needs, few were no longer subject to legal compulsion (although this may have contributed to some of the good outcomes – e.g., treatment adherence, lack of violence and offending, lack of substance misuse). Social outcomes, in terms of work, relationships and independent living were abysmal.

Most were alive, but the mortality rate was still far higher than would be expected in a cohort with members of a similar age.

Only one patient was living independently in the community, on no medication, was symptom free, was not misusing alcohol or drugs, had not been violent for over a year and had not been convicted. But he was not in an intimate relationship or working. It may be that some patients lost to follow-up achieved good outcomes.

Table 11.1. Summary of "good" outcomes: variables ascertained from case records – legal status, progress through services and untoward incidents.

Outcome	Sample size	Number with outcome	Percentage
Residence at end of 2001			
Not in high security or prison	146	99	67.8
Not in secure hospital or prison	146	72	49.3
Not in hospital or prison	146	40	27.4
Legal status at end of 2001			
Not subject to legal order	146	28	19.2
In community and not subject to legal order	146	23	15.8
Incidents during last year			
No aggressive incidents	145	105	72.4
No serious aggressive incidents	145	140	96.6
No absconding	145	141	97.2
No self-harm	145	136	93.8
None of the above	145	99	68.3
Convictions during follow-up			
No convictions	158	134	84.8
No serious convictions	158	144	91.1

Table 11.2. Summary of "good" outcomes: variables ascertained from case records – symptoms, treatment, social circumstances and mortality.

Outcome	Sample size	Number with outcome	Percentage
Symptoms during last year			
No positive symptoms	143	84	58.7
No negative symptoms	117	69	59.0
No symptoms (positive or negative)	117	47	40.2
Treatment during last year			
On no psychotropic medication	146	3	2.1
Compliant with medication	143	143	100
Compliant with psychosocial treatment	143	134	93.7
Compliant with all aspects of treatment	143	134	93.7
Social circumstances at end of 2001			
In full-time paid employment	142	0	0.0
In intimate relationship	141	10	7.1
Living independently	142	18	12.7
Mortality			
Alive	158	169	93.5

Table 11.3. Summary of "good" outcomes: variables ascertained from clinical interviews.

Outcome	Sample size	Number with outcome	Percentage
SCHIZOPHRENIA IN REMISSION			
Reality distortion absent (No score above 3 on BPRS items: Grandiosity, Suspiciousness, Unusual thought content, Hallucinatory behaviour)	106	62	58.5
Disorganization absent (No score above 3 on BPRS items: Mannerisms/posturing, Blunted affect)	104	90	86.5
Psychomotor poverty absent (No score above 2 on SANS global ratings of: Affective flattening, Avolition-apathy, Anhedonia-asociality, Alogia; no score above 3 on BPRS item Blunted affect)	106	39	36.8
Absence of all three areas of psychopathology (No reality distortion, disorganization or psychomotor poverty as defined above)	104	30	28.8
NO AGGRESSION TO SELF OR OTHERS			
No aggression to self (No score above 1 on SDAS item 10)	117	114	97.4
No aggression to others (No score above 1 on SDAS item 5, 6, 7, 8 or 9)	117	83	70.9
No aggression to self or others (No score above 1 on SDAS item 5, 6, 7, 8, 9 or 10)	117	83	70.9
NO ABUSE OF ALCOHOL OR DRUGS No excessive use of alcohol and no use of illegal drugs	119	130	91.5
NO NEUROLOGICAL SIDE-EFFECTS			
No tardive dyskinesia (No score above 2 on AIMS items: Severity of abnormal movements, Incapacitation due to abnormal movements)	97	96	99.0
No parkinsonism (No score above 2 on TAKE items: Bradykinesia, Rigidity, Tremor)	97	89	91.8
No akathisia (Barnes scale item Global clinical assessment of akathisia 2 or less)	98	94	95.9
No extra-pyramidal symptoms	93	84	90.3
NO UNMET NEEDS (CANFOR) According to patients According to staff	 107 109	 46 29	 43.0 26.6

Methodological considerations

The nature of the sample

Prevalence cohort

The sample was a cross-sectional cohort of all patients with schizophrenia in the State Hospital at the time of the baseline study. It was a prevalence cohort, not an incidence cohort. It was not a study of patients who started at the same place in terms of first episode of psychosis, first incident of violence, start of psychotic episode, admission to high security or discharge from high security. Studies of prognosis should usually be based on patients at the same stage in their illness. Prevalence cohorts include greater proportions of patients with chronic illness, and therefore potentially worse outcomes. This was demonstrated in an international study of the long-term outcome of schizophrenia, which included both incidence and prevalence cohorts (Harrison et al. 2001). In a forensic sample, as well as including a disproportionate number of chronically ill cases, a prevalence cohort may include a disproportionate number of patients perceived to pose an ongoing risk of harming others.

In this study some account was taken of this by examining variables (such as the length of stay in high security at baseline, previous psychiatric contact, chronicity of symptoms) when conducting comparisons, including such variables in logistic regression models when examining associates of outcomes, and by excluding patients who did not leave high security when looking at more distal outcomes, such as reaching the community.

Already violent cohort

All the patients in this cohort had already committed serious antisocial acts, mostly of a violent or sexually violent nature. Therefore when looking at offending or violence as a follow-up outcome, this is repetition of violence or offending in a group who have already been violent. The factors important in a person being violent or offending for the first time may not be the same as those important in repeated offending or violence. This may account for why, although epidemiological research has demonstrated an association between schizophrenia and violence (Swanson et al. 1990; Brennan et al. 2000), follow-up studies of general (Steadman et al. 1998) and forensic (Quinsey et al. 1998) samples have found the opposite relationship. Findings regarding the characteristics and outcomes of this sample cannot be generalised to non-forensic populations, although there may be findings that have relevance to the management of such patients.

Cohort detained in a high security hospital

These patients were detained in a high security hospital and were subject to close monitoring, supervision and support as they progressed (or did not progress) from high security. The management of many patients was subject to additional scrutiny by the State Hospital Medical Sub-Committee (now defunct) and, for restricted patients, by the Scottish Office (now the Mental Health Division of the Scottish Government). The management of these patients should have been geared towards preventing further violence and other adverse outcomes, and would reflect the prevailing views on these issues. A substantial amount of officially recorded offending was probably prevented by retaining aggressive patients in hospital, although it cannot be assumed that clinicians considered the right factors or came to the right conclusions when assessing risk of future violence.

In forensic samples naturalistic follow-up of managed patients is the only palatable approach than can be taken to researching outcomes. No one is going to allow or suggest randomisation to no treatment or allowing such patients to be discharged with no supervision, support or treatment so that the determinants of outcomes can be examined. This actually makes meaningful outcome based research on this group difficult to undertake.

As mentioned above, the findings may not generalise to non-forensic samples, but there may also be limitations to generalizability to forensic samples that have not required high security care. Given some of the similarities between the current sample and patients in medium secure units, and the fact that the State Hospital provided for patients requiring medium security at the time, these findings are probably of relevance to medium secure patients with schizophrenia.

One of the advantages of having a closely managed cohort is that certain factors (like ongoing substance misuse, treatment non-compliance, chaotic social circumstances, negative peer influences) were to a large extent factored out, so leaving a cohort where intrinsic factors, like course of illness and personality disorder, could perhaps be examined in a more 'pure form' than in community or general cohorts.

Psychotic cohort

All the patients in the current cohort had schizophrenia. The focus on a cohort with schizophrenia is an advantage in understanding these patients, as few forensic follow-up studies have concentrated on patients with schizophrenia, and no long-term studies I am aware of have collected the depth and breadth of data examined in this study. Mixed cohort studies may have missed or misrepresented findings of specific relevance to the outcome and

management of forensic patients with schizophrenia. It is only relatively recently that personality disorder and substance misuse have been examined in psychotic patients, rather than being looked at as alternative diagnostic groups. As shown in this study, it is important to take into account such comorbidity.

Scottish cohort

These were patients subject to the particular legislation, policies, services and practices in Scotland at the time. The characteristics and outcomes of patients may also have been influenced by factors such as the prevalence of alcohol and substance misuse, and of violence and crime in Scotland and Northern Ireland. Other jurisdictions may be different in some or many regards. These issues have recently been examined in a comparison of approaches to the treatment of mentally disordered offenders and demographic factors in 9 countries across 5 continents (Lindqvist et al. 2009). Although rates of psychosis were similar across the countries, there were considerable differences in substance misuse, crime, age distribution and ethnic groups. There are differences in patterns of homicide and violent crime between England and Scotland (Soothill et al. 2001). Such issues were highlighted when the sample from the current study were compared with a contemporaneous cohort of patients with psychosis from the English high security hospitals (Taylor et al. 2008). The Scottish cohort was more commonly civilly detained, had been in high security for fewer years and had far less patients from ethnic-minority groups. Substance dependence and comorbid personality disorder were more prevalent in the Scottish cohort. The former reflected differences between Scotland and England in rates of alcohol and substance misuse, the latter may have reflected the different ethnic demographic. Psychotic symptom drive to offending was more likely in patients without antecedent personality disorder regardless of country, and the violence histories of patients were similar, with almost identical rates of homicide. So although some findings held regardless of country, others seemed to be influenced by differences in service provision, legislation, demographics and substance use.

Sample size

The sample size of 169 patients may seem small. But as highlighted above, the sample size was average in comparison to other outcome studies of UK security hospital patients. It is also as large as or larger than many comparable individual long-term follow-up samples of patients with schizophrenia in general settings (Jablennsky 2000; Harrison et al. 2001). Few long-term follow-up studies of patients with schizophrenia that have examined long-term outcomes and their associations, beyond re-offending, have had larger sample sizes.

However the sample size may render the chance of type II errors (i.e. missing significant differences between groups) higher.

Comparison group

There was no contemporaneous comparison group to answer questions as to whether the characteristics and outcomes of these patients were different from non-forensic patients with schizophrenia or different from mentally disordered offenders without schizophrenia. The literature describing findings from other samples was used in this regard, but needs to be used with caution, especially where other samples are small or from other countries, or where findings have not been replicated in a number of studies. The baseline characteristics of this sample have been compared with a contemporaneous sample of patients with schizophrenia in general services (Miller et al. 2001), and with a contemporaneous English high security sample (Taylor et al. 2008) as outlined above. The comparison with general patients found that more general patients were female and married. They achieved better at school, had higher pre-morbid IQ, had better occupational levels, less familial alcohol abuse, less police contact, less self-harm, more frequent shorter admissions to hospital and fewer current and life-time symptoms of schizophrenia (Miller et al. 2001).

However the comparison groups of relevance in this study were those within the cohort (e.g. seriously violent vs. violent vs. not violent). Comparison of subgroups defined by administrative, forensic and clinical outcomes, and by comorbid disorders, helped understand the characteristics and outcomes of the current cohort.

Sample from the early 1990s

This sample was detained in high security in Scotland over 15 years ago. Since then there have been a number of potentially relevant changes. There have been changes at the State Hospital, particularly in the approach taken to risk assessment, the provision of psychological treatment, the provision of occupational therapy, the size of the hospital, governance processes within the hospital, and the threshold for admission has probably risen. Service developments out with the State Hospital have included the establishment of medium secure units and other forensic services; changes in general psychiatry with the acceleration of the move to reduce in-patient provision and increase the provision of services in the community. There have been changes in legislation and policy including: an emphasis on more thorough assessment of mentally disordered serious offenders before final disposal; an appeal against being detained in conditions of excessive security; and more robust arrangements for the case management and oversight of restricted patients. The political

climate has changed, to some extent influenced by a homicide committed by a restricted patient in the community (Mental Welfare Commission for Scotland, 2006), and the public, never particularly sympathetic to the plight of mentally disordered offenders, are probably even less sympathetic now. More general changes in Scotland, such as Devolution and trends in crime and substance misuse are also of relevance. Scotland continues to have an appallingly high homicide rate compared with other countries, probably mainly due to alcohol and substance misuse and knife carrying in young men. These changes all mean that the characteristics and outcomes of patients detained in the State Hospital now may be different from those found in this study, and any consideration of forensic patients with schizophrenia now would need to take into account those in medium secure units. One of the problems with any long-term study of outcomes, is that by the time the study is reported, findings may be out of date

Study design

Pseudo-prospective and truly prospective design

Most, perhaps all, long-term studies of the outcomes of secure hospital patients have employed pseudo-prospective designs. After the follow-up period has finished researchers go back to records to ascertain baseline characteristics (e.g. age, gender, previous convictions, diagnosis) and gather follow-up data from records (e.g. official criminal records for convictions). Truly prospective studies involve researchers collecting baseline data contemporaneously and then following-up and collecting outcome data on subjects. Prospective studies require more planning, resources and commitment. Some studies of the outcomes of English special hospital patients have perhaps had a truly prospective aspect to them, in that they have used data collected at baseline by researchers to populate the Special Hospitals Case Register. However the data collected for the register has not been the specific information that researchers have decided to look at in an a priori, way unlike a truly prospective study.

In the current study the baseline interviews and case record data collection were undertaken before the follow-up period. The only baseline variables ascertained during or after the follow-up period (and therefore in a pseudo-prospective way) were PCL-R, H-10 and VRAG scores. But only data available prior to the follow-up period were used to rate these and the research psychologist who undertook these ratings did not collect any outcome data. So the ascertainment of baseline data was largely done in a truly prospective way. When the State Hospital Survey was undertaken the data were collected with a view to a follow-up study.

But no specific follow-up study was planned at the time, unlike a truly prospective methodology. Follow-up case record and criminal record data were gathered without knowledge of baseline data, but were not gathered repeatedly in an ongoing way (except for the last year of follow-up), so were collected pseudo-prospectively. Interviews in 2000 and 2001 gave a truly prospective element to the collection of follow-up data.

The advantages of a truly prospective design are that data can be collected to suit the purpose of the study (rather than relying on the data available), there is reduced confounding of outcome and predictor, and no risk of contaminating baseline ratings with knowledge of outcome. The current study, although not all aspects were truly prospective, had all three of these advantages compared to many long-term studies of UK security hospital patients. However there were still limitations. For example, baseline data collection was not specifically planned with knowledge of specific outcomes to be studied

Sources of data

Various sources of data were used in this study: State Hospital records, other psychiatric records, prison records, official criminal records, electronic records, interviews with patients, interviews with psychiatrists and interviews with staff. Some data were collected cross-sectionally (e.g. structured rating scales used at baseline and at follow-up) other data was collected longitudinally before baseline (e.g. information on personal history, development, criminal history and psychiatric history) and during follow-up (e.g. data about aggression, offending, progress through services, and illness course). This differentiation between "cross-sectional" and "longitudinal" data is not clear-cut. Two "cross-sectional" interviews at different points in time produce "longitudinal" data when compared. In some ways the nature of the data collected in this study reflects the real world of forensic practice, where multiple sources of information are used to build up a picture in an individual case. Different types and sources of information have their pros and cons.

Case records may or may not reflect the reality of what has happened. Not all relevant information may be recorded. Contemporaneous entries in records were made for clinical purposes rather than with a view to helping a future researcher. The extent to which clinical staff are systematic and thorough in recording information will vary. Lack of information about a particular variable (e.g. positive symptoms) may mean it was not present or just was not given consideration at the time. In general, as would be expected in a sample of patients who have required high security care, records were very detailed, containing reports and documents from various disciplines covering relevant areas of functioning. But as patients

moved to less secure settings and the community, the frequency of entries in records and the frequency of contact with staff diminished, affecting the quantity and quality of material available. Detailed case records did, however, give a relatively detailed longitudinal picture of a case; and entries made contemporaneously by staff would not have been biased by knowing anything about the research and were recorded independently. The way a researcher approaches records may be affected by his or her own biases and approach.

Interviews give an opportunity to specifically examine areas in detail, with the ability to follow-up on questions and clarify the presence or absence of particular symptoms or features. Validated rating scales can help quantify the presence of symptoms and place the data in the context of other studies. They can also help in assessing change over time. However most symptom rating scales, are cross-sectional, giving the researcher a snap shot of a particular moment in time. Repeated assessment using interviews is resource intensive and it would have been expensive and unfeasible to assess patients once a year, let alone every 10 weeks as done in the MacArthur Violence Risk Assessment Study. When the follow-up study was planned it was envisaged that one researcher would interview each patient four times over two years, but it soon became clear that this was not going to be feasible with the resources available. With interview based rating scales issues of training and reliability arise.

It is sometimes assumed that rating scales (for example of symptoms, social functioning or aggression) should be used, in preference to 'real world' outcomes. Depending on the aims of the study this may or may not be helpful. For example, knowing the score of a patient on an aggression rating scale may be less informative or important than knowing whether the patient has attacked someone, how seriously the victim was hurt and how frequently such behaviour occurred. Any outcome measure has to be clinically meaningful. In presenting the findings from this study emphasis has been placed on presenting findings in a clinically meaningful way.

Having multiple ways of looking at an area of functioning can be helpful. It adds strength to the confidence one can have in a particular measure if two or more sources or approaches point to the same finding. But if different sources or approaches disagree this does not necessarily make them unreliable (Collishaw 2008). For example in the current study different ways were used to look at aggression during follow-up: psychiatric case records looking at a range of types of aggression from threats to serious physical harm, official criminal records, interview with patient at follow-up using SDAS and interview with

informant at SDAS. Correlations between certain assessments (e.g. SDAS rated aggression and violence during the same year) indicated convergent validity, but discrepancies (e.g. between convictions and actual violence) highlighted areas to be examined further.

Choosing variables for inclusion

A number of baseline and follow-up variables were potentially available for analysis as associates of outcomes. When undertaking bivariate analysis variables used were those which were identified in the literature as associated with outcomes, those which seemed clinically interesting or relevant, and an attempt was made not to include variables which would be highly correlated and just saying the same thing. Variables were included which assessed the same area in different ways (e.g. SANS total from interviews and persistence of negative symptoms from case notes; SDAS total from interviews and aggressive incidents from case records) and which may have seemed superficially similar but were actually significantly different (e.g. psychopathy as assessed using the PCL-R and antisocial personality disorder assessed using Feighner criteria). When undertaking logistic regression rather than starting with a large number of variables and using backward stepwise conditional withdrawal initially to develop models, a more planned and ordered process was used. Variables were selected for entry based on the literature, clinical relevance and the results of bivariate analysis. Highly correlated variables were not both entered. The key issues borne in mind when selecting variables were whether they were clinically meaningful and empirically relevant.

Detailed study of a specialist group versus epidemiological cohorts

Two types of study have been key in clarifying the relationship between mental disorders and violence: epidemiological cross-sectional community studies of large samples and national total birth cohort studies. Such studies have made it clear that there is a significant, but modest, relationship between schizophrenia and violence. That such a relationship exists cannot be refuted, and an overwhelming majority of researchers in the area accept this to be correct. However these studies only actually identify a small number of cases of people with schizophrenia who are aggressive and cannot be used to help in the detailed clinical understanding of the factors that are important in determining the occurrence of violence in individuals with schizophrenia. This requires studies involving a relatively large number of people with schizophrenia who have been violent, such as is presented in this Thesis. The sample presented in this Thesis is an extreme one, and findings may not be generalisable to less severe types of aggressive behaviour. But understanding serious aggression is clearly of clinical relevance and is of concern to society generally.

Data collection and analysis

Completeness of follow-up and data collection

Inevitably there was missing data: patients refused to be interviewed, patients could not be traced, records were not available, and sometimes researchers, being human, forgot to note or rate something. The loss of patients to follow-up, especially when one considers the completeness of case record data, was small compared to other long-term follow-up studies of patients with schizophrenia. There was more missing data when it came to follow-up interviews, but again this was in line with, or better than in other follow-up studies. The relative completeness of follow-up data in this study was probably helped by the fact that this was a forensic sample of patients subject to compulsory legal measures, and also by the fact that Scotland is a relatively small country and the researchers quickly built up contacts with relevant local services. Few patients were out with Scotland at follow-up, and none were known to be out with the UK. Two were in Northern Ireland and 6 were in England.

Where missing patients may have been an issue, comparison between the data available on missing patients and non-missing patients revealed very few differences with respect to baseline variables, indicating that no systematic biases were operating in making patients unavailable. Clearly a greater proportion of patients who were in the community or local services were lost than of patients in high security, none of whom were lost! When follow-up factors were looked at, patients who were not interviewed at follow-up were less likely to have been aggressive or convicted (according to records data) than patients who were interviewed. This reflects that it was more difficult to trace some patients who were in the community, but means that unlike other studies, where violent patients may be more likely to be excluded, in the current study such patients were more likely to be retained and included.

Data management

Managing the data was a considerable task, involving meticulous indexing and secure storage of paper records, ensuring data bases were properly set up from the start, entering and checking the data, indexing the various databases, transforming and merging the data bases, and keeping the electronic files organised and secure. The computer files used in this research contained 10 Mb of information.

Data analysis

Univariate analysis (i.e. description) of characteristics and outcomes used descriptive statistics such as numbers, proportions, means, medians and ranges. Bivariate analysis

involved chi-square tests, independent samples t-tests, one way ANOVA, paired samples t-tests and Pearsons's correlations depending on the type of data (categorical vs. continuous), the number of groups being compared (two or three) and whether comparisons were within or between patients (paired vs. independent samples). T-tests were used following statistical advice and after undertaking a number of parallel Mann-Whitney U tests that yielded very similar results. Survival analysis allowed the graphical representation of time to event data through Kaplan Meier survival curves.

Logistic regression was used to develop models for outcomes and comorbid diagnoses, which allowed the relative contribution of baseline and follow-up variables to be ascertained adjusted for all other variables in the model. Baseline variables were entered first as this data was temporally before the outcomes and potentially predictive. Follow-up variables were then added to see if more proximal outcome data was associated with other outcomes after adjusting for baseline and other follow-up variables. A separate logistic regression model just using variables relating to course of psychosis and comorbid disorders was developed for each outcome, to look specifically at the clinical characteristics which were associated with each outcome. This allowed the examination of the relative contribution of course of positive symptoms, course of negative symptoms, symptom precipitant to index behaviour, psychopathy, antisocial personality disorder and substance dependence to each outcome.

Multiple comparisons were made, raising the possibility that a number of significant results arose by chance. However there is no consensus on how and when adjustments should be made where multiple comparisons are made (Perneger, 1998). In an exploratory study and where the comparisons are not independent of each other, making adjustments such as the Bonferroni correction (Bland and Altman, 1995) may be unnecessary, too conservative and misleading.

Reliability and validity

The reliability of a number of measures used in this study (e.g. symptoms rating scales and risk scales) have been reported in this thesis. Researchers undertook specific training in all measures used and a number of cases were rated with another researcher sitting in. Levels of reliability were similar to those reported in other studies. The instruments used have been validated in a number of studies. Convergent validity was indicated for certain data by correlations between different approaches to the same outcome. For example rating scale assessed aggression at interview correlated with the level of aggression in that year rated from case notes; and rating scale assessed symptoms at interview correlated with symptoms

that year rated from case notes. Diagnoses were ascertained using standardised objective criteria (Feighner criteria for schizophrenia, antisocial personality disorder and substance dependence; the PCL-R for psychopathy), which have been shown to be reliable and valid, and with good reliability in the current study. However comorbid personality disorder was not assessed in a way that allowed an assessment of the full range of personality disorders in ICD 10 or DSM IV, and as discussed above, antisocial personality disorder as identified in this study may not correlate with current concepts of dissocial or antisocial personality disorder.

Summary of the strengths of this study

The particular strengths of the current study were:

- A focus on patients with schizophrenia producing findings of specific relevance to the most prevalent diagnostic group in UK secure hospitals
- An adequate sample size balancing the need for a high number of subjects with the amount of data that was collected
- Long-term follow-up
- Truly prospective elements to the study
- Multiple sources of information including records, patient interviews and informants
- Focus on clinically meaningful and (where previous studies were available to inform) empirically supported factors
- Use of both baseline and follow-up data to examine associates of outcomes
- Examination of outcomes beyond conviction, readmission and mortality, including clinical course of illness and social outcomes
- Loss of patients to follow-up was less that in many other forensic and non-forensic follow-up studies
- Use of logistic regression to look at the relative contribution of factors to outcomes adjusting for other factors
- Good reliability of diagnosis, interview ratings and case record data collection; and convergent validity of outcome measures when ascertained in different ways
- The problems of using a prevalence, rather than incidence, cohort were countered, to some extent, by taking into account relevant baseline variables in the analyses

- Although close management may have affected the natural course of cases, this may also have helped to factor out certain confounders (such as non-compliance and substance misuse).

A typology based on course of psychosis, comorbid personality disorder and course of violence

To try to help summarize and understand the findings from this study, and synthesize them with other findings in the literature, I have developed a typology of individuals with schizophrenia and violence. This is based on the course of psychosis, the presence of comorbid personality disorder and substance dependence, the nature and course of violence and the relationship between psychosis and violence.

Typologies of offenders

Where a group of offenders are heterogeneous, typologies may help to understand the subgroups whose members share characteristics relative to offenders in other subgroups. Typologies may be based on putative motives, offence characteristics and/or clinical characteristics. Many are derived from a particular author's experience and/or reading of the literature, and few have been subjected to empirical testing. However typologies may be useful in understanding and putting together the factors responsible for heterogeneity in a sample. In practice typologies can be used in case formulation and planning treatment. Pure types may be rare, but typologies offer prototypes, and the match of an individual case to a prototype may be informative.

Typologies of arsonists (Prins, 1994), rapists (Knight and Prentky, 1990), child sex offenders (Knight et al. 1989), sexual murderers (Proulx et al. 2007), stalkers (Mullen et al. 2008) and domestic violence offenders (Johnson et al. 2006) have been suggested. An instructive and useful example of the development of a typology is the one of stalkers developed by Mullen et al. (2008). This was initially developed from the literature and detailed clinical examination of 145 cases (Mullen et al. 1999). The subsequent validity and utility (for assessment and management) of this typology has come from description and statistical analysis of further cases that have been added to their sample. The key to the development of this typology was detailed descriptive clinical research.

Previous typologies of schizophrenia and violence

Although the term 'typology' has not always been used, descriptions of 'types' of individuals with schizophrenia who are violent have started to emerge. Taylor et al. (1998) emphasized the differences between individuals with and without comorbid antecedent personality

disorders. Steiner et al. (1998) and Ge et al. (2003) also suggested two types based on the presence or absence of pre-morbid personality disorder. Mullen (2006), describing this 'two-type' model, described type 1 cases as people with: organised delusional systems that are related to their violence, no prominent histories of conduct disorder or adult delinquency, their first act of violence usually after onset of psychosis and entering treatment, serious attacks (particularly homicidal attacks) on relatives or acquaintances, and 'look like' patients. By contrast the type 2 cases tended to have disorganised clinical syndromes, histories of conduct disorder, early-onset substance misuse, usually offend before developing psychosis, commit domestic and non-domestic violence, and 'look like' criminals.

Hodgins (2008) suggested a 'three-type' grouping. Type I with pre-morbid conduct disorder and comorbid antisocial personality disorder, have early onset and persisting antisocial and violent behaviour. In this group pre-morbid conduct disorder seems aetiologically related to the development of schizophrenia and there may be a high rate of substance misuse. Type II cases are not pre-morbidly aggressive, but display repeated aggression following the onset of psychosis. This group may also abuse substances. Type III cases are men who in their late 30s, having been unwell for some time but not violent, kill or try to kill. This group may be 'pseudo psychopathic' when unwell in that they develop delusions and or hallucinations relevant to the offence, but have been described as having a fluctuating state of deficient affective experience, similar to that seen in factor 1 psychopathy.

A suggested typology: six types of violent individuals with schizophrenia

The findings from the current study suggest that these two-type and three-type typologies may be too simplistic or require sub-types. Based on the onset of aggressive behaviour (either pre-morbidly or after the development of psychosis), the presence of associated personality disorder, the course of psychosis, and the pattern and seriousness of violence, a six-type typology is suggested (table 11.4).

Like the 'two-type' typology there is a differentiation based on the presence of pre-morbid personality disorder, and like the 'three-type' typology the course of psychotic symptoms is important. However there appear to be at least three types of personality disordered patients with different patterns of psychosis and offending. The pre-morbid 'antisocial behaviour' group probably have a range of personality characteristics, perhaps including a number of disorders from clusters A and B of DSM-IV axis-II. They have a better illness course than the groups with persistent psychosis with regard to negative symptoms and disorganisation,

but have ongoing or recurrent positive symptoms, compared to the 'criminal' and 'psychopathic' groups. The 'antisocial behaviour' group probably includes individuals where pre-morbid conduct disorder is developmentally related to an underlying predisposition to psychotic illness. They commit further acts of violence that may or may not be related to positive symptoms in the context of long-standing emotional instability, impulsivity and/or irritability. The other two personality disordered groups have good prognosis illnesses with less chronic symptoms and less negative symptoms. Unlike the 'antisocial behaviour' group, their personality problems do not seem related to an underlying development process leading to psychosis. The 'criminal' group are easy to mange in terms of psychosis, but are difficult to manage due to absconding, non-compliance and ongoing criminality, including acts of aggression. The 'psychopathic' group also have a good prognosis in terms of psychosis, but are the most likely to commit serious acts of violence at follow-up. They have committed serious violent offences (including homicide and offences against strangers) and pose an ongoing risk of serious harm whether they are psychotic or not. The 'criminal' group have high levels of factor 2 psychopathy, and the 'psychopathic' group have relatively high levels of factor 1 psychopathy and may be a more hostile group.

The groups without pre-morbid personality disorder are similar to Hodgins' (2008) types II and III. The 'psychotic drive' group are identical to and based on Hodgins' type III. They commit very serious acts of violence, including homicide, mainly against relatives after the onset of psychosis. Their offences are driven by delusions and perhaps hallucinations. They tend to have paranoid schizophrenia with less prominent disorganisation or negative symptoms. They tend to respond to treatment and only pose a risk if their symptoms persist or recur. It is not possible from the data in the current study to address the issue of 'pseudo-psychopathy', but this may be a feature in these cases. There seem to be two persistently ill groups similar to Hodgins' type II group. One group are persistently psychotic, but their aggression diminishes, and they tend to become institutionalised in open rehabilitation settings. The other group are persistently aggressive and become institutionalised in secure settings, although most do not commit acts of extreme violence. Hodgins (2008) described that these persistently aggressive and psychotic patients abused substances, whereas in this study they did not. This may be due to this cohort being retained in secure care.

Why is there a difference between this typology and the others that have been suggested? In many ways this is just a more detailed breakdown. Some of the differences between Hodgins' types and these types may be due to the differences in samples on which the typologies are based. Hodgins' typology is based on consideration of various study samples

including community cohorts and individuals who may have been less seriously aggressive than those in the current study.

It is not suggested that this typology will categorise patients perfectly into six boxes. As mentioned above typologies rarely achieve this, and inter-mediate cases possessing characteristics of more than one type are inevitable. Each type probably merges into the one next to it, and, in terms of the nature of the index violence, the course of illness and the potential issue of 'pseudo-psychopathy', there may be some merging between the 'psychopathic' group and the 'psychotic drive group'. However, given the findings regarding the interaction of factors in this study, a typological approach may be better than considering course of psychosis, personality disorder, type and course of aggression, and substance misuse as independent dimensions.

Clearly this typology would need to be replicated and validated before being given serious or widespread consideration. But a typology such as this may be useful clinically in formulating forensic cases to help with risk assessment and treatment/management planning. Given the nature of the sample in this study, it may be less useful where less serious offending is present. It may be that certain types of offending (e.g. sexual offending and fire-raising) may show different patterns of relationship with this typology. For example sexual aggression of a minor type is probably most likely in the persistently ill and chronically handicapped patients, whereas more serious sexual offending (e.g. rape) is more likely in the groups with personality disorders. This would be in keeping with the findings of Alden et al. (2007) Serious sexual offending with psychotic-drive is uncommon (Smith and Taylor 1999a). It may be that the extra-dimension of sexual deviation would need to be factored in, although it would probably function in a similar way as psychopathy – it would be related to pre-morbid serious offending and ongoing offending, and would be unrelated to psychosis (Smith 2000 a and b).

Table 11.4. Six 'types' of individuals with schizophrenia who are violent.

	Psychotic drive	Persistently psychotic – burnt out	Persistently psychotic & aggressive	Antisocial behaviour	Criminal	Psychopathic
Aggression pre-dates onset of psychosis	No	No	No	Yes	Yes	Yes
Extreme violence prior to admission*	Yes. Victims are relatives and acquaintances.	No	No	No	No	Yes. Victims include strangers.
Personality disorder	No	No	No	Yes	Yes	Yes
Personality	Maybe 'pseudo-psychopathic' when unwell	Chronic deterioration in social functioning due to psychosis.	Pre-morbid neuro-cognitive impairment. Personality function impaired by psychosis.	Heterogeneous underlying personality including elements of various DSM-IV personality disorders	Personality disorder with marked impulsivity and antisociality. Factor 2 psychopathy prominent.	Personality disorder with marked callousness and hostility. Higher factor 1 psychopathy.
Course of psychosis	Responds to treatment, less chronically impaired	Chronic positive and negative symptoms	Chronic positive and negative symptoms	Ongoing positive symptoms, but less negative symptoms and disorganisation than 'persistently psychotic'	Responds to treatment, less chronically impaired	Responds to treatment, less chronically impaired
Relationship between psychosis and violence	Violence driven by delusions and/or hallucinations	Aggressive when psychotic initially, but level of aggression decreases despite ongoing psychosis	On going aggression in the context of chronic positive and negative symptoms. Psychotic drive and indirect effect of illness on personality and social functioning.	Violence may or may not be related to positive symptoms.	Violence and offending unrelated to psychosis.	Serious violence unrelated to psychosis.
Course of offending and aggression	Does not tend to recur. May recur if psychosis recurs.	Reduces with time	Persistent, frequent, usually minor aggression	Further acts of aggression.	Further acts of aggression and criminal offending.	Further acts of serious violence.
Substance misuse	Substance use may precipitate psychosis. Not dependent.	No	No	Alcohol/drug dependence	Alcohol/drug dependence most associated with this group.	Alcohol/drug dependence.

* Although all the patients in the current study had committed serious acts of aggression, extreme violence refers to homicide and potentially fatal acts.

Implications

Clinical implications

There are a number of potential implications of these findings, although any theoretical or clinical assimilation of them would require replication. Individuals with schizophrenia who commit serious acts of aggression are heterogeneous. The relationship between the onset and persistence of aggression on the one hand, and the onset and persistence of psychosis on the other, is crucial. So is comorbidity, especially comorbid personality disorder and substance dependence. It is these factors that play key roles in determining the characteristics and outcomes of forensic patients with schizophrenia.

Although clinical assessment, pharmacological treatment, psychological treatment and rehabilitative measures, as used with anyone who suffers from schizophrenia, are important in the management of forensic patients with schizophrenia, properly conducted risk assessment, addressing substance misuse and personality disorder, and addressing criminogenic factors are important too. This is particularly so in individuals who have comorbid personality disorders. Proper assessment of personality function and personality disorder is important. The personality functioning of a patient will depend on both pre-morbid personality and the impact of psychosis. Management of patients needs to take into account their personality styles and specific approaches to treatment of comorbid personality disorder should be used where indicated (Dowsett and Craissati, 2008). In patients where violence and/or offending is driven by factors in common with non-psychotic offenders, these factors should be addressed through appropriate psychological treatment (McGuire, 2003). Although there is research evidence on the effectiveness of treatment for personality disorder and treatment programmes for offending behaviour in non-psychotic samples, there is a dearth of research in forensic patients with psychosis.

The actual nature of psychosis in forensic patients is probably no different from the nature of the illness in non-forensic samples. Illness factors interact with other factors in a person's background, personality and circumstances to lead to offending or aggression. A number of these other factors are more often encountered in people with schizophrenia. Services are good at preventing re-conviction, but there are high rates of violence in hospital towards staff and other patients. This is the area of recidivistic violence that requires the most attention in this group. Social outcomes are very poor, and far worse than in non-forensic samples. This difference is not due to the course of illness, but reflects the comorbidities, disadvantages and forensic nature of the group. More effort should be made to improve

social outcomes in these patients, but it should also be noted that many chronically aggressive patients need the type of long-term supportive, structured and tolerant care that is less and less available these days. Thus the expansion of forensic services, to fill in where other services no longer make provision (Priebe et al. 2008).

Clinical services should assess and document the characteristics and outcomes of patients so as to facilitate clinical research like that conducted in this study. Structured detailed clinical records, documentation of the presence and absence of factors (such as symptoms and violence), structured assessment of comorbid personality disorder, and the use of clinically useful structured assessments (e.g. the BPRS and HCR-20), would all facilitate the replication of this study and potentially improve the management of patients. However some caution needs to be exercised in expecting clinical services to collect data that can be used directly for researching outcomes. Services are inevitably primarily focussed on treating patients rather than collecting reliable and valid research data. It would be naïve and unfeasible to expect clinical services to routinely collect the type of data collected for the current study. But it is important that there is meaningful clinical research on the outcomes of forensic patients in Scotland, rather than having clinical practice guided by findings from other countries, which may or may not be applicable to Scottish patients.

Research implications

This study demonstrates that it is feasible, with not a huge amount of resource, to undertake detailed clinical research on the outcomes of forensic patients with psychosis, going beyond pseudo-prospective collection of baseline variables and readily available outcome data (e.g. criminal convictions). The 'gold standard' forensic outcome study is the McArthur Violence Risk Assessment Study (Steadman et al. 1998), but the amount of money and resources available for that study were enormous compared to the current study and other forensic outcome studies. Outcome studies need to look beyond static baseline characteristics to include longitudinal follow-up factors. They also need to look beyond readily available outcomes (such as recidivism, mortality and readmission) to look at important meaningful (but still objective) outcomes (such as clinical course of illness, social outcomes and actual violence/offending). Forensic outcome studies of patients with psychosis must include reliable and valid measures of comorbid personality disorder, substance misuse and course of psychosis.

The ideal replication study would involve the truly prospective follow-up of 150-200 patients with schizophrenia admitted to high and/or medium secure units, followed up for

sufficient time (15 – 20 years) to allow a majority to leave secure in-patient care and some to progress to the community. This would involve an incidence rather than prevalence cohort, but would not be a discharge cohort, so as to include patients who do not progress from secure care. Baseline assessment would involve assessment of symptoms using well-known, reliable and valid measures such as the BPRS and SANS, and assessment of personality disorder using assessments such as the PCL-R and International Personality Disorder Examination (IPDE; Loranger 1999). Personality assessments would be based on case record, interviews with patients and interviews with third parties. Using the IPDE or equivalent would allow a detailed assessment of the breadth of personality pathology. Case records and interviews at baseline would be used to ascertain relevant aspects of patients' histories, focussing on the factors presented in the results of this study. There would be a detailed contemporaneous assessment of the relationship between psychotic symptoms and index violence/offending. Alcohol and substance use, misuse and dependence would be quantified and assessed using records, interviews and third parties. Intermittent prospective follow-up would involve interviewing patients and assessing records every two years. This would involve re-assessment of symptoms, interviews about aggression/offending, assessment of substance use/misuse/dependence and enquiry about social functioning and outcomes. The focus would be on meaningful objective outcomes. The primary objective of this study would be to see if the findings regarding course of psychosis, comorbid personality disorder/psychopathy, substance dependence and the relationship between these and outcomes held true. The study would also provide comparable data to the present study on outcomes and associates of administrative, forensic, clinical and social outcomes.

However it is very unlikely that such a study, lasting for 15-20 years, would be funded or feasible. A more pragmatic suggestion might be a further study of a resident cohort, using the measures suggested above. There would be an initial follow-up at 5 years and then a further follow-up at 10 years. Rather than having researchers employed throughout, there would be prospective tracking of patients by a member of administrative staff, with researchers collecting data at baseline, after 5 years and at 10 years. The resources required for such a study would be identical to the study reported in this thesis. A specific focus on follow-up outcomes and replication from the start would obviate the need for some of the data collected in the current study to be collected. There could be an explicit categorization at baseline using the suggested typology, to see if it was valid and useful in predicting outcomes.

The use of contemporary comparison groups (e.g. non-forensic patients with schizophrenia or non-psychotic forensic patients) would help clarify whether the course of psychosis is similar between forensic and non-forensic patients, and whether violence and offending is associated with similar or different factors in non-psychotic cases. However non-psychotic patients (except those with learning disabilities) are rare in secure hospitals in Scotland, so such a cohort would have to be recruited in prison.

Looking beyond the current study, to the wider issue of psychosis and violence, the key research priority is the evaluation of the effectiveness of treatment interventions in improving functioning and reducing violence and offending. Although randomised controlled studies of interventions (such as certain pharmacological interventions, psychological treatments and services) can and have been undertaken, case control and cohort studies are also important, particularly for looking at longer-term outcomes.

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APPENDICES

Appendix A1
Studies of the prevalence of schizophrenia in prisoners

Studies of the prevalence of schizophrenia in prisoners are summarised in table A1.

Table A1. A summary of studies on the prevalence of schizophrenia in prisons.

Study	Country	Sample	Assessment method	Diagnostic criteria used (schizophrenia unless otherwise stated)	Prevalence period	Number of prisoners	Prevalence (%)
Guze (1976)	USA	Consecutive felons	Unknown	-	-	233	1
Petrich (1976)	USA	Jail inmates referred for psychiatric service	Clinical evaluation	-	-	122	31 M 25 F
Piotrowski *et al.* (1976)	USA	Pretrial detaineees referred for evaluation	Clinical evaluation	-	-	50	22
Nielson (1979)	USA	Jail inmates referred for evaluation	Clinical evaluation.	Psychosis rather than schizophrenia.	-	unknown	24
James *et al.* (1980)	USA	Prison inmates referred for medical services.	Clinical evaluation	-	-	409	5
Lamb & Grant (1983)	USA	Female jail inmates referred for evaluation	Clinical evaluation	'Severe psychopathology'	-	101	59
Taylor and Gunn (1984)	England	Male remand prisoners	Case records	-	-	2743	6.1
Guy *et al.* (1985)	USA	Male jail inmates	Structured Clinical Interview	-	-	486	11.5
Hyde & Seiter (1987)	USA	Male and female prison inmates	PERI to screen, then SCID	DSM III	-	509	1.5
Neighbors *et al.* (1987)	USA	Two-stage random sample stratified by institution type	DIS to all, then SCID to those screened in.	DSM III	Lifetime	1240	2.8
Bean *et al.* (1988)	USA	Two-stage random sample of inmates from Ohio Department of Corrections	PERI to screen, then SCID	DSM III	Lifetime	464	1.5

		stratified by facility.					
Daniel *et al.*(1988)	USA	Female prison inmates	DIS	DSM III		100	7
California Dept. of Corrections (1989)	USA	General population sample stratified by security level and random psychiatric sample	DIS	DSM III	Lifetime	413	3.4
Teplin (1990)	USA	Male jail detainees at reception	DIS	DSM IIIR	2 weeks	728	2.7
Bland *et al.* (1990)	Canada	Young prisoners	DIS	DSM III	6 months	180	2
Chiles *et al.* (1990)	USA	Sentenced male prisoners	DIS	DSM IIIR	Lifetime	109	5
Côté & Hodgins (1990)	Canada	Penitentiary inmates	DIS	DSM III	Lifetime	495	6.5
Abram & Teplin (1991)	USA	Randomly selected urban jail detainees				362	3
Gunn *et al.* (1991)	England & Wales	5% of all males serving prison sentences	Semi-structured interview	ICD 9 Psychosis	Current	1769	2
Hermann *et al.* (1991)	Australia	Random sample of remanded and sentenced prisoners	SCID	DSM IIIR	1 month	189	2
Hurley & Dunne (1991)	Australia	Remanded and sentenced female prisoners	SCID	DSM IIIR	1 month	92	2
Motiuk & Porporino (1991)	Canada	Random sample of males stratified by region	DIS	DSM IIIR	Lifetime	2185	4.4
Maden *et al.* (1994)	England	Female prison inmates	CIS	ICD 9 Psychosis		301	2
Arboleda-Florez *et al.* (1995)	Canada	Random sample of remand prisoners	SCID	DSM	1 month	1151	1
Davidson *et al.* (1995)	Scotland	Remand prisoners	CIS	ICD 10 Psychosis	Point	389	1
Joukamaa (1995)	Finland	Male and female remand prisoners	Interview	ICD-8	Point	903	3M 3F
Andersen *et al.* (1996)	Denmark	Remand prisoners at reception	PSE-10	ICD 10	1 month	228	4

Birmingham *et al.* (1996)	England	Random sample of male remand prisoners	SADS	ICD 10 Psychosis	Point	548	4
Blanchette & Motiuk (1996)	Canada	Non-random sample of female inmates	DIS	DSM IIR		76	

Brooke *et al.* (1996)	England & Wales	Random sample of male remand prisoners	SADS	ICD 10 Psychosis	Point	750	5
Teplin *et al.* (1996)	USA	Random sample of female remand prisoners	DIS	DSM IIIR	6 months	1272	2.4
Powell *et al.* (1997)	USA	Sentenced male prisoners	DIS	DSM IIIR	-	213	3
Agdahowe *et al.* (1998)	Nigeria	Sentenced male prisoners	Semi-structured interview	DSM IIIR	Point	100	2
Singleton *et al.*(1998)	England & Wales	Stratified sample of prisoners.	CIS-R and SCAN.	Schizophrenia Psychosis	1 year	3142	2 MR 1 MS 3 F 10 MR 7 MS 14 F
Brinded *et al.* (1999)	New Zealand	Remand and sentenced male and female prisoners	CIDI	DSM IV	Point	225	7 MR 10 MS 3 F
Bartlett *et al.* (2000)	Scotland	Male receptions to prison.	CIS-R screen, then SCAN	ICD 10 Psychosis	Point	119	5
Corrado *et al.* (2000)	Canada	Random sample of male remand prisoners	DIS	DSM IIIR	Point	192	5
Brinded *et al.* (2001)	New Zealand	Remand and sentenced male and female prisoners	CIDI	DSM IV	Point	441MR 640 MS	3 MR 2MS 7 F
Brink *et al.* (2001)	Canada	Random sample of sentenced male prisoners	SCID	DSM IV	Point	202	2
Parsons *et al.* (2001)	England	Female remand prisoners	SADS	ICD 10	Point	382	10
Fazel *et al.* (2001)	England & Wales	Sentenced elderly male prisoners	Semi-structured interview	DSM IV Psychosis	Point	203	5
Teplin *et al.*	USA	Random stratified sample of	DISC	DSM IIIR	6 months	1829	1M

(2002)		male and female young offenders		Psychosis			1F
Gosden *et al.* (2003)	Denmark	Remanded male young offenders	Interview	ICD 10	1 year	100	2

Vreugdenhil *et al.* (2004)	Netherlands	Sentenced male young offenders	DISC	DSM IIIR Psychotic symptoms		204	34
Fazel & Danesh (2002)	International	Systematic review combining data from 62 studies	Studies with clinical examination or interviews using diagnostic instruments.	Psychosis rather than schizophrenia		22790	3.7 M 4 F

M – male, F – female, R – remand, S - sentenced

CIDI – Composite International Diagnostic Interview

CIS – Clinical Interview Schedule

CIS-R – Clinical Interview Schedule-Revised

DIS – Diagnostic Interview Schedule

DIS-C - Diagnostic Interview Schedule for Children

PERI - Psychiatric Epidemiologic Research Instrument

PSE – Present State Examination

SADS - Schedule for Affective Disorders and Schizophrenia

SCID - Structured Clinical Interview for DSM

Appendix A2
Studies of the outcomes of UK security hospital patients

Table A2 sets out the details of studies of administrative, forensic, clinical and social outcomes in UK medium and high security hospital patients.

Table A2. Outcome studies of UK medium and high security patients.

Reference	Setting	Sample	Outcomes studied	Outcome findings	Associates of outcomes
Tong and McKay (1959)	High security hospital in England (Rampton)	423 patients discharged between 1945 – 1956	Conviction Imprisonment Re- admission Followed-up in late 1957	20% convicted 10% imprisoned 20% re-admitted	Failure associated with young age, shorter admission, direct discharge to community (versus hospital).
Gathercole (1968)	High security hospital in England (Moss Side)	100 patients discharged and followed up for 4-6 years	Conviction Re-admission Reaching community Length of stay in high security	26% convicted 22% re-admitted 29% remained in local hospitals Mean stay in high security 7 years	-
McGrath (1968a)	High security hospital in England (Broadmoor)	All discharged homicide cases over 100 year period 1,200 patients discharged over a 10 year period (including 293 homicide cases)	Homicide Re-call	0% killed 4% re-called	-
McGrath (1968b)	High security hospital in England (Broadmoor)	Clinical opinion not based on research data	Discharge	-	Describes difficult clinical issues in the decision to release patients who have committed homicide
Home Office and DHSS (1973)	High security hospitals and less secure hospitals in England	273 restricted patients discharged to the community in 1966-7	Conviction over 4 years	34% convicted 7% serious conviction	Absolute rather than conditional discharge associated with

					conviction
Walker and McCabe (1973)	High security and less secure hospitals in England	1160 patients admitted to hospitals on hospital orders in 1963-4 942 (81%) male, 218 (19%) female Male diagnoses: 42.2% schizophrenia, 34% subnormal, 13 % personality disorder Female diagnoses: 38% schizophrenia, 38% subnormal, 8% personality disorder 10% admitted to high security 14% admitted on restriction orders	FOR WHOLE COHORT Length of stay in hospital Whether discharged Absconding from hospital Placement in 1970 Mortality TWO YEAR FOLLOW-UP OF THOSE DISCHARGED WITHIN ONE YEAR Conviction Re-admission Employment	**Length of stay** (% staying - up to 1 year, 2-5 years, more than 5 years - respectively): MALES: Local hospital, non-restricted – 47.2, 37.2, 15.6 Local hospital restricted – 17.1,45.5, 37.4 Special hospital, non-restricted – 12.5, 29.2, 58.3 Special hospital, restricted – 3.1, 18.5, 78.4 FEMALES: Local hospital, non-restricted – 54.3, 31.1, 14.6 Local hospital restricted – 11.1, 66.7, 22.2 Special hospital, non-restricted – 16.7, 50.1, 33.2 Special hospital, restricted – numbers too small **Absconding** and not returning: males 21%, females 23% Absconding at least once (whether returned or not) in patients staying a year or less: males 19%, females 15% **Placement** in 1970: Discharged 54.6% Absconded (but not discharged) 1.9% Dead 3.8% Transferred to Scotland 1.3% Hospital 38.4% **Conviction**: 47% males, 31% females	Conviction associated with: short admission, absconding (and being discharged in absence), previous convictions, psychopathic disorder or subnormality (rather than schizophrenia), unemployed at index offence (in males). Re-admission associated with: short admission, previous admissions, not being employed at index offence (in females). Employment at follow-up associated with: longer admission, not absconding (and being discharged in absence), in employment at index offence (in females).

				Re-admission: 21% males, 21% females **Contributory employment**: Males: none 39%, any 61% Females: none 70%, any 30%	
Acres (1975)	High security hospitals in England	92 patients who had been on a court order discharged directly to the community in 1971 82% male 30% mental illness, 23% subnormality, 47% psychopathic disorder	Discharge process Conviction Imprisonment Re-admission (after further offence) Placement at follow-up Contact with family Relationship Accommodation Employment Contact with services Two year follow-up	Discharge initiated by: RMO 47%, Tribunal 53%. 46% convicted of 93 offences. Of 93 offences: 36% resulted in imprisonment, 13% in hospitalisation. Of 93 offences: 3% sexual, 15% violent Placement at two years: 4% dead, 33% institution (13% prison, 17& high security, 2% other hospital), 57% community (55% own home, 2% at work, 2% hostel), 5% unknown. 15% no family contact 60% in intimate relationship (decreased from 74% at offence) 22% lived in one place, 50% not more than 2 moves, 9% move 9 or more times; 235 changes of accommodation in cohort. Unemployment: 17% throughout, 23% < I month, 50% < 6months, 61% < 12 months; 178 changes of job in cohort. 64% contact with GP 32% contact with psychiatrist 97% contact with probation officer or social worker; but at end of two years 48% in contact	Conviction associated with psychopathic disorder (54%), subnormality (67%), not being mentally ill (18%); lack of statutory supervision, lack of aftercare: Tribunal (rather than RMO) initiated discharge. End of job associated with (178 episodes): poor behaviour (35%), getting a better job (35%), poor work (12%). Moving accommodation associated with (235 episodes): poor behaviour/criminal record (55%), getting better accommodation (32%)

Dell (1980)	High security hospitals in England	163 patients approved for transfer to less secure hospitals in 1976	Time waiting to be transferred to less secure hospital Readmission to high security	30% waiting over a year in 1976 60% waiting over a year in 1979 7% re-admitted	Transfer associated with contact with local services and not being a civil patient with severe mental handicap Refusal for transfer associated with lack of local facilities and patients' history of violence.
Loucas (1980)	High security hospital in England	Clinical opinion not based on research data	Delayed and refused transfer to less secure hospital	-	Lack of transfer associated with inadequate local facilities and stigmatisation of patients based on past behaviour
Bowden (1981)	High security hospital in England	Narrative review of follow-up studies	-	-	-
Black (1982)	High security hospital in England (Broadmoor)	128 male patients discharged	Conviction Imprisonment Re-admission Failure (any of above) Over 5 year period	10% violent conviction 23% imprisoned 19% re-admitted 41% failed	Conviction associated with not being conditionally discharged
Tennent and Way (1984)	High security hospitals in England	617 patients admitted 1961-5, discharged by 1978 and who had reached community	Conviction Follow-up until 1978 mean 8.8 years	55% convicted 21% violent conviction	Conviction associated with psychopathic disorder, absolute discharge, juvenile custody and previous imprisonment.
Norris (1984)	High security hospital in England (Broadmoor)	330 patients discharged between 1974 - 1981	Conviction over 4 years	27% convicted 16% serious conviction	Psychopathic disorder associated with conviction
Hamilton (1985)	High security hospital in England	Clinical opinion not based on research data, but presents some statistics	Delayed and refused transfer to less secure hospitals	Almost 50% of patients approved for transfer waiting over a year in 1983	Relationships between high security and local clinicians important

Dell and Robertson (1987)	High security hospital in England (Broadmoor)	76 male psychopathic disorder patients admitted on restricted hospital orders 1972 – 4 (out of 106 psychopathic disorder patients admitted on any order) 222 male mentally ill patients admitted on any order 1972-4	Length of stay in high security determined at end of 1984: Early release (<48 months) Intermediate (4-8 years) Long-term (>8 years)	Psychopathic disorder restricted hospital order patients: 24% early release, 24% intermediate, 53% long-term Mentally ill patients: 39% early discharge, 19% intermediate, 42% long-term	Length of stay for psychopathic disorder patients associated with nature of index offence. Length of stay for mentally ill patients not related to nature of index offence, but type of detention.
Larkin et al. (1988)	High security hospital in England (Rampton)	All patients resident between May – October 1985; 448 male and 139 female	Violence in high security hospital over a 6 month period	1144 violent incidents 0.7 incidents per male patient, 6 incidents per female patient 64% of incidents serious 3% of incidents life-threatening	4% of patients commit 60% of violence Female patients committed more violence Staff 3 times more likely to be attacked than patients
Hamilton (1990)	High security hospitals in England	Statistics on patients approved for transfer mentioned in a book chapter	Delayed and refused transfer to less secure hospitals	66% of patients waiting over a year and 15% waiting over 3 years in 1986	-
Smith et al. (1991)	High security hospital (Broadmoor)	30 patients from South West region resident in March 1990	Considered ready to leave by RMO Progress with transfer process	8 ready to leave 1 delayed more than a year	-
Taylor et al. (1991)	High security hospitals in England	1708 resident patients	Delayed and refused transfer to less secure hospitals Whether patients require high security care	Of the 315 (18%) patients with a transfer proposal, 71% had limiting factors causing delay 59% of all patients did not require high security care	Most important factor (accounting for 79% of delays) was lack of local facilities
Bailey and MacCulloch (1992 a&b)	High security hospital in England (Park Lane)	112 patients discharged directly to the community between 1974 - 1989	Conviction over up to 10 years	35% convicted 17% violent conviction	Conviction associated with psychopathic disorder and absolute discharge

Brown et al. (1992)	High security hospital in England (Rampton)	145 patients with mental illness and psychopathic disorder referred to local services in 1988-1990	Rejection for transfer to less secure hospital Time to transfer for those accepted	42% rejected by local services 3% accepted by local services but rejected by Home Office 40% waited over a year from acceptance to transfer	Rejection associated with previous inpatient violence, non-compliance, not being seen by local services, lack of local facilities, patient disturbed/unchanged
MacCulloch et al. (1993a&b, 1994)	High security hospital in England (Park Lane)	19 serious re-offenders from Bailey and MacCulloch (1992 a&b)	Serious conviction	All were cases who had serious convictions 2/3 clinical team felt management in community appropriate 6 clinical failings 13 administrative failings	Sexually motivated index offence, psychopathic disorder, discharge by Tribunal, court disposal
Cope and Ward (1993)	Medium secure units in England	51 patients admitted from high security hospitals and subsequently discharged from medium security 75% male, 49% mental illness	Length of stay in high and medium security Discharge destination Re-admission Conviction Average follow-up 5 years	Mean stay in high security 9.6 years, in medium security 0.8 years 49% discharged to community 20% discharged to local hospital 31% return to high security 11% of community cases convicted (all serious) 39% failed (serious conviction and/or return to high security)	Failure (conviction and/or return to high security) associated with psychopathic disorder
Dolan et al. (1993)	High security hospital in England (Ashworth)	105 patients transferred out between 1981 - 1991	Readmitted by 1992	39% readmitted	Recall associated with deficiencies in assessment, treatment and supervision patients, particularly with alcohol and sexual problems
Huws and Shubsachs (1993)	High security hospitals in England	30 patients who absconded between 1976 - 1988	Outcome of abscond	All found and returned 1/3 returned of own accord 2 committed serious offence	Absconding associated with psychopathic disorder, not hinder subsequent discharge (in absence of offending)
Maden et al. (1993)	High security hospitals in England	296 patients resident for at least one year (=	Security needs according to researchers and	Researchers: high 37%, medium 46%, other hospital 15%, community 3%	Perceived obstacles to discharge: lack

		20% cross-section of patients resident at the time) 81% male 55% schizophrenia	clinical team Violence in high security over a one year period Self-harm in high security over a one year period	Clinical team: high 50%, medium 31%, other hospital 13%, community 5% 1/3 – 2/3 of patients requiring medium security would need this for over two years 1/3 of patients physically violent (equates to 3 serious incidents per week in each hospital) 10% property damage, 41% severe verbal aggression/threats, 25% minor assault, 25% serious violence, 2% life-threatening violence Injury caused: 24% minor, 3% serious 18% self-injury, 2% suicide attempt	understanding of offence, difficulty relating to others, poor response to medication, ongoing aggression, poor co-operation with treatment, self-harm, substance abuse, risk of absconding
Dolan and Snowden (1994)	Medium secure unit in England	All escapes between 1986 – 93 amongst 767 admissions	Escapes	27 (4%) individuals responsible for 31 episodes 21 from within building, 10 from recreation area No serious violence, 3 offences	Escape associated with young, afro-caribbean, male, mental illness, acquisitive offending, previous absconding, transfer from police custody or prison. Most occurred from inside building, early in admission when staffing levels were low.
Murray et al. (1994)	High security hospitals in England	75 patients from North West Thames region resident in high security (excluded 36 where transfer had been initiated)	Need for high security care	23 definitely needed high security 16 need for high security doubted, but not inappropriately placed 36 definitely do not need high security (almost half needed long-term medium security)	Need for high security associated with severe personality disorder and treatment resistant psychosis. Doubtful need associated with suboptimal treatment of psychosis, ongoing psychotherapy and recent admission.

Shaw et al. (1994 a&b)	High security hospitals in England	119 patients from the North West region	Security needs	45% not need high security according to RMO 67% not need high security according to research panel ? need long-term medium security	Need for high security: ongoing aggression, positive psychotic symptoms, non-compliance, treatment resistance and previous substance abuse. Need for long-term medium security: unrestricted, older, socially/functionally impaired, treatment refractory but not an immediate danger to others. Need for regional medium security: treatment responsive, insightful, clear link between illness and offending, less functionally/socially impaired
Dolan and Shetty (1995)	High security hospital in England (Ashworth)	44 patients referred to local services in 1989	Placement and status 2 years following referral Time to transfer	34 patients accepted for transfer 22 had been transferred Transfer took an average of 14 months	Refusal associated with lack of beds, perception of previous behaviour and not being restricted
Smith et al. (1995)	High security hospitals in England	21 patients from South West region transferred to medium secure units between 1988 -1992	Time taken for transfer to medium security	Average wait 16 months	Delays due to Home Office, lack of regional beds and catchment disputes
Bartlett et al. (1996)	High security hospitals in England	91 patients from South West Thames region resident in 1992-3	Need for high security	50% not need high security	Most of those not requiring high security need long-term medium security
Reiss et al. (1996, 1999)	High security hospital in England	49 male patients with psychopathic disorder	In 2 years prior to discharge: general social	YPU PATIENTS: Average stay in YPU 5 years, average	Conviction associated with low IQ, previous

	(Broadmoor)	treated in 'Young Persons Unit' (YPU) between 1972 and 1989, and discharged by 1993 Comparison group of 40 non-YPU psychopathic patients	functioning, problem sexual behaviour, seclusion/special care, violent behaviour Treatment received in Broadmoor Mental state Whether discharged Destination on discharge Social outcome following discharge: social interaction, accommodation, employment, substance use Conviction Mortality Mean follow-up 5 years	stay in Broadmoor 8 years Range of psychotherapeutic treatments 16% developed symptoms of mental illness 67% good social functioning prior to discharge 76% discharged from high security Destination: 35% less secure hospitals, 41% to community 61% reached community Placement at end of follow-up: 24% high security (never discharged), 51% community, 10% less secure hospitals, 10% prison or special hospital (following further offence) 20% conviction (80% in community, 20% in hospital) 8% serious conviction 4% mortality Good social outcomes in community (n=28): social interaction 89%, employment 57%, accommodation 68%, substance use 71% COMPARISON GROUP: 68% discharged to community 25% convicted Less received psychosocial interventions in Broadmoor 10% had good overall social outcome	sexual offending and not having a good social outcome Lack of improvement in social function associated with high PCL-R score Need for seclusion or special care associated with high PCL-R score Discharge to community (rather than hospital) associated with high PCL-R score.
Gordon et al. (1997)	High security hospitals in UK	All patients resident in English and Scottish high security hospitals between 1966 and 1995	Homicides committed in high security hospitals	6 incidents involving 8 patients with 7 victims (6 patients and 1 member of staff)	Associated with sexual relationships and pathology, and escape attempts

Howard and Lumsden (1996)	High security hospital in England (Broadmoor)	44 male patients admitted between 1977-80	Violent offending Followed-up in 1990	16% convicted	Violence associated with neurophysiological measure - the Go/No Go contingent negative variation
Kershaw et al. (1997)	Restricted patients discharged from hospital	2781 patients conditionally discharged to the community from 1972 - 1994	Conviction Re-called to hospital Over 2 or 5 years	13% convicted within 2 years 2% grave conviction within 2 years 27% convicted within 5 years 5% convicted of a grave offence within 5 years 11% recalled within 2 years 15% recalled within 5 years	Conviction associated with young age, previous convictions, psychopathic disorder, direct discharge from high security, discharge by Mental Health Review Tribunal rather than Home Office
Buchanan (1998)	High security hospitals in England	425 patients discharged 1981-2	Conviction over 10.5 years	34% convicted 15% violent conviction 7.5% sexual conviction 15% serious conviction	Conviction moderately associated with young age, psychopathic disorder, prior conviction; but not with gender or discharge destination
Steels et al. (1998)	High security hospitals in England	95 psychopathic disorder (PD) and 94 mentally ill (MI) restricted patients discharged from 1976 – 1978 94% schizophrenia in mentally ill	Mortality Legal Contact with services Conviction Imprisonment Employment Relationship Mean follow-up 13.6 years	Mortality 21.2% twice general population (41% of deaths suicide) At end of follow-up 34% MI and 11% PD restricted Proportion (% of follow-up years) in (MI): prison 0.9, high security hospital 16.7, medium secure unit 0.7, general hospital 38.6, sheltered housing 14.5, family of origin 8.3, friends 0.9, alone 8.6, own family 9.3 Proportion (% of follow-up years) in (PD): prison 5.4, high security hospital 14.4, medium secure unit 2.2, general hospital 15.8, sheltered housing 13.1, family of origin 12.7, friends 2.7, alone 15.8, own family 17.9 Conviction MI 19.1%, PD 55.8% Specific offences MI (%): 1.1 homicide,	Mortality higher in mentally ill (28% v 15%) Institutional care associated with mental illness; time in community associated with psychopathic disorder Male gender, psychopathic disorder, previous convictions associated with reconviction and imprisonment. Psychopathic disorder associated with gaining employment and relationships. No association between

				7.9 violence, 1.1 sexual, 4.5 arson, 10.1 robbery, 2.2 other Specific offences PD (%): 1.1 homicide, 16.8 violence, 11.6 sexual, 11.6 arson, 31.6 robbery, 30.5 other PD 5 times more likely to establish relationship than MI (46% v 17%), and 5 times as likely to gain work (46% v 13%)	good social outcome and non-offending.
Baxter et al. (1999)	Medium secure unit in England	63 patients with schizophrenia discharged to the community (directly or via general services) from medium secure care before 1994 75% male 37% white	Mortality Conviction Offending Contact with services Re-admission Legal status Health and social needs/patient satisfaction Followed up for up to 10 years (to January 1995)	Location at follow-up (%): high security hospital 6, medium secure unit 8, private hospital 8, local hospital 11, community 54, prison 1, untraceable/miscellaneous 8 3% dead (both by suicide) 89% re-admitted (73% multiple) 17% restricted 30% violent re-conviction (most disposals to hospital) 67% violent re-offending 92% in contact with psychiatric services: psychiatrist>CPN=social worker>GP Camberwell Assessment of Need: mean number of needs 7.6 (patient), 7.8 (staff)	Violent offending associated with comorbid conduct disorder and alcohol misuse. Conviction associated with young age, polydrug use, conduct disorder, not being on a restriction order
Brook et al. (1999)	High security hospital in England (Ashworth)	36 patients who absconded 1985 – 96 Comparison group of 150 non-absconders	Absconding 11 year period	22 from community outings and 14 escapes Rare (over same period 23,000 outings and 6,500 patients) 83.4% captured/returned within a day.	Minimal risk to public, authorized leave, previous absconding, previous assaults, previous acting-out,

				11.1% offended, none grave	young age, shorter admission, antagonistic to authority, anxiety/conflict re transfer
Davison et al. (1999)	High security hospitals in England	159 patients with personality disorders discharged from 1988-1991 (61 community discharges, 98 discharged to less secure hospitals)	Re-conviction after 5 to 9 years Destination on discharge (in sample definition)	42% of community discharges convicted (mean no. of offences 6 for those convicted); 32 % serious conviction; mean time to serious offence 1.9 years 28% of hospital discharges convicted (mean no. of offences 3 for those convicted); 22% serious conviction; mean time to serious conviction 3.6 years	Re-conviction not associated with direct discharge to community rather than via less secure hospital, but was associated with lack of legal compulsion; also associated with young age and previous convictions.
Friendship et al. (1999)	Medium secure unit in England	234 patients discharged between 1980 and 1994	Conviction Mean follow-up 6.6 years	24% convicted (56 patients responsible for 267 convictions) 12% serious conviction 30% of those who reached community convicted	Note that many patients spend substantial periods of follow-up in hospital reducing opportunity to be convicted. Most institutional violence does not lead to conviction. Conviction associated with: young age, shorter admission, previous convictions
Maden et al. (1999 a&b)	Medium secure unit in England	234 patients discharged between 1980 and 1994 70% schizophrenia	Length of stay in medium security Violence in medium security Mortality Discharge destination and location during follow-up Re-conviction Mean follow-up 6.6	Mean stay 10 months 26% violent in medium security 9% died (3% suicide) Discharge destination: 31% open ward, 24% community, 16% locked ward, 11% high security, 8% medium security, 9% prison, 1% general hospital Anytime during follow-up in: 74% community, 21% high security, 24%	Conviction associated with: male, young, previous conviction, shorter stay in medium security, not being restricted. Re-admission associated with: younger age at first psychiatric contact, previous admissions

			years	prison Location in October 1994: 42% community, 14% high security, 11% general psychiatry, 7% medium security, 4% prison, 2% abroad, 9% dead, 11% untraced Conviction: 24% convicted, 14% violent conviction, 4% sexual conviction Re-admission to hospital 75%	Ethnic origin (White/European v Black/African-Caribbean) not associated with conviction, re-admission or placement at follow-up.
Taylor et al. (1999)	High security hospitals in England	661 Mental Health Review Tribunals held in 1992	Outcome of Tribunal	7% order discharge 8% recommend transfer	Discharge associated with: female, psychopathic disorder, shorter length of stay.
Butwell et al. (2000)	High security hospitals in England	3263 patients resident from 1986 to 1995 accounting for 3522 resident episodes (Average resident episodes 1826 per year, average daily population 1650)	Number of discharge episodes Number of deaths Destination on discharge Length of stay in high security	36% of 510 remand order episodes end in discharge 136 – 218 discharges per year of non-remand patients, totalling 1709 discharges in 10 years 7 – 24 deaths per year, totalling 142 deaths (4% of patients) in 10 years (23% unnatural) Destination on discharge: 24% community, 63% hospital, 12% prison Median 6.3 years in high security (mean 8.2 years)	Length of stay decreases from sever mental impairment, to mental impairment, to mental illness, to psychopathic disorder
Falla et al. (2000)	Medium secure unit in England	Patients discharged	Conviction Mean follow-up 3.5 years	7% serious conviction	-
Quinn and Ward (2000)	Medium secure unit in England	23 patients admitted from high security hospitals	Length of stay in high and medium security Destination on discharge Serious conviction	Mean stay in high security 8.1 years, in medium security 1.8 years Return to high security 22% Community discharge 61% Discharge to less secure hospital 17% Serious conviction 11%	-

				Failure (serious conviction or return to high security) 26%	
Swinton and Haddock (2000)	High security hospital in England (Ashworth)	106 patients on clozapine and 106 matched controls	Treatment with clozapine Transfer to less secure hospital 1990-1998 Survival analysis	40% of clozapine cases and 18% of controls moved to less secure hospitals	Continuous treatment with clozapine associated with leaving high security
Thomson and Allen (2000)	High security hospital in Scotland (Carstairs)	171 patients discharged	Conviction over 10-13 year follow-up	31% convicted 19% violent conviction	-
Gudjonsson et al. (2000), Rutter et al. (2004)	Medium secure unit in England	280 patients resident between 1980-96	Violent incidents in medium secure unit	59% violent (2180 incidents) 6% persistently violent (25 or more incidents) 11% of incidents caused injury and 1% required hospital treatment Nursing staff more likely victims than other patients.	6% of patients accounted for 67% of incidents (25 or more incidents each) Persistent violence associated with: no previous prison sentence, female gender, history of special education. Nurse victim associated with female perpetrator, mental illness, civil section
Halstead et al. (2001)	Medium secure learning disability unit in England	35 patients discharged after at least 1 year in unit	Living in community Mortality Conviction Admission to high security Follow-up up to 5 years	60% living in community (with support) 6% dead 3% convicted 9% admitted to high security	Better outcome with more significant disability Early months after discharge associated with relapse
Mohan et al. (2001)	High security hospital in England (Broadmoor)	29 restricted patients leaving in 1984 and 130 restricted patients leaving between 1990 - 4	Use of trial leave prior to transfer/discharge	7% left under trial leave in 1984 71% left under trial leave in 1990 - 4	Use of trial leave associated with: female, homicide or violent index offence, not with reduced length of stay
Castro et al. (2002)	Independent sector medium secure unit in	166 patients admitted between 1995 – 8 of	Length of stay in medium security	Length of stay: 0-6 months 69%, 6-12 months 23%, >12 months 9%	Longer length of stay associated with number

	England	whom 49 followed-up 6 months after discharge 82% male 60% schizophrenia	Discharge from medium security Destination on discharge Conviction Non-convicted aggression Absconding Self-harm Compliance with treatment Mental state Contact with family, friends, services Employment Alcohol/drug use	99% discharged Destination on discharge: 64% psychiatric hospital, 31% community, 6% prison, 2% high security hospital Conviction: 19% Aggression 23%, sexual aggression 2%, arson 2% Absconding 13% Self-harm 6% Good or complete compliance with medication 63% Day centre 17%, day hospital 31% Individual therapy 23%, group therapy 15% Good or full improvement in mental state 38% Contact with family 89%, friends 89% Employment: full-time 7%, part-time 17%, voluntary 13% Alcohol/drug misuse 8%	of therapies, previous detentions, behavioural problems. Re-admission associated with not having schizophrenia. Conviction associated with sexual aggression history, non-compliance and with length of stay in institutions; not with previous convictions.
Dolan et al. (2002)	Medium secure unit in England	87 patients admitted	Violence in medium security over 12 weeks	Unknown (full paper could not be retrieved, only abstract)	PCL-SV, VRAG and H 10 (of HCR-20) associated with violence.
Duncan et al. (2002)	High security hospital in Scotland (Carstairs)	95 patients re-admitted to State Hospital following discharge between 1992 – 7	Re-admission to high security	22% re-admitted (95 patients responsible for 123 re-admissions) All re-admissions within 3 years of discharge	Re-admission associated with shorter initial admission, prison transfer, remand order, not being restricted. Violence associated with re-admission from hospital, relapse associated with return from prison
Edwards et al. (2002)	Medium secure unit in England and Wales	225 patients admitted between 1983 – 1996 79% schizophrenia	Duration of stay Destination on discharge Location at follow-up	Mean admission length 26 months 50% stayed more than 24 months 10% stayed more than 5 years	Admission length associated with white gender and homicide

		85.3% male 55.1% white	Mortality Convictions Followed up at 2 and 5 years post-admission	Destination on discharge: 55% community, 12% locked wards, 7% open wards, 9% court/prison, 10% high security hospital, 6% other medium secure unit Location 2 years after admission: 4% prison, 8% high security hospital, 52% remain in same medium secure unit, 4% re-admitted or in another medium secure unit, 6% local hospital, 22% community, 5% no contact Location 5 years after admission: 3% prison, 10% high security hospital, 12% remain in same medium secure unit, 5% re-admitted or in another medium secure unit, 11% local hospital, 51% community, 9% no contact Mortality at 5 years 2% Convicted at 2 years: 10% any, 3% serious (of 66 who reached community); 5% any (of whole cohort of 225) Convicted at 5 years: 10% any, 4% serious (of 104 who reached community); 11% any (of whole cohort of 152)	conviction Conviction associated with previous convictions
Jamieson and Taylor (2002)	High security hospitals in England	223 patients discharged in 1984	Mortality Reached the community Services used during follow-up Re-admission to high security Time in high security Conviction Follow-up to end of	Mortality 22% (34% in high security, 14% in other institutions, 51% in community) 83% reached the community 16% medium secure unit 56% general psychiatric ward 22% prison 19% re-admitted to high security median stay in high security 7 years	Not reaching community associated with: male, older age, longer stay in high security, mental illness, civil detention; but not with seriousness of offending. Most time during follow-up was in community,

			1995 (11-12 years)	36% convicted (22% in those who did not live in the community)	then in general ward, then in high security, then in prison, with least in medium security. Re-admission to high security associated with not reaching community, and occurred soon after discharge.
Gray et al. (2003)	Two medium secure units	34 patients admitted	Aggression (verbal, property, physical) Self-harm Follow-up 3 months whilst in medium security	50% verbally aggressive (mean number 7, median 1) 32% property damage (mean number 1, median 0) 32% physically aggressive (mean number 1, median 0) 53% self-harmed (mean number 6, median 1)	BPRS and HCR-20 strongly related to aggression; PCL-R moderately related to aggression. Becks Hopelessness Scale strongly related to self-harm. Age at first psychiatric contact associated with verbal and property aggression.
Dolan and Khawaja (2004)	Medium secure unit in England	70 patients discharged to the community	Conviction Violence Re-admission Minimum 2 year follow-up	Unknown (full reference could not be retrieved, only abstract)	HCR-20 associated with violence and re-admission, but not conviction. H predicted poor outcome, C and R predicted shorter time to poor outcome.
Gray et al. (2004)	Medium secure unit in Wales	315 patients discharged between 1992 – 9 49% schizophrenia 17% personality disorder	Conviction by end of 1999	31% minor conviction 18% serious conviction 87% of offending occurred within 1000 days of discharge	PCL-SV, HCR-20 and OGRS associated with any conviction. PCL-SV and OGRS associated with serious conviction. All instruments perform better in mentally ill than personality disordered

							patients.
Harty et al. (2004)	High security hospitals in England	1255 resident patients	Need for high security care Needs	40% need less secure care Most social and clinical needs met. Most frequent areas of unmet need: daytime activities, substance misuse, sexual offending, safety to others, and psychotic symptoms			
Jamieson and Taylor (2004)	High security hospitals in England and Wales	See Jamieson and Taylor (2002) 195 patients discharged in 1984	Conviction by end of 1995 (follow-up 11-12 years)	38% convicted 26% serious conviction 5% multiple convictions (>9)			14% of convictions occurred during institutional residence. Median time to first conviction less than 2 years. Personality disorder associated with serious conviction.
Maden et al. (2004)	Medium secure units in England and Wales	959 patients discharged between April 1997 – March 1998	Conviction over 2 year follow-up	15% convicted 6% violent conviction			Conviction associated with previous convictions, substance misuse, history of sexual abuse, shorter admission to medium security, loss of contact with services
Jamieson and Taylor (2005)	High security hospitals in England	223 patients discharged in 1984 212 patients discharged in 1996 1984:53% mental illness, 31% psychopathic disorder, 15% mental impairment 1996: 76% mental illness, 15% psychopathic disorder, 10% mental	Destination on discharge Mortality Length of stay in high security prior to discharge Reach community Time in various settings during follow-up Conviction Followed up until death or 5 years (end 1989 or end 2001)	Percentages DISCHARGED TO: Community Medium sec Other hospital Prison Death Court MORTALITY Unnatural	1984 34 11 43 5 8 0 12 5	1996 13 31 23 18 6 10 14 4	Serious conviction associated with direct community discharge, discharge to prison, young age and longer time in secure care. Psychopathic disorder only associated with serious conviction in 1984 cohort.

		impairment More remand orders and prison transfers, less hospital orders in 1996		ADMINISTRATIVE: Readmit high sec Community PROPN. TIME IN: High security Medium sec Other hospital Prison Community TIME (medn. yrs): In high sec at d/c To reach comm.. CONVICTION: Lesser Serious	 18 80 10 5 29 5 52 7.2 1.6 12 19	 18 50 12 20 20 17 32 6.5 1.6 11 24	
Philips et al. (2005)	Medium secure unit in independent sectors in Wales	315 patients discharged from 1993 – 1999 87.6% male 84.4% white	Conviction Follow-up until 2001 Survival analysis	36.5% convicted Mean 10.9 offences per-offender 18.5% violent conviction			Conviction associated with young age, fewer previous admissions, shorter admission previous convictions and personality disorder.
Dolan and Davies (2006)	Medium secure unit in England	134 male patients with schizophrenia (DSM-IV) admitted between 1996 – 2004 81% white	Violence, non-compliance, substance misuse, antisocial attitudes criminal peers, attempted escape self-harm during 12 weeks after admission	Rates (%) of incidents in non-psychopathic v psychopathic patients: Any 47 v 69 Instrumental aggression 87 v 98 Physical violence 45 v 60 Criminal associates 21 v 40 Substance misuse 58 v 82 Poor engagement 82 v 98 Pro-criminal attitudes 74 v 100			PCL-SV associated with all these outcomes, but not self-harm or attempted escape
Doyle and Dolan (2006)	3 medium secure units and 2 non-forensic units in	112 patients discharged to the community (34 from	Violence (from records, self-report, informant) Follow-up 24 weeks	19% violent (9% records, 11% self-report, 13% informant) 12% in medium secure discharges			Violence associated with psychopathy, not being on enhanced CPA, HCR-20

	England	medium security, 78 from general services) 70% mentally ill 51% schizophrenia	post-discharge	22% in general service discharges	total, VRAG score, PCL-SV score, anger, impulsiveness; no association with medium secure v general.
Alexander et al. (2006)	Medium secure learning disability unit in England	27 patients discharged between 1987-93 and 37 discharged between 1994 – 2000 47% comorbid schizophrenia	Conviction Non-convicted antisocial behaviour Relapse Re-admission to hospital Change of residence Levels of support, CPA level and statutory supervision 1 – 13 years follow-up	9% convicted (NOT 11) 30% arrested 58% offending-like behaviour 37% relapsed 30% re-admitted 59% change of residence Most leave to high support and CPA At end point 53% subject to MHA and 28% in hospital	Personality disorder, not having schizophrenia acquisitive offending and young age associated with re-conviction Offending-like behaviour associated with re-admission, arrest (but not conviction)
Maden et al. (2006)	Medium secure units in England and Wales	959 patients discharged between April 1997 – March 1998 843 male, 116 female	Length of stay in medium security Readmission to hospital Discharge destination Conviction Follow-up 12 months, but 2 years for conviction data	Median length of stay: 206 days for males, 259 days for females Readmission: 21% males, 27% females Discharge placement for males: 25% secure hospital, 20% open hospital, 14% prison, 42% community Discharge placement for females: 28% secure hospital, 22% open hospital, 7% prison, 43% community	Gender difference in conviction rate accounted for by self-harm, previous convictions and alcohol/drug problems
Main and Gudjonnson (2006)	Medium secure unit in England	65 patients resident (voluntary sample)	Non-compliance with regime	65% violated at least one rule	Rule breaking associated with younger age, antisocial personality, lower impression management and previous drug misuse
Coid et al. (2007a)	Medium secure units in 7 of the 14 regional health authorities in England and Wales	1613 patients admitted between 1989 – 1993 87% male 77% white 60% schizophrenia	Reaching the community by end of 1998 Conviction (based on 1344 patients who spent sometime in community by end of 1998)	83% reached community Mean stay in medium security 0.8 years Reconviction in males: 34% any, 18% violent, 2% sexual, 12% grave Reconviction in females: 15% any, 6%	Violent conviction associated with young age, male gender, non-white, previous convictions, personality disorder, shorter stay in

		37% personality disorder 24% alcohol disorder 28% drug disorder	Length of stay in medium security before discharge Mean follow-up 6.2 years	violent, 5% grave Total of 2915 offences, 170 (6%) grave	medium security. Grave conviction associated with young age, black, personality disorder, previous grave convictions, not being restricted
Coid et al. (2007b)	Medium secure units in 7 of the 14 regional health authorities in England and Wales	Sample as above. 409 patients managed in the community by forensic services compared with 657 patients managed in the community by general adult services	Convictions Re-admission Mortality	Forensic sample convicted: 23% any, 4% violent, 3% grave General sample convicted: 27% any, 5% violent, 3% grave Forensic sample re-admission: 23% any, 8% general, 15% medium security, 1% high security General sample re-admission: 26% any, 20% general, 5% medium security, 1% high security Mortality: 5% forensic sample (2% suicide), 9% general sample (3% suicide)	Forensic sample more likely older, been in high security, serious index offence, subject to restrictions, personality disorder. General sample more likely previous psychiatric admissions, psychosis, treatment resistance, violent in medium security. No difference in outcomes between forensic and general follow-up.
Davies et al. (2007)	Medium secure unit in England	The 550 out of 595 patients admitted between 1983 and 2003 who were discharged by June 2003 84% male 67% mental illness 27% psychopathic disorder	Not leaving medium security Time in medium security Discharge destination Conviction Non-convicted violence Mortality Re-admission Employment Mean follow-up 9.4 years. 5246 person years of follow-up from discharge.	ADMINISTRATIVE: 7.5% did not leave medium security Mean stay in medium security 346 days Discharge destination: 34% less secure hospitals, 27% community, 27% criminal justice system (prison/court), 7% high security, 3% medium security RE-ADMISSION: 69% re-admitted to any hospital 38% re-admitted to secure hospital (28% to medium security, 15% to high security)	Conviction associated with psychopathic disorder Employment associated with psychopathic disorder

				MORTALITY: Mortality 10% (44% natural, 32% suicide, 25% other unnatural); SMR 6. CONVICTIONS: 49% convicted (85% in community, 9% in hospital, 2% in prison); mean time to conviction 3.2 years. 14% grave conviction At 2 years: 26% any, 7% grave At 5 years: 42% any, grave 12% UNCONVICTED BEHAVIOUR: Unconvicted violence: 28% at 2 years, 42% at 5 years. Unconvicted fire-setting: 3% at 2 years, 6% at 5 years SOCIAL: 15% stable employment	
Snowden et al. (2007)	Independent sector medium secure units in England and Wales	996 male patients discharged between 1992 – 2001 (not all cases had complete data – figures based on 363 to 641 cases) 69% white, 56% schizophrenia	Conviction at 6 months, 1 year, 2 years, 3 years and 5 years following discharge	Any conviction 26%, violent conviction 7.5% at 2 years Any conviction 45%, violent conviction 15% at 5 years	VRAG particularly strongly associated with conviction in first year. OGRS and VRAG associated with conviction over the whole follow-up.
Gray et al. (2008)	4 independent sector medium secure units in the UK	996 male patients (not all patients had complete follow-up) 56% schizophrenia or other psychoses, 10% affective disorder, 9% personality disorder, 5% drug induced psychosis, 9% mental retardation	Re-conviction at ½, 1, 2 and 5 years following discharge from medium security from 1992 - 2001	Any conviction 5, 11, 20, 34 Violent conviction 2, 3, 5, 11 (Percentage convicted at ½. 1, 2, 5 years respectively)	Any-conviction and violent conviction associated with HCR-20 total, H subscale and R subscale, but not C subscale

Ho et al. (2009)	Medium secure unit in Scotland	96 patients discharged between 2001 – 4 92% male 71% schizophrenia	Destination at discharge Conviction Violence 2 years following discharge	Destination at discharge: 46% community, 25% open ward, 12% prison, 8% high security hospital, 12% low secure units, Convictions: serious violence 2%, minor violence 8%, non-violent 9% Violence (whether convicted or not): any 41%, serious 4%	Minor violence (mainly in hospital) associated with contemporaneous mood disorder, non-compliance and alcohol abuse. Serious violence associated with non-compliance, substance misuse and relapse in psychotic symptoms. Serious and any violence associated with PCL-SV, VRAG and H subscale of HCR-20. Conviction not associated with these. Restriction order associated with not offending.
Blattner and Dolan (2009)	Medium secure unit in England	72 patients admitted from high security hospitals between 1986 – 2001 discharged by 2002 87% male, 79% white, 69% mental illness, 67% schizophrenia	Length of stay in high and medium security Return to high security Destination on discharge Conviction Follow-up until 2003, mean follow-up 4.9 years	Mean stay in high security 7.4 years, in medium security 1.2 years Return to high security 46% Community discharge 54% Discharge to local hospital 0% Conviction 21%, serious conviction 15% Failure (return to high security or serious conviction) 56%	Psychopathic disorder associated with conviction
Exworthy and Wilson (2010)	Medium and low secure units in England	Commentary on report on absconding and escape	Absconding	Not a research study	-
Gow et al. (2010)	Medium secure unit in Scotland	219 patients admitted between 2000 – 2005 88% male, 69% schizophrenia	Length of stay in medium security Destination on discharge Aggression, self-harm and absconding in	Mean stay 0.8 years, 0.6 years for discharged patients 84% discharged Destination on discharge: 48% community, 20% open wards, 10% low	Violence in medium security associated with female gender, personality disorder, childhood behaviour

			medium security	security wards, 7% high security hospital, 2% other medium secure unit, 8% prison, 5% courts 1216 incidents 28% of patients physical violence, 5% sexually abusive behaviour, 9% self-harm, 22% abscond	problems.

Appendix B1
The Feighner Criteria

The criteria developed by Feighner et al. (1972), sometimes called the St Louis criteria, heralded the introduction of operationalised research diagnostic criteria in psychiatry. Spitzer et al. (1975) further developed them as the Research Diagnostic Criteria (RDC), which were very influential on the development of DSM-III (American Psychiatric Association, 1980). Criteria for fourteen conditions were set out in the original paper. These included schizophrenia, depression, mania, mental retardation, organic brain syndrome, anti-social personality disorder, alcoholism, drug dependence, anxiety neurosis, obsessive compulsive neurosis and hysteria. Given the importance of the definition of schizophrenia used in this study, the criteria for schizophrenia from the original paper are set out in full here:

For a diagnosis of schizophrenia A through C are required:

A. *Both of the following are necessary: (1) A chronic illness with at least six months of symptoms prior to the index evaluation without return to the premorbid level of adjustment. (2) Absence of a period of depressive or manic symptoms sufficient to qualify for affective disorder or probable affective disorder.*

B. *The patient must have at least one of the following: (1) Delusions or hallucinations without significant perplexity or disorientation associated with them. (2) Verbal production that makes communication difficult because of a lack of logical or understandable organization. (In the presence of muteness the diagnostic decision must be deferred.)*

(We recognize that many patients with schizophrenia have a characteristic blunted or inappropriate affect; however, when it occurs in mild form, inter-rater agreement is difficult to achieve. We believe that on the basis of presently available information, blunted affect occurs rarely or not at all in the absence of B-1 or B-2.)

C. *At least three of the following manifestations must be present for a diagnosis of "definite" schizophrenia, and two for a diagnosis of "probable" schizophrenia. (1) Single. (2) Poor premorbid social adjustment or work history. (3) Family history of schizophrenia. (4) Absence of alcoholism or drug abuse within one year of onset of psychosis. (5) Onset of illness prior to age 40.*

These criteria are strict and narrow compared with other diagnostic criteria for schizophrenia (Forrester et al. 2001).

Appendix B2
The Violence Risk Appraisal Guide (VRAG); the Historical, Clinical, Risk Management-20 (HCR-20); and the Psychopathy Check List-Revised (PCL-R)

Three instruments of relevance to predicting future violence were used. Two, the VRAG (Quinsey et al., 1998) and the HCR-20 (Webstcr et al., 1997), are violence risk assessment tools; the third, the Psychopathy Check List-Revised (PCL-R), is an assessment of personality. These were not rated, indeed two did not exist, at the time of the original State Hospital Survey. They were therefore applied retrospectively using only information available before 1994.

The **VRAG** was developed from data on the factors associated with recidivism in male mentally disordered offenders discharged from a Canadian high security hospital. It has 12 items each of which has an integer weighting ranging from -5 to 12. The range of total scores (from -26 to 38) can be divided into 9 'bins', each of which is associated with a reported percentage probability of violent recidivism at 7 and 9 year follow-up.

The **HCR-20** was developed from examination of the literature on violence risk in mentally disordered offenders and is intended to be used as structured clinical guidance. There are 10 historical items (covering largely static historical variables), 5 clinical items (covering dynamic variables relating to current clinical circumstances) and 5 risk management items (covering dynamic variables relating to future management). In clinical practice the clinical and risk items must be re-evaluated as a person's circumstances and clinical state change. In this study the Historical scale (H-10) was used alone as an actuarial measure. For research purposes the items are scored on a 3-point scale from 0 to 2 and the H-10 total could therefore range from 0 to 20.

The **PCL-R** has 20 items, each scored on a 3 point scale from 0 to 2, giving a total score ranging from 0 to 40. It was developed as a measure of the extent to which an individual

matched Cleckley's (1976) description of the prototypical psychopath, and has been found to be a good predictor of violent recidivism (Dolan and Doyle, 2000). The cut-off to make a diagnosis of psychopathy has been found to be culturally mediated (Hare, 1998, Cooke et al., 2005). For the UK Cooke and Michie (1999) suggested that a score of 25 or above was diagnostic of psychopathy, and a score of 15-24 indicated a moderate degree of psychopathy. The PCL-R has been found to have two underlying factors: Factor 1 reflecting the interpersonal and emotional aspects of psychopathy (callousness, deceitfulness, grandiosity, superficiality and detachment) and Factor 2 reflecting the behavioural aspects (impulsivity, poor behavioural control and socially deviant behaviour) (Hare, 1991). More recent 3 (Cooke et al., 2004) and 4 (Hare 2004) factor models have been described, but were not used in this study

The items comprising each of the three scales are shown in table B2.

Table B2. Items of VRAG, H-10 (of HCR-20) and PCL-R.

Violence Risk Appraisal Guide	**HCR-20**	**PCL-R**
Items (Weighting)	*Historical (H-10) Items*	*Items*
History of alcohol problems (.13)	Previous violence	Glibness/Superficial Charm
Diagnosis of Schizophrenia (-.17)	Young age at first violent incident	Grandiose sense of self worth
Diagnosis of Personality Disorder (.26)	Relationship instability	Need for stimulation/proneness to boredom
Psychopathy (.34)	Employment problems	Pathological lying
Elementary school maladjustment (.31)	Substance use problems	Conning/manipulative
Separation from biological parents before 16 years of age (.25)	Major mental illness	Lack of remorse or guilt
Age at index event (Young .26)	Psychopathy	Shallow affect
Nonviolent offense history (.20)	Early maladjustment	Lack of empathy
Victim injury at index offense (-.16)	Personality disorder	Parasitic lifestyle
Female victim at index event (-.11)	Prior supervision failure	Poor behavioral controls
Failure on prior conditional release (.24)		Promiscuous sexual behavior
Marital status (Single .18)		Early behavioral problems
		Lack of realistic, long-term goals
		Impulsivity
		Irresponsibility
		Failure to accept responsibility for actions
		Many short-term marital relationships
		Juvenile delinquency
		Revocation of conditional release
		Criminal versatility

Appendix B3
Follow-up rating scales

Standardized psychiatric assessment for chronic psychotic disorders (Krawiecka et al. 1977). The Krawiecka Scale assesses eight symptoms of schizophrenia and other symptoms: depression, anxiety, flattened or incongruous affect, retardation, delusions, hallucinations, incoherence, and poverty of speech. An assessment can be made in about 15 minutes. Each item is rated on a 5 point scale from 0 to 4. A cut off of a score of 3 or 4, equivalent to that used for the BPRS, was used to ascertain whether a symptoms was present or not. A study comparing the Manchester Scale and the Brief Psychiatric Rating Scale (Overall and Gorham, 1962) found that the former had better interrater reliability than the latter and concluded that the Manchester Scale was a suitable alternative to the BPRS (Manchanda et al., 1986). Equivalent symptoms to the BPRS were used to categorize patients as having 'reality distortion', 'disorganization' or 'psychomotor poverty', although obviously using far less items than available to ascertain these using the BPRS (see below).

Brief Psychiatric Rating Scale (BPRS; Overall, 1962). An 18 item scale measuring positive psychotic symptoms, general psychopathology and affective symptoms. Some items are rated by observation of the patient and others require self-reporting by the patient. Each item is rated on a seven-point scale. In addition to the 18 items of psychopathology there are two 'overview items: 'severity of illness' and 'global improvement'. It is one of the most frequently used instruments for evaluating psychopathology in patients with schizophrenia. Its psychometric properties, in terms of reliability, validity and sensitivity to change, have been studied extensively (Hedlund and Vieweg, 1980). A cut off of 4 (moderate) or above was used to define a symptom as present. The following additional variables were derived:

- BPRS total score – sum of scores on 18 items of psychopathology
- BPRS psychotic sub-score – sum of items conceptual disorganization, suspiciousness, hallucinatory behaviour, unusual thought content
- Reality distortion – score of 4 or above on any of the following: grandiosity, suspiciousness, hallucinatory behaviour, unusual thought content
- Disorganization – score of 4 or above on any of the following: conceptual disorganization, mannerisms & posturing
- Psychomotor poverty – score of 4 or above on blunted affects, or score of 3 or above on any global rating from SANS (except inattentiveness).

Comprehensive Psychopathological Rating Scale (CPRS; Asberg et al. 1978). Has 65 items covering different psychopathological phenomena, a global measure and an item covering assumed reliability. Each item is rated on a four point scale. It originated in work by the Swedish Medical Research Council to evaluate changes in psychiatric disorders with treatment (Asberg and Schalling, 1979). Good levels of inter-rater reliability have been reported (e.g. Perris et al. 1979).

Scale for the Assessment of Negative Symptoms (SANS; Andreasen, 1989). Assesses five symptom complexes to obtain ratings of negative symptoms. They are affective blunting, alogia, avolition/apathy, anhedonia/asocaility, and disturbance of attentiveness. Each of 24 items is rated on a 6 point scale, which includes five global ratings for each domain. SANS items were rated using information from patients and third parties. A person was assessed as having symptoms in the five domains if the global rating for that domain was 3 (moderate) or above. SANS global ratings were used, along with the BPRS blunted affect item, to derive a psychomotor poverty variable (see above). A SANS composite score was calculated by summing the scores for the five global rating items.

Assessment of Involuntary Movements Scale (AIMS) (Guy, 1976). This assessment instrument for tardive dyskinesia assesses abnormal involuntary movements in three body regions: orofacial movements, rated on four separate items; extremity movements, on two separate items; and trunk movements, on one item. Each item is rated on a 5-point scale (0-4), with instructions to rate the highest severity observed and to score movements that occur upon activation one less than those observed spontaneously. Three separate items score global severity, the subject's awareness, and incapacitation due to involuntary movements (each on a 5-point scale). Two additional items cover the subject's dental status, as movements in the orofacial area are more obvious in edentulous patients. Satisfactory inter-rater reliability has been demonstrated (Smith et al. 1979, Lane et al. 1985), and it is the most widely used instrument for assessing tardive dyskiniesia.

Scale for Targeting Abnormal Kinetic Effects (TAKE) (Wojcik et al. 1980). This scale assesses parkinsonism and akathisia (although only one item relates to the latter). Following an examination each of bradykinesia, rigidity, tremor, autonomic side-effects and akathisia are rated on a 5-point scale. Three global items, each also on a 5-point scale, rate overall severity, level of incapacitation and the subject's awareness.

Rating Scale for Drug-Induced Akathisia (Barnes 1989). There are four items. Three items are assessed on a four point scale: objective restlessness, subjective awareness,

subjective distress. The last item, global clinical assessment, is assessed on a 6 point scale. Owens (1999) considered it to have strong face validity, to be easy to use and to have well-defined and relevant anchor points. A score of 3 (moderate) or above on the global clinical assessment item was used to define a person as having akathisia.

Social Dysfunction and Aggression Scale (SDAS; Wistedt et al. 1990). This consists of nine items covering outward aggression and two items covering inward aggression. The time period covered was the last four weeks, and items were rated using information from patients and third parties. Each item is rated using a five point scale. The SDAS correlates well with other similar scales and inter-observer reliability has been found to be adequate. From the individual item scores on the SDAS the following additional variables were derived:

- SDAS total score
- aggression to self or others - score of 2 or above on items covering verbal, physical to objects, physical to persons, self-mutilation
- aggression to others - score of 2 or above on items covering verbal, physical to objects, physical to persons
- physical violence - score of 2 or above on items covering physical to objects, physical to persons

Camberwell Assessment of Need – Forensic Version (CANFOR; Thomas et al. 2003). This covers 25 potential needs of mentally disordered forensic patients. Each is assessed according to the patient and a member of staff in parallel, producing two assessments. For each need first there is identification of whether it is a need. If so how much help the patient gets from friends/relatives or from services is assessed, followed by an assessment of how much help the person needs from services. There is then an assessment of the patient's satisfaction with the help they receive. It helps identify areas where there are no needs, areas where there are needs but these are met, and areas where need is unmet. It has been found to have good validity and reliability (Thomas et al. 2008).

Appendix C

Baseline psychopathology and side-effect rating scale results

The tables in this appendix set out the detailed results of the psychopathology (Krawiecka, Montgomery-Asberg) and neurological side-effect (AIMS, TAKE) rating scales when they were used at baseline.

Table C1.1. Results of individual items on the Krawiecka at baseline interview (n=160).

Item	Score Mean	0 N (%)	1 N (%)	2 N (%)	3 N (%)	4 N (%)
Depression	0.79	95 (59.4)	12 (7.5)	45 (28.1)	8 (5.0)	0
Anxiety	0.56	113 (70.6)	13 (8.1)	25 (15.6)	9 (5.6)	0
Incongruity of affect	0.33	138 (86.3)	0	14 (8.8)	7 (4.4)	1 (0.6)
Flattening of affect	1.21	87 (54.4)	0	34 (20.6)	29 (18.1)	10 (6.1)
Retardation	0.26	144 (90.0)	0	8 (5.0)	6 (3.8)	2 (1.3)
Hallucinations	1.19	107 (66.9)	3 (1.9)	2 (1.3)	8 (5.0)	40 (25.0)
Delusions	2.12	70 (43.8)	0	2 (1.3)	17 (10.6)	71 (44.4)
Incoherence of speech	0.48	131 (81.9)	0	12 (7.5)	15 (9.4)	2 (1.3)
Poverty of speech/muteness	0.11	154 (96.3)	0	3 (1.9)	1 (0.6)	2 (1.3)

Possible range for each item is 0-4 with higher scores indicating more severe psychopathology.

Table C1.2. Results of the individual items on the Montgomery-Asberg scale at baseline interview (n=160).

Item	Score Mean	0 N %	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %
Apparent sadness	0.31	140	2	9	7	2	0	0
		87.5	*1.3*	*5.6*	*4.4*	*1.3*		
Reported sadness	0.86	99	10	34	10	6	1	0
		61.9	*6.3*	*21.3*	*6.3*	*3.8*	*0.6*	
Inner tension	0.66	115	6	20	16	3	0	0
		71.9	*3.8*	*12.5*	*10.0*	*1.9*		
Reduced sleep	0.31	145	1	4	3	4	3	0
		90.6	*0.6*	*2.5*	*1.9*	*2.5*	*1.9*	
Reduced appetite	0.10	153	2	2	2	1	0	0
		95.6	*1.3*	*1.3*	*1.3*	*0.6*		
Concentration difficult	1.38	83	1	31	23	21	1	0
		51.9	*0.6*	*19.4*	*14.4*	*13.1*	*0.6*	
Lassitude	1.17	84	4	44	18	9	1	0
		52.5	*2.5*	*27.5*	*11.3*	*5.6*	*0.6*	
Inability to feel	0.19	147	1	8	2	2	0	0
		91.9	*0.6*	*5.0*	*1.3*	*1.3*		
Pessimistic thoughts	0.39	131	3	20	5	1	0	0
		81.9	*1.9*	*12.5*	*3.1*	*0.6*		
Suicidal thoughts	0.48	129	1	19	6	5	0	0
		80.6	*0.6*	*11.9*	*3.8*	*3.1*		

Possible range for each item is 0-6 (higher scores indicating greater disability)

Table C1.3. Results of individual AIMS items at baseline interview (n=160).

Item	Score Mean	0 N %	1 N %	2 N %	3 N %	4 N %
Muscles of facial expression	0.00	160	0	0	0	0
		100				
Lips and perioral area	0.00	160	0	0	0	0
		100				
Jaw	0.19	145	2	10	3	0
		90.6	*1.3*	*6.3*	*1.9*	
Tongue	0.51	128	8	7	9	8
		80.0	*5.0*	*4.4*	*5.6*	*5.0*
Upper limbs	0.31	142	0	5	13	0
		88.8		*3.1*	*8.1*	
Lower limbs	0.00	160	0	0	0	0
		100				
Neck, shoulders, hips	0.03	158	0	1	1	0
		98.8		*0.6*	*0.6*	
Severity of abnormal movements	0.61	112	12	23	13	0
		70.0	*7.5*	*14.4*	*8.1*	
Incapacity by abnormal movements	0.30	125	22	13	0	0
		78.1	*13.8*	*8.1*		
Awareness of abnormal movements	0.09	149	7	4	0	0
		93.1	*4.4*	*2.5*		

Possible range for each item is 0-4 (higher scores indicating greater disability)

Table C1.4. Results of individual TAKE items at baseline interview (n=160).

Item	Score Mean	0 N %	1 N %	2 N %	3 N %	4 N %
Bradykinesia	1.25	80	3	34	43	0
		50.0	*1.9*	*21.3*	*26.9*	
Rigidity	0.50	125	4	17	14	0
		78.1	*2.5*	*10.6*	*8.8*	
Tremor	1.78	47	5	51	51	6
		29.4	*3.1*	*31.9*	*31.9*	*3.8*
Autonomic side-effects	0.82	100	6	38	15	1
		62.5	*3.8*	*23.8*	*9.4*	*0.6*
Akathisia	1.26	71	6	54	28	1
		44.4	*3.8*	*33.8*	*17.5*	*0.6*
Overall severity of side-effects	1.83	13	34	80	33	0
		8.1	*21.3*	*50.0*	*20.6*	
Incapacitation by side-effects	0.91	51	77	27	5	0
		31.9	*48.1*	*16.9*	*3.1*	
Awareness of side effects	0.58	83	62	14	1	0
		51.9	*38.8*	*8.8*	*0.6*	

Possible range for each item is 0-4 (higher scores indicating greater disability)

Appendix D

Follow-up SDAS interviews

Tables D1 and D2 show the results of the first and second follow-up SDAS interview assessments.

Table D1. First follow-up SDAS item scores (n=127).

Item	Score Mean	0 N %	1 N %	2 N %	3 N %	4 N %
Irritability	1.10	62	18	23	20	4
		48.8	*14.2*	*18.1*	*15.7*	*3.1*
Negativism / uncooperative	0.69	81	18	20	6	3
		63.3	*14.1*	*15.6*	*4.7*	*2.3*
Dysphoric mood	1.25	46	30	30	15	6
		36.2	*23.6*	*23.6*	*11.8*	*4.7*
Socially disturbing / provocative	0.51	97	8	13	5	4
		57.4	*4.7*	*7.7*	*3.0*	*2.4*
Non-directed verbal / vocal	0.43	105	1	12	6	3
		82.7	*0.8*	*9.4*	*4.7*	*2.4*
Directed verbal / vocal	0.79	86	5	21	7	8
		67.7	*3.9*	*16.5*	*5.5*	*6.3*
Physical towards things	0.17	121	0	1	0	5
		95.3		*0.8*		*3.9*
Physical towards staff	0.13	120	2	1	3	1
		94.5	*1.6*	*0.8*	*2.4*	*0.8*
Physical towards others than staff	0.16	120	1	0	5	1
		94.5	*0.8*		*3.9*	*0.8*
Self-mutilation	0.12	121	0	4	1	1
		95.3		*3.1*	*0.8*	*0.8*

Table D2. Second follow-up SDAS item scores (n=128).

Item	Score Mean	0 N %	1 N %	2 N %	3 N %	4 N %
Irritability	1.42	35	37	33	14	9
		27.4	*28.9*	*25.8*	*10.9*	*7.0*
Negativism / uncooperative	0.74	68	35	16	8	1
		53.1	*27.3*	*12.5*	*6.3*	*0.8*
Dysphoric mood	1.23	47	33	27	13	8
		36.7	*25.8*	*21.1*	*10.2*	*6.3*
Socially disturbing / provocative	0.55	94	13	10	7	4
		73.4	*10.2*	*7.8*	*5.5*	*3.1*
Non-directed verbal / vocal	0.54	93	15	8	10	2
		72.7	*11.7*	*6.3*	*7.8*	*1.6*
Directed verbal / vocal	0.76	92	4	13	9	10
		71.9	*3.1*	*10.2*	*7.0*	*7.8*
Physical towards things	0.20	118	1	3	5	1
		92.2	*0.8*	*2.3*	*3.9*	*0.8*
Physical towards staff	0.22	117	2	1	8	0
		91.4	*1.6*	*0.8*	*6.3*	
Physical towards others than staff	0.17	119	1	1	6	0
		93.7	*0.8*	*0.8*	*4.7*	
Self-mutilation	0.05	125	0	0	2	0
		98.4			*1.6*	

Appendix E
Follow-up psychopathology and side-effect rating scale results

The tables in this appendix set out the detailed results of the follow-up psychopathology rating scales (Krawiecka, BPRS, SANS) and neurological side-effects rating scales (AIMS, TAKE, Barnes) assessed at interview in 2000-1 and 2001-2.

Table E1. First follow-up Krawiecka scale item scores (n=104).

Item	Score Mean	0 N %	1 N %	2 N %	3 N %	4 N %
Depression	0.31	79	16	8	0	0
		76.7	*15.5*	*7.8*		
Anxiety	0.62	68	9	18	6	0
		67.3	*8.9*	*17.8*	*5.9*	
Flattening / incongruity of affect	1.74	24	18	31	25	7
		22.9	*17.1*	*29.5*	*23.8*	*6.7*
Retardation	0.83	57	19	17	8	2
		55.3	*18.4*	*16.5*	*7.8*	*1.9*
Hallucinations	0.90	76	2	2	5	18
		73.8	*1.9*	*1.9*	*4.9*	*17.5*
Delusions	1.48	51	12	10	2	29
		49.0	*11.5*	*9.6*	*1.9*	*27.9*
Incoherence of speech	0.40	82	10	5	6	1
		78.8	*9.6*	*4.8*	*5.8*	*1.0*
Poverty of speech/ muteness	0.50	79	9	10	8	0
		74.5	*8.5*	*9.4*	*7.7*	

Table E2. Second follow-up Krawiecka scale item scores (n=97).

Item	Score Mean	0 N %	1 N %	2 N %	3 N %	4 N %
Depression	0.38	70	17	8	1	0
		72.9	*17.7*	*8.3*	*1.0*	
Anxiety	0.49	66	14	15	1	0
		68.8	*14.6*	*15.6*	*1.0*	
Flattening / incongruity of affect	2.09	13	8	37	35	4
		13.4	*8.2*	*38.1*	*36.1*	*4.1*
Retardation	0.61	61	14	16	4	0
		64.2	*14.7*	*16.8*	*4.2*	
Hallucinations	1.09	65	4	0	10	18
		67.0	*4.1*		*10.3*	*18.6*
Delusions	1.53	46	12	7	3	28
		47.9	*12.5*	*7.3*	*3.1*	*29.2*
Incoherence of speech	0.51	79	3	4	6	5
		81.4	*3.1*	*4.1*	*6.2*	*5.2*
Poverty of speech/ muteness	0.47	73	9	10	4	1
		75.2	*9.3*	*10.3*	*4.1*	*1.0*

Table E3. First follow-up BPRS item scores (n=108).

Item	Score Mean	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Somatic concern	1.74	72	7	14	6	2	2	1
		69.2	6.7	13.5	5.8	1.9	1.9	1.0
Anxiety	1.68	71	10	11	10	1	1	0
		68.3	*9.6*	*10.6*	*9.6*	*1.0*	*1.0*	
Emotional withdrawal	1.95	68	11	14	7	6	3	1
		61.8	*10.0*	*12.7*	*6.4*	*5.5*	2.7	0.9
Conceptual disorganisation	1.54	86	4	111	2	3	3	0
		78.9	*3.7*	*10.1*	*1.8*	*2.8*	*2.8*	
Guilt feelings	1.17	94	7	4	1	0	0	0
		88.7	*6.6*	*3.8*	*0.9*			
Tension	1.40	84	14	10	0	1	0	1
		76.4	*12.7*	*9.1*		*0.9*		0.9
Mannerisms & posturing	1.44	84	8	9	6	1	0	0
		77.8	*7.4*	*8.3*	*5.6*	*0.9*		
Grandiosity	1.37	93	4	5	0	5	0	1
		86.1	*3.7*	*4.6*		*4.6*		0.9
Depressive mood	1.38	84	10	11	3	0	0	0
		77.8	*9.3*	*10.2*	*2.8*			
Hostility	1.79	72	12	12	13	2	1	0
		64.3	*10.7*	*10.7*	*11.6*	*1.8*	0.9	
Suspiciousness	2.47	*59*	*9*	*8*	*9*	*5*	12	4
		55.7	*8.5*	*7.5*	*8.5*	*4.7*	11.3	3.8
Hallucinatory behaviour	2.04	*81*	*3*	*2*	*7*	*6*	4	7
		73.6	*2.7*	*1.8*	*6.4*	*5.5*	3.6	6.4
Motor retardation	1.93	*63*	*15*	*15*	*12*	*4*	1	0
		57.3	*13.6*	*13.6*	*10.9*	*3.6*	0.9	
Uncooperativeness	1.74	*85*	*8*	*5*	*5*	*2*	0	7
		75.9	*7.1*	*4.5*	*4.5*	*1.8*		6.3
Unusual thought content	2.44	*64*	*8*	*4*	*4*	*16*	9	3
		59.3	*7.4*	*3.7*	*3.7*	*14.8*	8.3	2.8
Blunted affect	3.17	*29*	*11*	*26*	*15*	*17*	6	5
		26.6	*10.1*	*23.9*	*13.8*	*15.6*	5.5	4.6
Excitement	1.28	*89*	*3*	*8*	*2*	*1*	0	0
		86.4	*2.9*	*7.8*	*1.9*	*1.0*		
Disorientation	1.33	*84*	*7*	*5*	*4*	*1*	0	0
		83.2	*6.9*	*5.0*	*4.0*	*1.0*		
Severity of illness	3.29	*27*	*25*	*11*	*7*	*16*	13	8
		25.2	*23.4*	*10.3*	*6.5*	*15.0*	12.1	7.5

Table E4. Second follow-up BPRS item scores (n=94).

Item	Score Mean	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Somatic concern	1.83	57	13	13	7	2	2	0
		60.6	13.8	13.8	7.4	2.1	2.1	
Anxiety	1.62	62	13	13	5	1	0	0
		66.0	*13.8*	*13.8*	*5.3*	*1.1*		
Emotional withdrawal	2.12	46	12	21	10	4	1	0
		48.9	*12.8*	*22.3*	*10.6*	*4.3*	1.1	
Conceptual disorganisation	1.83	71	6	4	3	5	5	0
		75.6	*6.4*	*4.3*	*3.2*	*5.3*	*5.3*	
Guilt feelings	1.29	76	11	5	2	0	0	0
		80.9	*11.7*	*5.3*	*2.1*			
Tension	1.16	83	7	4	0	0	0	0
		88.3	*7.4*	*4.3*				
Mannerisms & posturing	1.52	70	7	9	5	2	0	0
		75.3	*7.5*	*9.7*	*5.4*	*2.2*		
Grandiosity	1.96	69	4	2	4	6	8	1
		73.4	*4.3*	*2.1*	*4.3*	*6.4*	*8.5*	*1.1*
Depressive mood	1.59	66	9	14	4	0	0	1
		70.2	*9.6*	*14.9*	*4.3*			*1.1*
Hostility	1.48	67	11	13	0	2	0	0
		72.0	*11.8*	*14. 0*		*2.2*		
Suspiciousness	2.56	49	7	12	5	7	11	3
		52.1	*7.4*	*12.8*	*5.3*	*7.4*	11.7	3.2
Hallucinatory behaviour	2.06	64	6	3	7	5	7	2
		68.1	*6.4*	*3.2*	*7.4*	*5.3*	7.4	2.1
Motor retardation	1.76	56	13	20	3	1	1	0
		59.6	*13.8*	*21.3*	*3.2*	1.1	1,1	
Uncooperativeness	1.40	71	11	8	2	1	0	0
		76.3	*11.8*	*8.6*	*2.2*	*1.1*		
Unusual thought content	2.68	48	13	4	3	5	18	3
		51.1	*13.8*	*4.3*	*3.2*	*5.3*	19.1	3.2
Blunted affect	3.45	11	8	29	24	18	4	0
		11.7	*8.5*	*30.9*	*25.5*	*19.1*	*4.3*	
Excitement	1.13	84	4	4	0	0	0	0
		91.3	*4.3*	*4.3*				
Disorientation	1.29	77	9	4	2	1	0	0
		82.8	*9.7*	*4.3*	*2.2*	*1.1*		
Severity of illness	3.29	20	20	19	10	6	11	8
		21.3	*21.3*	*20.2*	*10.6*	*6.4*	*11.7*	*8.5*

Table E5. First follow-up SANS item scores (n=129).

Item	Score Mean	0 N %	1 N %	2 N %	3 N %	4 N %	5 N %
Unchanging facial expression	2.63	**20**	**8**	**19**	**29**	**33**	**9**
		16.9	*6.8*	*16.1*	*24.6*	*28.0*	*7.6*
Decreased spontaneous movements	1.66	**42**	**16**	**20**	**15**	**17**	**4**
		36.8	*14.0*	*17.5*	*13.2*	*14.9*	*3.5*
Paucity of expressive gestures	2.10	**43**	**12**	**7**	**19**	**14**	**21**
		37.1	*10.3*	*6.0*	*16.4*	*12.1*	18.1
Poor eye contact	0.74	**84**	**7**	**8**	**9**	**4**	**4**
		72.4	*6.0*	*6.9*	*7.8*	*3.4*	*3.4*
Affective non-reactivity	2.03	**38**	**16**	**11**	**20**	**24**	**9**
		32.2	*13.6*	*9.3*	*16.9*	*20.3*	*7.6*
Lack of vocal inflections	2.38	**22**	**18**	**25**	**12**	**28**	**13**
		18.6	*15.3*	*21.2*	*10.2*	*23.7*	*11.0*
Global rating of affective flattening	**2.20**	**23**	**24**	**20**	**17**	**25**	**9**
		19.5	***20.3***	***16.9***	***14.4***	***21.2***	***7.6***
Poverty of speech	0.67	**93**	**5**	**9**	**2**	**12**	**1**
		76.2	*4.1*	*7.4*	*1.6*	*9.8*	*0.8*
Poverty of content of speech	0.67	**91**	**4**	**7**	**6**	**7**	**3**
		77.1	*3.4*	*5.9*	*5.1*	*5.9*	*2.5*
Blocking	0.08	**109**	**9**	**0**	**0**	**0**	**0**
		92.4	*7.6*				
Increased latency of response	0.57	**91**	**6**	**7**	**13**	**1**	**1**
		76.5	*5.0*	*5.9*	*10.9*	*0.8*	0.8
Global rating of alogia	**0.89**	**78**	**14**	**8**	**10**	**12**	**0**
		63.9	***11.5***	***6.6***	***8.2***	***9.8***	
Grooming and hygiene	1.37	**63**	**12**	**19**	**18**	**12**	**5**
		48.8	*9.3*	*14.7*	*14.0*	9.3	3.9
Impersistence at work	1.51	**68**	**10**	**12**	**10**	**14**	**15**
		52.7	*7.8*	*9.3*	*7.8*	*10.9*	*11.6*
Physical anergia	1.88	**50**	**13**	**12**	**24**	**17**	**13**
		38.8	*10.1*	*9.3*	*18.6*	*13.2*	10.1
Global rating of avolition-apathy	**1.73**	**39**	**28**	**24**	**11**	**21**	**6**
		30.2	***21.7***	***18.6***	***8.5***	***16.3***	***4.7***
Recreational interests & activities	1.74	**47**	**15**	**22**	**22**	**16**	**7**
		36.4	*11.6*	*17.1*	*17.1*	*12.4*	*5.4*
Sexual interest and activity	1.51	**73**	**6**	**4**	**7**	**18**	**16**
		58.9	*4.8*	*3.2*	*5.6*	*15.5*	*12.9*
Ability to feel intimacy & closeness	1.69	**58**	**13**	**11**	**12**	**25**	**9**
		45.3	*10.2*	*8.6*	*9.4*	*19.5*	*7.0*
Relationships with friends & peers	2.25	**44**	**16**	**7**	**17**	**16**	**29**
		34.1	*12.4*	*5.4*	*13.2*	*12.4*	*22.5*
Global rating of anhedonia-asociality	**2.04**	**33**	**21**	**21**	**24**	**22**	**8**
		25.6	***16.3***	***16.3***	***18.6***	***17.1***	***6.2***
Social inattentiveness	1.24	**74**	**9**	**10**	**14**	**14**	**6**
		58.3	*7.1*	*7.9*	*11.0*	*11.0*	*4.7*
Inattentiveness during MSE	2.00	**34**	**13**	**13**	**12**	**9**	**17**
		34.7	*13.3*	*13.3*	*12.2*	*9.2*	*17.3*
Global rating of inattentiveness	**1.55**	**49**	**18**	**14**	**20**	**15**	**4**
		40.8	***15.0***	***11.7***	***16.7***	***12.5***	***3.3***

Table E6. Second follow-up SANS item scores (n=128).

Item	Score Mean	0 N %	1 N %	2 N %	3 N %	4 N %	5 N %
Unchanging facial expression	2.41	**19**	**11**	**31**	**26**	**22**	**9**
		16.1	*9.3*	*26.3*	*22.0*	*18.6*	*7.6*
Decreased spontaneous movements	1.37	**48**	**19**	**20**	**11**	**12**	**3**
		42.5	*16.8*	*17.7*	*9.7*	*10.6*	*2.7*
Paucity of expressive gestures	1.86	**42**	**11**	**17**	**13**	**17**	**11**
		37.8	*9.9*	*15.3*	*11.7*	*15.3*	9.9
Poor eye contact	1.18	**55**	**18**	**23**	**8**	**7**	**4**
		47.8	*15.7*	*20.0*	*7.0*	*6.1*	*3.5*
Affective non-reactivity	1.98	**30**	**18**	**23**	**28**	**19**	**3**
		24.8	*14.9*	*19.0*	*23.1*	*15.7*	*2.5*
Lack of vocal inflections	2.09	**25**	**7**	**40**	**21**	**20**	**2**
		21.7	*6.1*	*34.8*	*18.3*	*17.4*	*1.7*
Global rating of affective flattening	**2.14**	**23**	**18**	**35**	**24**	**18**	**7**
		18.4	***14.4***	***28.0***	***19.2***	***14.4***	***5.6***
Poverty of speech	0.77	**90**	**7**	**11**	**9**	**8**	**2**
		70.9	*5.5*	*8.7*	*7.1*	*6.3*	*1.6*
Poverty of content of speech	0.52	**98**	**9**	**4**	**6**	**6**	**1**
		79.0	*7.3*	*3.2*	*4.8*	*4.8*	*0.8*
Blocking	0.02	**92**	**2**	**0**	**0**	**0**	**0**
		97.9	*2.1*				
Increased latency of response	0.56	**67**	**12**	**8**	**7**	**1**	**0**
		70.5	*12.6*	*8.4*	*7.4*	*1.1*	
Global rating of alogia	**0.77**	**83**	**13**	**13**	**14**	**3**	**1**
		65.4	***10.2***	***10.2***	***11.0***	***2.4***	**0.8**
Grooming and hygiene	1.38	**56**	**10**	**30**	**22**	**10**	**0**
		43.8	*7.8*	*23.4*	*17.2*	7.8	
Impersistence at work	1.80	**48**	**15**	**19**	**13**	**14**	**15**
		38.7	*12.1*	*15.3*	*10.5*	*11.3*	*12.1*
Physical anergia	1.96	**28**	**23**	**35**	**15**	**22**	**5**
		21.9	*18.0*	*27.3*	*11.7*	*17.2*	3.9
Global rating of avolition-apathy	**1.96**	**24**	**26**	**36**	**19**	**19**	**4**
		18.8	***20.3***	***28.1***	***14.8***	***14.8***	***3.1***
Recreational interests & activities	1.96	**29**	**18**	**36**	**27**	**10**	**8**
		22.7	*14.1*	*28.1*	*21.1*	*7.8*	*6.3*
Sexual interest and activity	0.54	**90**	**7**	**5**	**9**	**2**	**2**
		78.3	*6.1*	*4.3*	*7.8*	*1.7*	*1.7*
Ability to feel intimacy & closeness	2.16	**35**	**17**	**23**	**18**	**16**	**19**
		27.3	*13.3*	*18.0*	*14.1*	*12.5*	*14.8*
Relationships with friends & peers	2.73	**18**	**14**	**26**	**21**	**25**	**24**
		14.1	*10.9*	*20.3*	*16.4*	*19.5*	*18.8*
Global rating of anhedonia-asociality	**2.43**	**12**	**24**	**33**	**27**	**20**	**12**
		9.4	***18.8***	***25.8***	***21.1***	***15.6***	***9.4***
Social inattentiveness	1.04	**67**	**18**	**23**	**12**	**7**	**1**
		52.3	*14.1*	*18.0*	*9.4*	*5.5*	*0.8*
Inattentiveness during MSE	1.64	**30**	**20**	**10**	**16**	**7**	**6**
		33.7	*22.5*	*11.2*	*18.0*	*7.9*	*6.7*
Global rating of inattentiveness	**1.31**	**53**	**24**	**23**	**18**	**10**	**1**
		41.1	***18.6***	***17.8***	***14.0***	***7.8***	***0.8***

Table E7. First follow-up results of individual AIMS items (n=103).

Item	Score Mean	0 N %	1 N %	2 N %	3 N %	4 N %
Muscles of facial expression	0.11	99	0	1	3	0
		96.1		*1.0*	*2.9*	
Lips and perioral area	0.09	98	1	4	0	0
		95.1	*1.0*	*3.9*		
Jaw	0.05	101	0	1	1	0
		98.1	*1.0*	*1.0*		
Tongue	0.09	100	1	2	0	1
		96.2	*1.0*	*1.9*		*1.0*
Upper limbs	0.08	99	0	4	0	0
		96.1		*3.9*		
Lower limbs	0.02	102	0	1	0	0
		99.0		*1.0*		
Neck, shoulders, hips	0.01	102	1	0	0	0
		99.0	*1.0*			
Severity of abnormal movements	0.17	92	6	4	1	0
		89.3	*5.8*	*3.9*	*1.0*	
Incapacity by abnormal movements	0.05	99	5	0	0	0
		95.2	*4.8*			
Awareness of abnormal movements	0.03	100	3	0	0	0
		97.1	*2.9*			

Possible range for each item is 0-4 (higher scores indicating greater disability)

Table E8. Second follow-up results of individual AIMS items (n=91).

Item	Score Mean	0 N %	1 N %	2 N %	3 N %	4 N %
Muscles of facial expression	0.09	85	3	1	1	0
		94.4	*3.3*	*1.1*	*1.1*	
Lips and perioral area	1.00	86	0	3	1	0
		95.6		*3.3*	*1.1*	
Jaw	0.01	89	1	0	0	0
		98.9	*1.1*			
Tongue	0.17	81	3	3	2	0
		91.0	*3.4*	*3.4*	*2.2*	
Upper limbs	0.03	87	3	0	0	0
		96.7	*3.3*			
Lower limbs	0.00	91	0	0	0	0
		100				
Neck, shoulders, hips	0.04	89	0	2	0	0
		97.8		*2.2*		
Severity of abnormal movements	0.21	79	4	6	1	0
		87.8	*4.4*	*6.7*	*1.1*	
Incapacity by abnormal movements	0.03	85	1	1	0	0
		97.7	*1.1*	*1.1*		
Awareness of abnormal movements	0.02	85	0	1	0	0
		98.8		*1.2*		

Possible range for each item is 0-4 (higher scores indicating greater disability)

Table E9. First follow-up results of individual TAKE items (n=95)

Item	Score Mean	0 N %	1 N %	2 N %	3 N %	4 N %
Bradykinesia	0.55	62	17	13	3	0
		65.3	*17.9*	*13.7*	*3.2*	
Rigidity	0.23	79	10	6	0	0
		83.2	*10.5*	*6.3*		
Tremor	0.40	74	10	5	6	0
		77.9	*10.5*	*5.3*	*6.3*	
Autonomic side-effects	0.04	93	0	2	0	0
		97.9		*2.1*		
Akathisia	0.48	73	4	12	6	0
		76.8	*4.2*	*12.6*	*6.3*	
Overall severity of side-effects	0.47	67	13	13	2	0
		70.5	*13.7*	*13.7*	*2.1*	
Incapacitation by side-effects	0.31	74	13	8	0	0
		77.9	*13.7*	*8.4*		
Awareness of side effects	0.32	75	11	8	1	0
		78.9	*11.6*	*8.4*	*1.1*	

Possible range for each item is 0-4 (higher scores indicating greater disability)

Table E10. Second follow-up results of individual TAKE items (n=91)

Item	Score Mean	0 N %	1 N %	2 N %	3 N %	4 N %
Bradykinesia	0.93	44	15	26	6	0
		48.4	*16.5*	*28.6*	*6.6*	
Rigidity	0.38	67	11	10	1	0
		75.3	*12.4*	*11.2*	*1.1*	
Tremor	0.49	60	19	10	2	0
		65.9	*20.9*	*11.0*	*2.2*	
Autonomic side-effects	0.21	76	7	6	0	0
		85.4	*7.9*	*6.7*		
Akathisia	0.42	67	11	12	1	0
		73.6	*12.1*	*13.2*	*1.1*	
Overall severity of side-effects	0.93	40	20	26	4	0
		44.4	*22.2*	*28.9*	*4.4*	
Incapacitation by side-effects	0.30	68	14	6	0	0
		77.3	*15.9*	*6.8*		
Awareness of side effects	0.47	59	18	10	1	0
		67	*20.5*	*11.4*	*1.1*	

Possible range for each item is 0-4 (higher scores indicating greater disability)

Table E11. First follow-up results of individual Barnes akathisia scale items (n=96).

Item	Score Mean	0 N %	1 N %	2 N %	3 N %	4 N %	5 N %
Objective	0.10	89	4	3	0		
		92.7	*4.2*	*3.1*			
Subjective: Aware of restlessness	0.48	70	6	20	0		
		72.9	*6.3*	*20.8*			
Subjective: Distress related to restlessness	0.16	84	9	3	0		
		87.5	*9.4*	*3.1*			
Global clinical assessment of akahisia	0.53	71	6	12	7	0	0
		74.0	*6.3*	*12.5*	*7.3*		

Possible range for each item is 0-3 (higher scores indicating greater disability) except global clinical assessment with range of 0-5.

Appendix F
Comparison of neurological side-effects at baseline and follow-up

Table F sets out a comparison of individual items of the AIMS and TAKE, assessing levels of tardive dyskinesis, parkinsonism and akathisia, at baseline and follow-up.

Table F. Paired samples t-test comparing scores on AIMS (tardive dyskinesia) and TAKE (parkinsonism and akathisia) items at baseline and follow-up interviews.

Item	N	Baseline mean score on item	Follow-up mean score on item	t	P
AIMS severity	107	0.69	0.21	4.46	0.000
AIMS incapacitation	104	0.35	0.03	4.92	0.000
AIMS awareness	103	0.09	0.02	1.83	0.071
TAKE bradykinesia	104	1.33	0.88	3.21	0.002
TAKE rigidity	102	1.03	0.73	1.57	0.121
TAKE tremor	104	1.77	0.50	9.06	0.000
TAKE autonomic	102	0.91	0.21	5.38	0.000
TAKE akathisia	104	1.29	0.44	6.05	0.000
TAKE severity	103	1.88	0.88	8.73	0.000
TAKE incapacitation	101	0.90	0.30	6.70	0.000
TAKE awareness	101	0.60	0.47	1.62	0.109