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Type of Discharge and Risk of Recidivism Measured by the HCR-20: A Retrospective Study in a Dutch Sample of Treated Forensic Psychiatric Patients

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This retrospective study examined the predictive validity of the HCR-20, a violence risk assessment instrument. The HCR-20 as well as the Psychopathy Checklist-Revised (PCL-R) were coded on the basis of file information of 120 patients discharged from a Dutch forensic psychiatric hospital between 1993 and 1999 (average follow-up period 72.5 months). The patients were divided into four groups according to type of discharge: 1) discharge by the court in line with the hospital staff's advice and after a transmural phase; 2) discharge by the court in line with the hospital staff's advice, but without a preceding transmural phase; 3) discharge by the court against the hospital staff's advice; and 4) readmission to another institution. Recidivism data (reconvictions) from the Ministry of Justice were related to the risk assessments. The base rate for violent recidivism was 36%, and 52% for general recidivism. The HCR-20 and PCL-R total scores demonstrated good predictive validity for violent recidivism (AUC = .82 and .75, respectively). The HCR-20 was a significantly better predictor of violent recidivism than unstructured clinical judgment stated in hospital staff's advice to the court. In addition, the HCR-20 total score predicted significantly better than the PCL-R total score, although the difference in AUC values was no longer significant when the item 'Psychopathy' was removed from the HCR-20 total score.

When is a forensic psychiatric patient ready to leave the secured institution without posing a serious risk to society? In The Netherlands, society is regularly confronted with serious violent recidivism by forensic psychiatric patients during probationary leave or after discharge (Hilterman, 2001). Violent (re)offending by patients who are admitted under a judicial order causes strong feelings of fear, anger, and concern in society. A carefully conducted risk assessment before a probationary leave, parole decision, or termination of (mandatory) treatment can help to appraise the risk of recidivism in an adequate way and thereby prevent serious violent offenses (Douglas & Webster, 1999). To date, the most widely used method in forensic practice, at least in The Netherlands, is the unstructured clinical judgment approach that is exclusively based on the professional expertise of the clinician. However, research has revealed some important limitations of this unstructured clinical judgment, such as poor reliability and validity (Monahan, 1981; for a discussion of these limitations see Quinsey, Harris, Rice, & Cormier, 1998, pp. 55-72). Although more recent studies have demonstrated clinical accuracy to be significantly better than chance, unstructured clinical judgment is liable to systematic biases. For example, clinicians were found to be accurate in predicting risk of recidivism in male cases with a violent history, but they underestimated the risk of violence in female psychiatric patients and over-

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estimated the risk of violence in nonwhite men (Lidz, Mulvey, & Gardner, 1993; McNiel & Binder, 1995).[1] Therefore, several authors have recommended employing structured risk assessment procedures in order to optimize accuracy and validity (Borum, 1996; Webster, Douglas, Eaves, & Hart, 1997a).

A risk assessment instrument that has drawn considerable international attention is the Historical, Clinical, Risk Management-20 (HCR-20; Webster, Douglas, Eaves, & Hart, 1997b). The HCR-20 is a checklist consistent with a structured professional judgment (SPJ) approach, and consists of 20 items representing risk factors for violence in the past (Historical scale), present (Clinical scale) and future (Risk management scale). Research in various psychiatric and forensic settings in different countries has demonstrated good interrater reliability and predictive validity for the HCR-20 (Douglas and Weir, 2003). For instance, Douglas, Ogloff and Hart (2003) found good predictive validity for the HCR-20 in a sample of 100 forensic psychiatric patients. Moreover, they demonstrated that the SPJ final risk judgments added incremental validity to the HCR-20 used in an actuarial sense.

The way a forensic psychiatric patient leaves a treatment institution inevitably impacts on the risk of recidivism. Research suggests that involuntary outpatient commitment following residential treatment or a resocialization period in which the patient is supervised by probation officers, results in less recidivism (Niemantsverdriet, 1993; Swanson et al., 2000). In The Netherlands, the transmural phase – a resocialization phase in which the patient lives outside the secure forensic hospital, but is still supervised and treated by staff from the hospital – is gaining in popularity. The rationale behind this form of treatment is that patients are gradually and thoroughly prepared for their return to society resulting in better integration and less relapse in violent behavior. Since 1991, patients involuntarily admitted to the Dr. Henri van der Hoeven Kliniek, a Dutch forensic psychiatric hospital, can be discharged after having passed this transmural treatment phase. Although the clinical experiences with this form of treatment are positive, no systematic research examining the relationship between transmural treatment and (the risk of) recidivism has been conducted thus far.

In this article, we present findings from a retrospective study on the interrater reliability and predictive validity of the HCR-20 in a group of patients who were discharged between 1993 and 1999 from the Dr. Henri van der Hoeven Kliniek. Most of the patients in this forensic psychiatric hospital were admitted under the judicial order *terbeschikkingstelling* (tbs) which is translated as 'disposal to be treated on behalf of the state'. The tbs-order is imposed by the court on offenders who committed a serious offense and are considered to have diminished responsibility for it because of severe psychopathology. According to the Dutch Criminal Code, the court has to re-evaluate the patient every one or two years (the latter period being set by the previous sentence) to determine whether the risk of recidivism is still too high and treatment needs to be continued. At these annual/biannual reviews, the hospital has to provide the court with a detailed description and evaluation of a patient's treatment and a judgment about the risk of recidivism. The decision to terminate the tbs-order can only be made by the court. We compared (the risk of) recidivism between four groups of offenders who are categorized according to their type of discharge: 1) discharge by the court in line with the hospital staff's advice and after a transmural phase; 2) discharge by the court in line with the hospital staff's advice, but without a preceding transmural phase; 3) discharge by the court against the hospital staff's advice, with or without a transmural phase; and 4) readmission to another secure institution. These types of discharge reflect different *un-structured* clinical judgments. Discharge in line with the hospital staff's advice after a transmural phase reflects the lowest judgment of risk, readmission to another secure institution is considered the highest level of risk. Patients who are readmitted to another secure forensic hospital have generally exhibited severe disruptive behavior (e.g., escape, aggressive incidents), which could not be managed by hospital staff by other means (e.g., medication, highly structured/individualized treatment).

The main objective of the present study was to determine the value of the HCR-20 in the prediction of violence in Dutch forensic psychiatric patients and

[1] For a detailed discussion of the clinical-actuarial controversy, see the reviews of Douglas, Cox, & Webster (1999) and Litwack (2001).

to identify differences in (risk of) recidivism between the four groups. We hypothesized that patients who were discharged after a successful transmural phase will recidivate less compared to patients in the other three groups because of a solid preparation before return to society. In this way, it is possible to retrospectively examine if there is a significant association between actual recidivism and the hospital staff's perceived risk of recidivism as stated in the advice to the court. We employed the Psychopathy Checklist-Revised (PCL-R; Hare, 1991), because psychopathy is one of the important historical risk factors in the HCR-20, and also examined its predictive validity.

METHOD

Setting

This study was conducted in the Dr. Henri van der Hoeven Kliniek, a Dutch forensic psychiatric hospital with 100 inpatient beds and 30 transmural places in Utrecht, a city with 265.000 inhabitants in the center of The Netherlands. This hospital was founded in 1955 and is one of 13 forensic psychiatric institutions in The Netherlands. The hospital admits both men and women and provides a variety of treatment activities, for instance, job training, education, sports, creative arts, and psychotherapy. The treatment model of the hospital is cognitive-behavioral with an emphasis on relapse prevention and 'no cure but control' (Laws, Hudson, & Ward, 2000). The emphasis of treatment is not on changing the personality of the offender, but on reducing/managing risk factors for recidivism. During intramural treatment, patients can gradually gain more liberties. When staff considers a patient prepared, he or she can apply for supervised leaves, and subsequently for unsupervised leaves. Ideally, these gradual expansions of freedom finally result in a resocialisation phase (see below).

Different Types of Discharge

In 1991, a new form of resocialization, the transmural treatment phase, was initiated at the hospital. Before 1991, patients were usually discharged after a probationary leave in which they were supervised by probation officers. However, for most patients the change from intramural treatment to probationary leave was too abrupt because of discontinuity in care. The goal of the new transmural treatment is to allow patients a gradual adjustment to society. The hospital has purchased and rented several houses in the city of Utrecht and also established a collaborative agreement with a sheltered housing organization. During the transmural phase, the patient lives outside the hospital, but is still treated and supervised by a specialized team from the hospital, sometimes in collaboration with staff from the sheltered housing organization. The task of this specialized team, which has regular contacts with the patient, is to supervise the patient and to be attentive to possible precursors of criminal or violent relapse. With the team's help, the patient can practice living on his own, learn to resist temptations, build a social network and leisure activities, and apply the insights and skills from the relapse prevention plan that was made during psychotherapy in the hospital.

Every one or two years, the court decides to terminate or prolong the tbs-order. There are two possibilities: discharge in line with the hospital staff's advice or discharge against the hospital staff's advice. Patients can be discharged after having passed the transmural phase or probation period or directly from the hospital without a resocialization phase. One reason for the court to terminate the tbs-order against the hospital staff's advice is the principle of proportionality, in which the court then considers the duration of treatment no longer reasonable and/or compatible with the (maximum) length of imprisonment applicable to the index offense committed. Another reason may be that the judges do not agree with the hospital staff's appraisal of the recidivism risk of the patient. The fourth type of discharge occurs if the hospital decides to ask the Ministry of Justice for a readmission to another forensic institution. This usually takes place in cases of severe disruptive incidents and when the relationship between the patient and hospital staff is disturbed to such an extent that a positive effect of further treatment is considered highly unlikely. It should be noted that most of the patients in this latter group suffer from severe personality disorders, not merely from Axis I disorders such as schizophrenia.

In the present study, we identified four types of discharge:

1. *Transmural*. The patient was discharged by the court in line with the hospital staff's advice, and after the patient has passed the transmural phase;
2. *Conform*. The patient was discharged by the court in line with the hospital staff's advice, without a preceding transmural phase;
3. *Contrary*. The patient was discharged by the court against the hospital staff's advice, some with a transmural phase;
4. *Readmission.* The treatment is not terminated, instead the patient is readmitted to another forensic psychiatric hospital or to a penitentiary institution.

Participants

The sample consisted of 120 patients who were treated during a period of at least one year[2] in the Dr. Henri van der Hoeven Kliniek and were discharged between January 1993 and December 1999. This time period was chosen because the first transmural patients were discharged in the year 1993, and a follow up period of at least three years is recommended (Dolan & Coid, 1993). Between 1993 and 1999, 150 patients were discharged from the hospital. Of these 150 patients, 30 were discharged by the court in line with the hospital staff's advice after a transmural phase. Subsequently, we selected 90 patients who could be divided into three groups of 30 in accordance with the above described types of discharge *Conform, Contrary* and *Readmission*. It should be noted that the majority of the non-selected patients could not be included in one of the groups because they had a different judicial status. From the *Transmural* group, three patients moved to sheltered housing, the rest to their own or their family's home. Five patients of the *Conform* group moved voluntarily to a non-secure psychiatric institution for further treatment, two to sheltered housing and the rest to their own or their family's home. All patients from the *Contrary* group were released to their own or family's home. Eleven patients from this group were discharged while they were still in the transmural phase, and 19 while still being treated in the hospital. Patients from the *Readmission* group were transferred to another forensic psychiatric hospital (6), a selection institution for forensic psychiatric patients (12), or a penitentiary institution (11). The residence of one patient was unknown. At the end of the study, December 2002, the place of residence of the readmitted patients was searched in a national computer system containing data on all offenders convicted to the tbs-order: 17 patients were still in a forensic psychiatric hospital under the tbs-order, eight patients were discharged because the court had terminated their tbs-order, two patients had unauthorized absences and one patient had died in a forensic psychiatric hospital. The residence of two patients could not be retrieved from the computer system. Table 1 presents demographic, criminal and treatment characteristics of the sample.

The majority of the patient sample was male, Dutch, single and unemployed at the time of the index offense. Most patients in Dutch forensic psychiatric hospitals suffer from comorbid Axis II disorders (according to the fourth edition of the Diagnostic and Statistical Manual of Mental disorders; DSM-IV; APA, 1994), particularly cluster B disorders (see Hildebrand & de Ruiter, 2004; de Ruiter & Greeven, 2000). In general, substance use disorders occur in about 60% of all cases, often in combination with Axis I and / or Axis II disorders; pure Axis I disorders (i.e., schizophrenia, affective disorders, parafilia) are present in about 5% of the patients. Forty percent of the sample had committed homicide or attempted homicide (in 67% resulting in the death of the victim), 25% a sexual offense, 21% a violent offense, 1% a property offense and 13% arson (in 94% with danger to persons). The table shows a number of significant differences between the four groups. Overall, the *Readmission* group had more unfavorable demographic characteristics, especially when compared to the *Transmural* and *Conform* groups: they more often had no work, multiple substance abuse, prior admissions to inpatient psychiatric hospitals, obtained lower scores on intelligence scales and – albeit not significant –

[2] There were three exceptions: two patients from the 'Contrary' group stayed in the hospital for four and seven months, respectively. One patient left the hospital after ten months. These three patients were admitted from other forensic psychiatric institutions where they had been treated during a minimum period of three years.

Table 1
Sample characteristics

	Transmural $N = 30$	Conform $N = 30$	Contrary $N = 30$	Readmission $N = 30$	Total $N = 120$
Demographic					
Mean age upon admission	26.7	26.1	25.7	23.4	25.5
Male	26 (87%)	24 (80%)[a]	28 (93%)	29 (97%)[b]	107 (89%)
Dutch nationality	28 (93%)	24 (80%)	26 (87%)	23 (77%)	101 (84%)
Upbringing in foster or children's home	12 (40%)	14 (47%)	13 (43%)	18 (60%)	57 (48%)
Single (at the time of the index offense)	21 (70%)	23 (77%)	21(70%)	24 (80%)	89 (74%)
No education after primary school	11 (37%)	14 (47%)	12 (40%)	17 (57%)	54 (45%)
Unemployed	12 (40%)[a]	13 (43%)	16 (53%)	21 (70%)[b]	62 (52%)
Psychiatric					
Out-patient treatment(s)	8 (27%)	6 (20%)	10 (33%)	3 (10%)	27 (23%)
Inpatient admission(s)	10 (33%)[c]	10 (33%)[c]	12 (40%)	20 (67%)[d]	52 (43%)
Substance(s) abuse	17 (57%)[c]	19 (63%)[a]	24 (80%)	26 (87%)[b,d]	86 (72%)
Axis I disorder	4 (13%)	7 (24%)	1 (3%)	7 (24%)	19 (16%)
Axis II disorder	23 (77%)	19 (63%)	26 (87%)	20 (69%)	88 (74%)
Mean intelligence score	106.0[b,f]	104.8b	100.1[e]	94.4[a]	101.1
Index offenses					
(Attempted) homicide	14 (47%)	11 (37%)	9 (30%)	14 (47%)	48 (40%)
Sex offense	4 (13%)[a]	6 (20%)	14 (47%)[b]	6 (20%)	30 (25%)
Violent offense	4 (13%)	7 (23%)	5 (17%)	9 (30%)	25 (21%)
Property offense	1 (3%)	-	-	-	1 (1%)
Arson	7 (23%)[b]	6 (20%)[b]	2 (7%)	1 (3%)[a]	16 (13%)
Victim was not a stranger	13 (48%)	14 (47%)	11 (37%)	13 (48%)	51 (43%)
Mean duration of imprisonment in months	17.1	16.9	19.0	15.5	17.1
Mean number of previous convictions	1.7[a]	1.6[a,e]	3.0[f]	4.2[b]	2.6
Mean age at first conviction	22.2[d]	21.1[d]	18.7[f]	16.3[c,e]	19.6
Treatment					
Mean duration of treatment in months	66.0[b]	54.4	67.1[b]	47.3[a]	58.7
Treatment included a probationary period	18 (60%)[d]	15 (50%)[d]	16 (53%)[d]	4 (13%)[c]	53 (44%)
Serious incidents during treatment	10 (33%)[c]	14 (47%)[c]	15 (50%) [c]	26 (87%)[d]	65 (54%)
Secluded in isolation room during treatment	2 (7%)[a]	6 (20%)[a]	5 (17%)[a]	14 (47%)[b]	23 (19%)
Escaped from the hospital	7 (23%)[c]	7 (23%)[c]	8 (27%)[c]	23 (77%)[d]	45 (38%)

Note. [a] < [b], $p < .05$. [c] < [d], $p < .01$. [e] < [f] , $p < .05$ (two-tailed). The differences were investigated with the F-test or Chi-square analysis. Number of patients whose intelligence scores were available: 17 transmural, 14 conform, 14 contrary, 18 readmission. Serious incidents = incidents for which the patient was secluded for at least two days in own room, recovery room or isolation room.

more often grew up in foster care or institutional care and had a lower level of education. Regarding criminal characteristics, it is notable that arsonists are over-represented in the *Transmural* and *Conform* group and sex offenders in the *Contrary* group. Furthermore, we found significant differences in the number of previous convictions and mean age at first conviction. Readmitted patients compared to the other groups had more previous convictions and were younger at their first conviction. Concerning behavior during treatment, the *Readmission* group compared to the other groups had more unauthorized absences (escapes from hospital or not returning from leave for at least two days) and had caused more serious incidents (e.g., violent behavior or drugs dealing) for which they were secluded for at least two days in their own room, a recovery room or an isolation room.

Instruments

HCR-20. The HCR-20 is a structured professional guideline (checklist) designed for the assessment of risk of future violence in adult offenders with a violent history and / or a major mental disorder or personality disorder. The instrument was developed from a thorough consideration of the empirical literature and the clinical expertise of a number of forensic clinicians. The HCR-20 consists of 20 items, divided into three subscales: Historical scale, Clinical scale and Risk management scale that relate to risk factors in the past, present and future, respectively. Table 2 presents the items of the HCR-20. The Historical items are static, unchangeable factors,[3] while the Clinical and Risk management factors are considered to be changeable, for instance, due to clinical intervention.

The items are coded on a 3-point scale: '0' the item does not apply according to the available information,'1' the item probably or partially applies, and '2' the item definitely applies. The HCR-20 also offers the possibility to code 'other considerations', that is, case-specific risk factors that do not fit within the item descriptions. The HCR-20 is coded by an experienced forensic clinician, who also uses all available information on the offender when making a determination, preferably from different sources and gathered with different methods. The rater also considers the degree of risk management that is necessary to prevent violence. The final risk judgment is scored as low, moderate, or high and is valid for a specific time period, for instance, during a specific treatment phase or for a given context (e.g., inpatient versus outpatient). The final risk judgment is performed on a case by case basis and as a structured professional judgment that is arrived at through the process of coding the checklist and integrating all available information. In arriving at the final risk judgment, the rater should also consider the degree of risk management that is necessary to prevent violence.

In the present study, the Dutch authorized adaptation of the HCR-20 (Philipse, de Ruiter, Hildebrand, & Bouman, 2000) was used. Since January 2001, the Dutch version of the HCR-20 is used in the Dr. Henri van der Hoeven Kliniek and prospective research in a group of 60 patients has demonstrated good interrater reliability (de Vogel & de Ruiter, 2004). In a recently conducted prospective study in a group of 127 male patients from this hospital, we found good predictive validity for the HCR-20 as coded by clinicians and researchers for incidents of physical violence during treatment (de Vogel & de Ruiter, in preparation). In a retrospective study into the predictive validity of the Dutch HCR-20 in a group of 69 forensic psychiatric patients, Philipse, van Erven, and Peters (2002) found that particularly the Historical factors and the final risk judgment predicted relapse in violent offending.

Psychopathy Checklist-Revised. The PCL-R is designed to assess the construct of psychopathy. Originally, the PCL-R comprised two factors: Factor 1 which includes selfishness, callousness and remorseless use of others, and Factor 2 which represents a chronically unstable and antisocial lifestyle (Hare, 1991). Recently, Hare (2003) published the second edition of the PCL-R. In this second edition, Factor 1 and 2 are both divided into two empirically derived and validated factors: Interpersonal and Affective, and Lifestyle and Antisocial, respectively. The instrument consists of 20 items that are coded on a three-point scale - '0' the item does not apply, '1' the item probably or partially applies, and '2' the item definitely applies

[3] This is not completely true, as Historical items can change in a negative way, for instance, item 10 when a patient violates the rules by escaping from the hospital.

Table 2
HCR-20 Items

Historical items	*Clinical items*	*Risk management items*
1. Previous violence	1. Lack of insight	1. Plans lack feasibility
2. Young age at first violent incident	2. Negative attitudes	2. Exposure to destabilizers
3. Relationship instability	3. Active symptoms of major mental illness	3. Lack of personal support
4. Employment problems	4. Impulsivity	4. Noncompliance with remediation attempts
5. Substance use problems	5. Unresponsive to treatment	5. Stress
6. Major mental illness		
7. Psychopathy		
8. Early maladjustment		
9. Personality disorder		
10. Prior supervision failure		

Note. From Webster, Douglas, Eaves, & Hart (1997b).

– after administering a semi-structured interview and reviewing all collateral information. The total score can range from 0 to 40 and reflects an estimate of the degree to which an individual matches the prototypical psychopath. The cut off score for the diagnosis of psychopathy is generally 30, but in some European countries, for instance, Scotland, England and Sweden, a cut off score of 25 or 26 has proven more useful (Hare, Clark, Grann, & Thornton, 2000).

Although originally not developed as a risk assessment instrument, two meta-analyses showed the PCL-R to be a strong predictor of violent recidivism (Hemphill, Templeman, Wong, & Hare, 1998; Salekin, Rogers, & Sewell, 1996) and, therefore, psychopathy as measured by the PCL-R is included as one of the risk factors in risk assessment instruments such as the HCR-20. The ability of the PCL-R to predict violent recidivism has been shown to have cross-cultural generalizability (Hare et al., 2000). Research in the Dr. Henri van der Hoeven Kliniek rendered a good interrater reliability for the Dutch version of the PCL-R (Vertommen, Verheul, de Ruiter, & Hildebrand, 2002; Hildebrand, de Ruiter, de Vogel, & van der Wolf, 2002). Furthermore, PCL-R scores were significantly related to disruptive behavior in a sample of 92 male forensic psychiatric inpatients in the Dr. Henri van der Hoeven Kliniek (Hildebrand, de Ruiter, & Nijman, 2004). In the present study, the PCL-R was coded exclusively on the basis of file information. Ideally, the PCL-R is coded on the basis of both a semi-structured interview and file

information, however, previous research showed that for research purposes, PCL-R ratings can be conducted reliably on file information alone (Grann, Långström, Tengström, & Stålenheim, 1998; Hildebrand, de Ruiter, & de Vogel, 2004).

Procedure

File information was gathered on 120 patients who were discharged between January 1993 and December 1999 (admission between February 1984 and December 1996). In general, these files consisted of psychological reports, reports to the court regarding treatment progress, treatment plans and evaluations. Prior to coding, the files were screened by a research assistant who removed the outcome of the hospital staff's advice to the court. Next, we coded the Dutch versions of the HCR-20 and PCL-R on the basis of the file information. All raters were trained in coding the HCR-20 and PCL-R. The rating procedure was performed while all raters were blind to the outcome (i.e., recidivism) and to the type of discharge. It should be emphasized that the clinical decisions were not influenced by the HCR-20 and PCL-R ratings. At the time the patients in this sample were in treatment, hospital staff did not have access to PCL-R scores, and the HCR-20 was not yet used in the hospital. In order to establish the interrater reliability, three raters (in different compositions out of a group of four raters) independently rated 30 cases that were randomly selected from the 120 cases and agreed upon a consensus score. This consensus score was used for the analyses on predictive validity. Subsequently, the remaining cases were divided among three raters.

Recidivism Data

After all the files had been coded, recidivism data were retrieved from the Judicial Documentation register of the Dutch Ministry of Justice. Recidivism was defined as a new conviction by the court for an offense in accordance with Dutch criminal law. For the identification of violent offenses, we used the HCR-20 definition of violence: violence is actual, attempted, or threatened harm to a person or persons (Webster et al., 1997b). Furthermore, we explored new convictions for general offenses, including property offenses, traffic offenses and drugrelated offenses. The follow-up period, starting on the date of discharge by the court or readmission to another institution and ending on the date of data gathering (December 1, 2002), varied from 36 to 114 months with an average of 72.5 months (SD = 22.7, Median = 71.0). The follow-up period for the *Transmural* group (60.9 months) was significantly shorter compared to the period of the *Conform* (78.1 months; F (58, N = 60) = 5.9, $p < .01$) and *Readmission* group (79.9 months; F (57, N = 59) = 4.3, $p < .01$), but not the *Contrary* group (70.8 months; F (58, N = 60) = 15.7, $p = .07$).

Statistical Analyses

Survival analysis, also referred to as the Kaplan Meier method, was used to calculate recidivism rates (Schmidt & Wytte, 1988). This type of analysis takes into account the time the offender has been at risk. Thus, it is possible to calculate the recidivism rate for a specific period despite the fact that the follow-up periods of the patients diverge. The Log rank statistic was used to test differences between the four groups. The F-test was used to examine differences between the four groups in PCL-R and HCR-20 mean scores, for differences in HCR-20 final risk judgments and psychopathy diagnoses (PCL-R $\geq$ 26) we used Chi-square analysis. The interrater reliability was examined by means of the Intraclass Correlation Coefficient (ICC), using the two-way random effect variance model and consistency type (Shrout & Fleiss, 1979). Critical values we applied for single measure ICCs were: ICC .75 = excellent; .60 ICC < .75 = good; .40 ICC < .60 = moderate; ICC < .40 = poor (Fleiss, 1986). The predictive validity of both instruments and the unstructured clinical judgment was established with Receiver Operating Characteristics (ROC) analyses (see for a description of this method Mossman, 1994; Rice & Harris, 1995). The major advantage of this statistical method is its insensitivity to base rates. The ROC analyses result in a plot of the true positive rate (sensitivity) against the false positive rate (1-specificity) for every possible cut off score of the instrument. The Area Under the Curve (AUC) can be interpreted as the probability that a randomly selected recidivist would score higher on the instrument than a randomly selected non-recidivist. An AUC of .00 represents perfect negative prediction, an AUC of .50 chance

prediction, and an AUC of 1.0 perfect positive prediction. In general, AUC values of .70 and above are considered moderate, and above .75 good (Douglas, 2001). To compare the obtained AUC values of the HCR-20, PCL-R and unstructured clinical judgment, we used the software program AccuROC (Vida, 1997) which applies the non-parametric method described by DeLong, DeLong and Clarke-Pearson (1988). Pearson *r* correlations were calculated for comparative purposes. Furthermore, Cox regression analyses, which result in the Hazard ratio (e^B) that can be interpreted as the relative risk, were conducted to evaluate whether the HCR-20 and PCL-R total scores and HCR-20 final risk judgments add incremental validity to type of discharge as a predictor of violent recidivism. All analyses were conducted using SPSS version 11.

RESULTS

Reconviction Rates

Figure 1 presents the survival curves for violent reconvictions. As can be seen from the starting point of these curves, a proportion of the patients already recidivated during their tbs-order. This was especially the case for the *Readmission* group; 11 of 17 still detained patients violently recidivated during their tbs-order, either during their admission to the Dr. Henri van der Hoeven Kliniek or to another institution. In total, 36% of the patients recidivated with a violent offense, and when we accounted for the time the patients had been at risk and used survival analysis this percentage was 39. There were significant differences in the failure rates (computed with survival analyses) between the four groups on violent recidivism: the *Readmission* group recidivated significantly more compared to the *Transmural*, *Conform* and *Contrary* groups (violent recidivism rates 67 versus 27, 19 and 44, respectively; log rank ($3, N = 119) = 23.3, p < .001$). The recidivism rate of the *Contrary* group was significantly higher compared to the *Conform* group (log rank ($1, N = 60) = 4.4, p < .05$), but not to the *Transmural* group. However, when we included the eleven patients who were discharged by the court against the hospital staff's advice while they were still in the transmural phase in the *Transmural* group instead of in the *Contrary* group, the difference in violent recidivism between the *Transmural* and *Contrary* group was significant (violent recidivism rates 22 versus 59, log rank ($1, N = 60) = 5.2, p < .05$). Patients with a PCL-R score of 26 or above recidivated significantly more than patients with a lower score than 26 (violent recidivism rates 69 versus 31, log rank ($1, N = 119) = 19.7, p < .001$; Odds ratio = 5.4, CI = 2.1 – 13.5), and patients who scored above the HCR-20 median (= 26) recidivated significantly more compared to those who scored below the median (violent recidivism rates 64 versus 28, log rank ($1, N = 119) = 25.3, p < .001$; Odds ratio = 8.4, CI = 3.5 – 20.3). Furthermore, 52% of the total group was re-convicted for any offense (all offenses), and when we accounted for time at risk and used survival analyses, this percentage was 72. There were significant differences between on the one hand the *Transmural* and *Conform* groups and on the other hand the *Readmission* group (50, 63 versus 79 respectively; log rank ($3, N = 119) = 11.7, p < .01$). The recidivism rate of the *Contrary* group (71%) did not significantly differ from the other three groups.

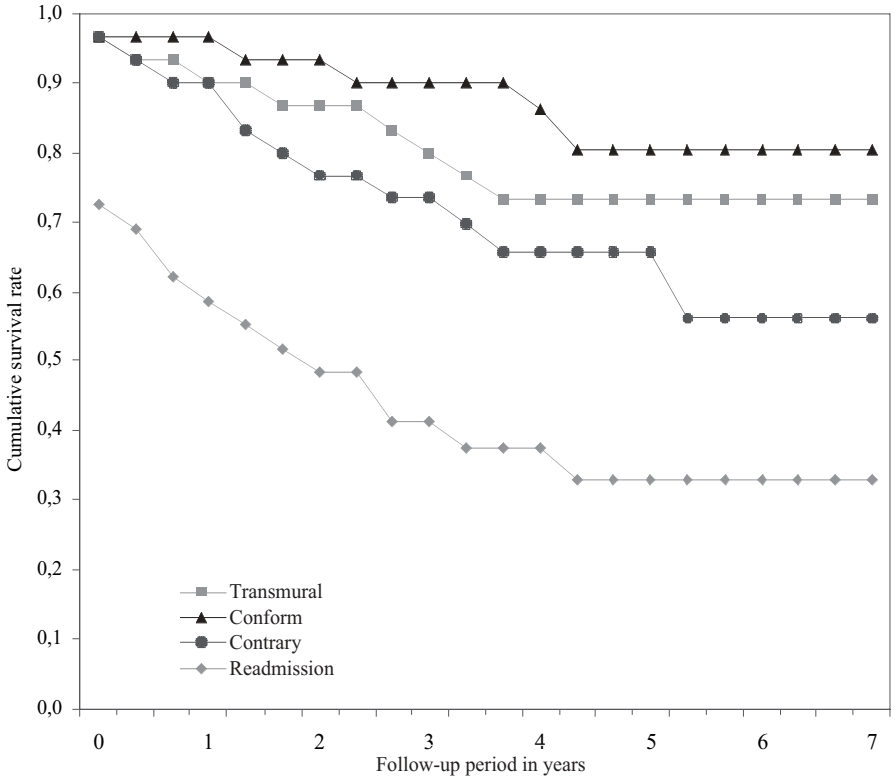
Interrater Reliability

The overall interrater reliability of the HCR-20 was good. The Historical scale, Clinical scale and total score showed excellent reliability (ICCs = .89, .76, and .83, respectively), the final risk judgment good reliability (ICC = .73), and the Risk management scale moderate reliability (ICC = .58). Two items - both from the Risk management scale - demonstrated poor interrater reliability: 'Lack of personal support' and 'Stress' (ICCs = .33 and .31, respectively).

Risk Judgments and Diagnosis of Psychopathy

Table 3 shows the mean HCR-20 and PCL-R scores of the four groups. The *Readmission* group compared to the other three groups had significantly higher scores on the Historical scale of the HCR-20 and the PCL-R total score. Furthermore, the *Contrary* group obtained higher HCR-20 (subscales) scores and PCL-R total scores compared to the *Transmural* and *Conform* groups, but lower scores on the Historical scale and PCL-R total than the *Readmis-*

Figure 1. *Kaplan-Meier survival curve for violent re-offending during or after tbs-order (N = 119)*



sion group. The final risk judgments and diagnosis of psychopathy (PCL-R = 26) are also presented in Table 3. Again, the *Readmission* group compared to the *Transmural* and *Conform* group had more unfavorable judgments; almost all readmitted patients were judged to pose a high risk and half of them fulfilled the criteria for psychopathy. The *Contrary* group had more high risk judgments compared to the *Transmural* and *Conform* group, but less compared to the *Readmission* group.

Predictive Validity

Table 4 shows the Areas Under the Curve and Pearson correlations of the HCR-20, PCL-R and unstructured clinical judgment[4] for violent and general recidivism. Figure 2 presents the ROC curves for the HCR-20, PCL-R and unstructured clinical judgment for violent re-offending. The AUC values for violent offenses were significantly above .50 for both the (subscales of the) HCR-20, the (factors of the) PCL-R and the unstructured clinical judgment. However, the AUC values for the three measures differed significantly. The HCR-20 (Historical and Risk management scale, total score and final risk judgment) was significantly more accurate in predicting violent recidivism than the unstructured clinical judgment, $\chi 2$ (1, N = 119) = respectively 4.4, 4.2, 7.4 and 4.5, $p < .05$. Besides, the HCR-20 total score predicted significantly better than the PCL-R total score, $\chi 2$ (1, N = 119) = 4.5, $p < .05$. When the item 'Psychopathy' was removed from the HCR-20 total score, the AUC value of the HCR-20 total score changed minimally from .822 (HCR-20 including item 'Psychopathy') to .817 (HCR-20 excluding item 'Psychopathy'). Although this change was very small, the difference in predictive validity

[4] For the analyses on predictive validity, the four modes of discharge were considered as a 4-point scale: transmural = 1 (lowest risk), conform = 2, contrary = 3, and readmission = 4 (highest risk).

Table 3
Mean HCR-20 and PCL-R scores (with SD in brackets), final risk judgments and diagnosis of psychopathy (PCL-R ≥ 26)

	Transmural $N = 30$	Conform $N = 30$	Contrary $N = 30$	Readmission $N = 30$	Total $N = 120$
HCR-20					
Historical scale	12.6 (2.7)[a]	12.8 (2.9)[a]	14.6 (2.6)[b,c]	16.0 (2.6)[b,d]	14.0 (3.0)
Clinical scale	3.7 (1.6)[a]	4.3 (2.1)[c]	5.4 (1.9)[b,d]	7.0 (1.3)[b,d]	5.1 (2.1)
Risk management scale	6.5 (2.1)[c]	5.6 (1.7)[c]	7.6 (1.7)[d]	9.1 (1.1)[d]	7.2 (2.1)
Total score	22.8 (5.3)[a]	22.8 (5.6)[a]	27.6 (5.4)[b]	32.0 (4.3)[b]	26.3 (6.4)
Risk judgment: low	7 (23%)[d]	6 (20%)[d]	1 (3%)[c]	0 (0%)[c]	14 (12%)
Risk judgment: moderate	15 (50%)[b]	17 (57%)[b]	13 (43%)[b]	2 (7%)[a]	47 (39%)
Risk judgment: high	8 (27%)a,[c]	7 (23%)[a,c]	16 (53%)[a,d]	28 (93%)[b]	59 (49%)
PCL-R					
1st ed. Factor 1	6.1 (2.7)[a]	6.8 (3.5)	7.9 (4.2)	8.5 (3.8)[b]	7.3 (3.7)
1st ed. Factor 2	7.9 (4.3)[a]	8.8 (4.2)[a]	10.2 (4.8)[c]	14.5 (3.3)[b,d]	10.4 (4.8)
2nd ed. Interpersonal	1.8 (1.5)[c]	2.4 (2.0)	2.8 (2.4)	2.9 (2.4)[d]	2.5 (2.1)
2nd ed. Affective	4.1 (1.4)[a,c]	4.6 (1.9)	5.0 (2.0)[d]	5.4 (1.7)[b]	4.8 (1.8)
2nd ed. Lifestyle	4.7 (2.3)[a]	5.0 (2.3)[a]	5.6 (2.8)[a]	8.1 (1.8)[b]	5.8 (2.7)
2nd ed. Antisocial	3.6 (2.5)[a,c]	3.9 (2.4)[a]	5.2 (2.7)[a,d]	7.0 (1.9)[b]	4.9 (1.9)
Total score	15.4 (5.7)[a]	17.0 (6.7)[a]	20.2 (8.3)[b,c]	25.3 (6.3)[b,d]	19.5 (7.7)
PCL-R ≥ 26	2 (7%)[a,c]	3 (10%)[a]	8 (27%)[d]	15 (50%)[b]	28 (23%)

Note. [a] < [b], $p < .01$. [c] < [d], $p < .05$ (two-tailed). 1st ed. = Hare's PCL-R (1991). 2nd ed. = Hare's PCL-R Second edition (Hare, 2003).

between the HCR-20 total score and PCL-R total score was no longer significant, $\chi 2$ (1, $N = 119$) = 3.2, $p = .08$.

Next, we conducted Cox regression analyses. The unstructured clinical judgment was entered on block 1. The HCR-20 total score and PCL-R total score were entered on block 2 and the HCR-20 final risk judgment was entered on block 3 by using the forward conditional method. The unstructured clinical judgment produced a significant model fit, $\chi 2$ (1, $N = 119$) = 14.5, $p < .001$. The HCR-20 total score produced a significant improvement to the model's fit, $\chi 2$ change (1, $N = 119$) = 23.6, $p < .001$. Finally, the HCR-20 final risk judgment produced a significant improvement to the model's fit, $\chi 2$ change (1, $N = 119$) = 5.3, $p < .05$. In the final model, the HCR-20 total score ($e^B = 1.1$, 95% CI = 1.0-1.2) and final risk judgment ($e^B = 3.1$, 95% CI = 1.2-8.4) were significant predictors of violent recidivism.

DISCUSSION

In this article, the relation between type of discharge and (risk of) recidivism was examined in a group of treated forensic psychiatric patients. To our knowledge, this study is the first to compare results of different risk assessment methods: unstructured clinical judgment (operationalized as type of discharge), actuarial judgment (HCR-20 subscales and total scores) and structured professional judgment (HCR-20 final risk judgment). The HCR-20 – both the actuarial scores and the final risk judgment - was the best predictor of violent

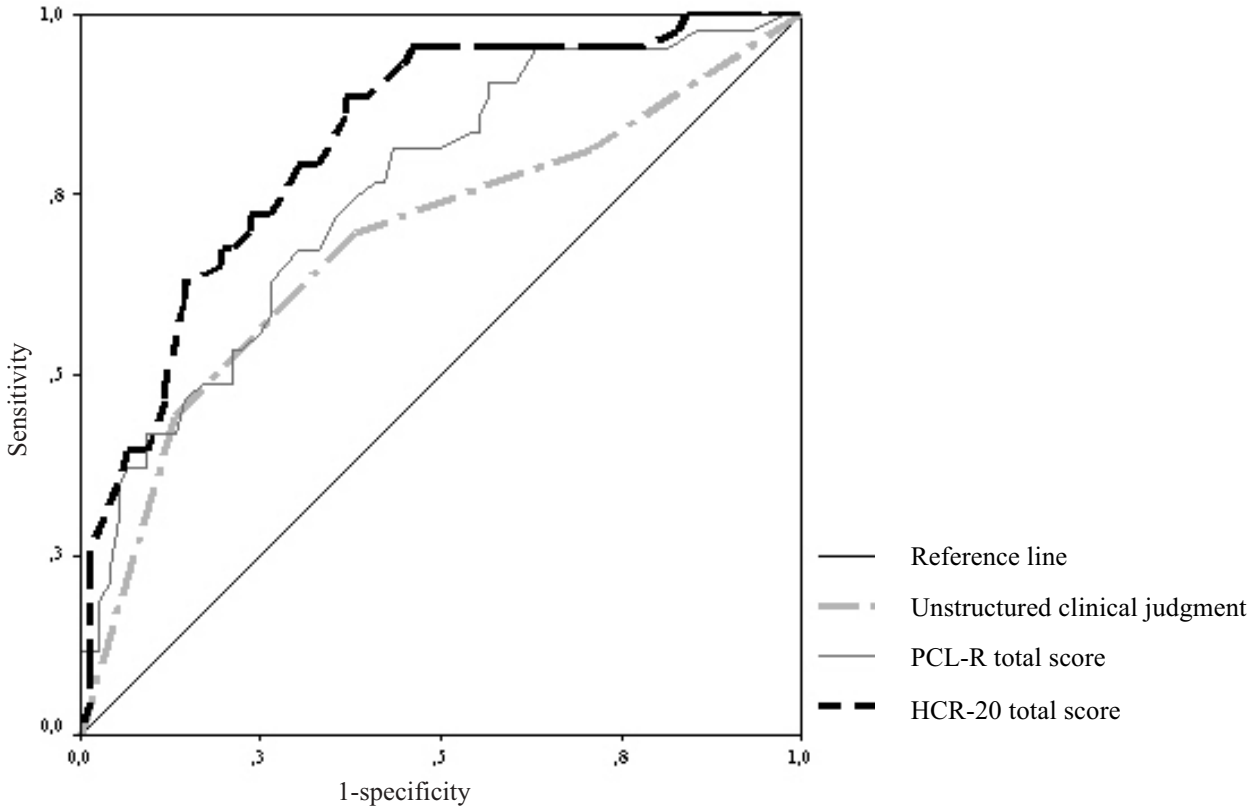
Table 4
Predictive validity of the HCR-20 and PCL-R (N= 119)

	Violent offending			General offending		
	AUC	SE	r	AUC	SE	r
HCR-20						
Historical scale	.80***	.04	.47**	.70***	.05	.34**
Clinical scale	.77***	.04	.46**	.67**	.05	.30**
Risk management scale	.79***	.04	.47**	.67**	.05	.30**
Total score	.82***	.04	.52**	.70***	.05	.35**
Final risk judgment	.79***	.04	.51**	.66**	.05	.30**
PCL-R						
1st ed. Factor 1	.63**	.05	.23*	.63*	.05	.20*
1st ed. Factor 2	.79***	.04	.47**	.70***	.05	.33**
2nd ed. Interpersonal	.55	.06	.12	.58	.05	.13
2nd ed. Affective	.67**	.05	.29**	.62*	.05	.22*
2nd ed. Lifestyle	.77***	.05	.45**	.71***	.05	.36**
2nd ed. Antisocial	.77***	.04	.45**	.66**	.05	.28**
Total score	.75***	.05	.43**	.68**	.05	.43**
PCL-R $\geq$ 26	.65**	.06	.34**	.58	.05	.20*
Unstructured clinical judgment	.68**	.05	.32**	.63*	.05	.22*

Note. *p < .05, ** p < .01, *** p < .001 (two-tailed). AUC = Area Under the Curve. SE = Standard Error. r = Pearson correlation coefficient. Violent offending = including sexual and homicide offenses. When item 7 'Psychopathy' was removed from the HCR-20, the AUC values of the H scale was .779 and of the HCR-20 total score .817. 1st ed. = Hare's PCL-R (1991). 2nd ed. = Hare's PCL-R Second edition (Hare, 2003).

recidivism. The interrater reliability and predictive validity of the HCR-20 we obtained are in line with previous findings (Douglas, 2001). In addition, the PCL-R showed good predictive validity for violent re-offending, however, the HCR-20 total score predicted significantly better than the PCL-R total score. Yet, the difference in AUC values was only marginally significant after the item 'Psychopathy' was removed from the HCR-20 total score. This trend is compatible with the results of a study in 193 civilly committed patients by Douglas, Ogloff, Nicholls, and Grant (1999) who compared AUC values of the HCR-20 and the Psychopathy Checklist: Screening Version (PCL:SV; Hart, Cox, & Hare, 1995) and found the HCR-20 to be a significantly better predictor of violent behavior. The categorical diagnosis of psychopathy (PCL-R score $\geq$ 26) showed significant, but only moderate predictive validity (AUC = .65). Most studies into the predictive validity do not report AUC values for the categorical diagnosis of psychopathy, because ROC analyses are less suitable to apply with dichotomous or trichotomous variables. However, the odds ratio and correlation coefficient we found between the diagnosis of psychopathy and violent re-offending resemble previous results (see Hare et al., 2000).

Figure 2. *ROC curves for HCR-20, PCL-R and unstructured clinical judgment for violent re-offending (N= 119)*



Note: HCR-20 total score is including item *Psychopathy*.

When using the two factor model of the first edition of the PCL-R, particularly Factor 2 predicted violent re-offending, whereas Factor 1 showed below moderate predictive validity. Our finding is in line with previous research (Grann, Långström, Tengström, & Kullgren, 1999). With the PCL-R second edition four factor model, we found significant predictive validity for the factors Affective, Lifestyle and Antisocial, but not for the factor Interpersonal. To our knowledge, this is the first study that applies the new four factor model. Although the unstructured clinical judgment predicted significantly better than chance, the predictive accuracy for violent recidivism was weak and significantly worse compared to the HCR-20 actuarial scores and structured final risk judgments. Our finding is in line with previous research that found actuarial risk assessment to be superior to unstructured clinical judgment in predictive accuracy (Gardner, Lidz, Mulvey, & Shaw, 1996; Grove & Meehl, 1996).

Furthermore, the final risk judgment was found to add significant incremental validity to the HCR-20 used in a numerical sense. This is in line with studies that also found that the structured final risk judgments added incremental validity to the HCR-20 numerical scores (Douglas et al., 2003; de Vogel & de Ruiter, in preparation). The same pattern was found for two other SPJ instruments; the Sexual Violence Risk-20 (SVR-20; Boer, Hart, Kropp, & Webster, 1997; Dempster, 1998; de Vogel, de Ruiter, van Beek, & Mead, 2004) and the Spousal Assault Risk Assessment guide (SARA; Kropp, Hart, Webster, & Eaves, 1999; Kropp & Hart, 2000). In conclusion, our findings provide strong support for the structured professional judgment model of risk assessment.

The present study demonstrated several significant differences between the four discharge groups. On the whole, the readmission group compared to the other three groups showed more unfavorable demographic, criminal and treatment characteristics, as well as recidivism rates, HCR-20 scores and final risk judgments, and PCL-R scores/diagnosis. This finding alone attests to the validity of the HCR-20 as a predictor of violent recidivism. The recidivism rates of the *Readmission* group are worrying, especially considering the fact that a significant proportion of this group was in residential treatment or detention while recidivating. Most notable are the high HCR-20 and PCL-R scores of the readmitted patients: almost all were judged as high risk and half of them were diagnosed as psychopaths.

Next, it was striking that almost no significant differences could be detected between the *Transmural* group and the *Conform* and *Contrary* groups. Indeed, we found no significant differences at all between the *Transmural* and the *Conform* group. Our hypothesis that patients who have passed a transmural treatment phase compared to patients who were discharged by the court in line with the hospital staff's advice, but without a preceding transmural phase, pose a lower risk for violent re-offending because of a solid preparation before return to society was not confirmed. It must be noted, however, that seven patients of the *Conform* group were voluntarily transferred to a general psychiatric institution or sheltered living upon termination of the tbs-order, compared to three patients in the *Transmural* group. Possibly, these patients recidivated less because they were still in care of an (albeit non-secure) institution and receiving treatment. This suggestion is supported by the results of the MacArthur Risk Assessment study that showed significantly less violent recidivism in psychiatric patients receiving seven or more treatment sessions during a follow-up period compared to patients receiving six or less treatment sessions after a short-term admission to a closed psychiatric ward (Monahan et al., 2001).

Between the *Transmural* and *Contrary* group, we found significant differences in risk of recidivism as rated with the HCR-20. The actual recidivism rate of the *Contrary* group is higher than of the *Transmural* group, but this difference was not significant. A possible explanation is that eleven patients of the *Contrary* group were in the transmural phase when the tbs-order was terminated by the court. Perhaps, these patients had already benefited from the transmural phase although the hospital did not believe they were ready to be discharged yet. This hypothesis was confirmed when we included the eleven patients who had a termination of the tbs-order against the hospital staff's advice whilst in the transmural phase in the *Transmural* group instead of the *Contrary* group. In this case, the difference in violent recidivism between the *Transmural* and *Contrary* group was indeed significant. It should also be noted that half of the patients in both the *Conform* and *Contrary* group have experienced a period of probationary leave under supervision of probation officers, some successful and some not because they returned to the hospital. Thus, these patients have had a period of practicing living outside the hospital. However, in The Netherlands, this probationary supervision is more limited than the much more intensive transmural phase in which the patient is still supervised by hospital staff.

To summarize, our hypothesis that patients who have passed a successful transmural phase and who were discharged by the court in line with the hospital staff's advice pose a lower risk of violent recidivism compared to the other groups could not be confirmed. We did not find more favorable recidivism outcomes compared to patients who were discharged by the court in line with the hospital staff's advice and no transmural treatment phase. However, we did discover a reasonable outcome compared to patients who were readmitted or were discharged by the court against the hospital staff's advice, especially when considering the findings from the alternative post hoc analyses in which those patients from the contrary group whose treatment had been terminated during the transmural phase were added to the transmural group. Thus, a transmural phase seems to have a preventive effect in terms of violent recidivism.

A number of limitations to the present study should be mentioned. The first limitation relates to the retrospective design of the study. We could only use file information to code the HCR-20 and PCL-R and the quality of these files differed, which may have influenced the ratings. Moreover, in spite of the fact that a research assistant had deleted the hospital staff's recommendations to the court, in some files there may have been clues regarding the

hospital staff's advice to the court. A second limitation is that our sample size was small, so differences between the groups may not be valid. Moreover, the sample was derived from only one forensic psychiatric hospital, thereby limiting generalizability. Nevertheless, we consider this group to be representative for Dutch offenders with a tbs-order, because they are largely similar in demographic, psychiatric and criminal characteristics to the tbs-population in general (see van Emmerik & Brouwers, 2001). The question of the generalizability of our findings to patients in other jurisdictions deserves special attention. As already mentioned in the Method section, our patient sample consists largely of individuals with comorbid personality disorder and substance use disorder. Psychotic and other Axis I disorders are present in a minority of cases. We are aware that our forensic psychiatric sample is more similar to a general offender sample in North America than to a North American forensic psychiatric sample, and this should be taken into consideration when comparing our findings to those of other studies. A third limitation is that recidivism data were retrieved from only one source, the Judicial Documentation register of the Ministry of Justice. As a consequence, the reconviction rate is inevitably an underestimation of the actual recidivism rate, because not all offenders are reported, apprehended and arrested.

Large-scale prospective studies across different settings and contexts, for instance, in the prison system and outpatient forensic clinics are needed to confirm the predictive validity of the (Dutch) HCR-20 found in this study. On the other hand, a number of problems might be encountered with prospective research. The most important problem is that prospective predictive research will be hampered by the clinical goals of risk assessment, i.e., risk management and prevention. Hart (1998) stated that predictions of violence are not passive assessments, but decisions that influence services delivered to individuals: "Clinicians are bound - morally, ethically, and legally - to try to prove themselves wrong when they predict violence and take every reasonable action to prevent violence" (p.365). Thus, when clinicians perform HCR-20 risk assessments it is very likely that the outcome influences decisions concerning leave, entry into a transmural treatment phase, or termination of (mandatory) treatment and that high-risk patients will not be released from the hospital. Therefore, retrospective studies such as the present study are particularly suitable to examine the predictive validity of risk assessment instruments.

In conclusion, we propose two recommendations regarding the use of structured risk assessment in forensic clinical practice. First, any accurate systematic risk assessment must provide information regarding useful risk management strategies. We believe that high-risk cases, such as the patients in the *Readmission* group, can be identified in an early phase of treatment. With the PCL-R, psychopathic traits can be explored and with repeated measures of the HCR-20, clinicians and researchers can monitor treatment progress. An early identification of high-risk patients makes it possible to adjust treatment plans and design adequate risk management strategies to prevent violent recidivism both in and outside the hospital. In addition, an early identification of high-risk patients could possibly prevent the necessity of readmitting patients which usually causes feelings of failure in both hospital staff and patient. Second, we want to stress that collaboration between researchers and clinicians is necessary for optimizing risk assessment accuracy and prevention of violent re-offending. Intensive collaboration between forensic mental health professionals from intramural settings, outpatient settings and sheltered housing organizations can help to further develop aftercare methods.

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