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## Patient characteristics related to length of stay in Dutch forensic psychiatric care

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### ABSTRACT

Create an overview of characteristics of patients in long-term forensic psychiatric care (LFPC) with a higher length of stay (LOS) care compared to patients in regular forensic psychiatric care (RFPC) with a shorter LOS. Data were collected from 139 patient records. This study examined whether patients in LFPC differ from patients in RFPC on sociodemographic data, legal data and clinical data and whether those characteristics are able to predict LOS. Patients in LFPC were more often born in a Dutch Caribbean country, less often had a substance abuse disorder, were more often emotionally neglected during childhood, had a higher HCR-20 risk item score, a higher security needs score, a higher (less successful) recovery score, were more often recidivist and had absconded more often than RFPC patients. Certain characteristics were able to distinguish the longer LOS group which might be useful to establish sequel services and enhance treatment efficiency.

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### Introduction

Forensic psychiatric care aims to reduce the risk of recidivism, enhance mental health and encourage a safe return to society. However, a group of forensic patients remains who require prolonged periods in secure forensic hospitals as their risk of recidivism does not diminish enough to safely return to society. In recent years, more attention has been drawn to length of stay (LOS) in forensic

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psychiatric care (Sharma, Dunn, O'Toole, & Kennedy, 2015). In several Western countries, the average duration a patient stays in highly secure forensic settings has been rising (Andreasson et al., 2014; Davoren et al., 2012; Margetić, Margetić, & Ivanec, 2014; O'Neill et al., 2003; Ross, Querengässer, Fontao, & Hoffmann, 2012; Shah, Waldron, Boast, Coid, & Ullrich, 2011; Sharma et al., 2015). Two decades ago researchers in the UK reported mean LOS in medium security was less than 2 years (Maden, Friendship, McClintock, & Rutter, 1999; McKenna, 1996). In 2002, a UK study showed that mean LOS exceeds 5 years for about 10% of forensic psychiatric patients (Edwards, Steed, & Murray, 2002). Another UK study indicated that 27% of the patients in high and medium secure hospitals have a LOS of 10 years and more (Rutherford & Duggan, 2007). However, more recent studies showed that many inpatients in UK medium and high secure hospital (34 and 66%) have a mean LOS substantially exceeding 2 years (Shah et al., 2011). Studies in other European countries report mean LOS of 5.8 years in Sweden and Germany (Andreasson et al., 2014; Ross et al., 2012), 6.7 years in Croatia (Margetić et al., 2014) and an increasing LOS from 6.1 years (O'Neill et al., 2003) to 7.6 years in Ireland (Davoren et al., 2012). Also in the Netherlands, the average LOS of a forensic inpatient in high security provision rose from 5.6 to 9.8 years between 1990 and 2009 (Nagtegaal, Horst, & Schönberger, 2011). Caution is required when interpreting these figures due to variability in the reporting of LOS as cross-sectional, prospective, or completed, mean, median, or categorical data and because of variable admission criteria and variable definitions of high and medium security (Davoren et al., 2015).

This development has several negative implications. First, an increasing LOS counteracts treatment efficiency. When treatment is prolonged in highly restrictive conditions for longer than necessary, rehabilitation is impeded (Davoren et al., 2015). Additionally, it is desirable to shorten LOS from a humanitarian point of view. Human rights might be violated when LOS increases unnecessarily, particularly regarding the principle of proportionality according to the Council of Europe (Macovei, 2000). Furthermore, treatment in secure hospitals is expensive and can have a serious impact on a nation's health care budget.

Although many Western countries acknowledge the importance of reducing LOS, controlling it can be very challenging. Several factors can have an impact on LOS, such as a country's jurisdiction, changes in criminal justice policy (Grove, MacLeod, & Godfrey, 1998), changes in the organization of a country's mental health system (Sharma et al., 2015), and patient characteristics (Davoren et al., 2015; Dumont et al., 2012; Moran, Fragala, Wise, & Novak, 1999; Shah et al., 2011).

Many studies have investigated patient characteristics affecting LOS in forensic psychiatry in several European countries and in the US (Andreasson et al., 2014; Davoren et al., 2012, 2015; Lammers, Nijman, & Vrinten, 2014; Margetić et al., 2014; Moran et al., 1999; O'Neill et al., 2003; Ross et al., 2012; Shah et al., 2011). Some of the factors found to be related to LOS were only found in some of the studies. The sole sociodemographic factor which has been found to be related to a longer LOS was being male (Davoren et al., 2015). Legal factors

that were found to be related to a longer LOS were a history of absconding (Andreasson et al., 2014), a need to prevent absconding, public confidence, victim sensitivity, legal process (Davoren et al., 2015), a younger age at index offense (Moran et al., 1999), and a younger age at the first documented delinquency (Ross et al., 2012). Clinical factors linked to a longer LOS were previous psychiatric admissions (Ross et al., 2012; Shah et al., 2011), previous contact with child and adolescent psychiatric services (Andreasson et al., 2014), having a lifetime diagnosis of learning disability, having severe mental illness as diagnosis, making less progress in rehabilitation measured three months prior to the conducted study (O'Neill et al., 2003), persistence of mental state associated with violence, specialist forensic treatment need, complex risk of violence (comorbidity), problematic institutional behavior (Davoren et al., 2015), and a higher baseline risk of recidivism (Lammers et al., 2014) as measured with the HCR-20 historical factors (Webster, Douglas, Eaves, & Hart, 1997).

Sociodemographic factors associated with a shorter LOS included being a parent (Andreasson et al., 2014), a longer history of employment prior to admission (Moran et al., 1999; Ross et al., 2012) and higher level of school qualification and professional achievements (Ross et al., 2012). Clinical factors found to be related to a shorter LOS were a diagnosis of an affective disorder (Andreasson et al., 2014; Shah et al., 2011), a higher Global Assessment of Function score (American Psychiatric Association [APA], 2000; Andreasson et al., 2014), less severe violent behavior during admission at the forensic hospital (Ross et al., 2012), not being secluded (Davoren et al., 2015) and having an adjustment disorder as primary diagnosis (Davoren et al., 2015). There were no legal factors found to be related to a shorter LOS.

Contradictory results were found for several factors in different studies. Studies in Sweden (Andreasson et al., 2014), Ireland (Davoren et al., 2015; O'Neill et al., 2003), Germany (Ross et al., 2012), and the US (Moran et al., 1999) concluded that a more serious index offense was related to longer LOS, whereas in the UK (Shah et al., 2011) a severe index offense was associated with a shorter LOS. In a study from Ireland (O'Neill et al., 2003), substance abuse problems were associated with a shorter LOS, whereas in Sweden, Andreasson et al. (2014) found that substance abuse problems were associated with longer LOS, while in the UK no relationship was found between substance abuse and LOS (Shah et al., 2011). Having a diagnosis of a psychotic or schizophrenic nature was associated with a longer LOS in Sweden, the UK and Ireland (Andreasson et al., 2014; O'Neill et al., 2003; Shah et al., 2011), whereas in Germany it was related to a shorter LOS (Ross et al., 2012).

There are probably several reasons for the diverse, somewhat contradictory, results. One could be that prospective and cross-sectional studies will yield different results, another the differing jurisdictions and diverse contexts in which the studies were conducted. For instance, in Ireland, offenders with a personality disorder as their main diagnosis are not admitted to secure forensic psychiatric care (Mental Health Act, 2001), whereas in the Netherlands, Germany,

and England those patients do get admitted to secure forensic psychiatric care (Expertisecentrum Forensische Psychiatrie [EFP], 2014; MRVG, 2016; Thomson, 2010).

A second reason for the diverse results might be a nation's political system and organization of mental health care. Notably, those factors can have an impact on the amount of time a patient is allowed or obliged to stay in a high secure forensic institution. For instance, in several countries there are insufficient appropriate places in regular mental health care where patients can be sent after their treatment in a forensic hospital (Brown & Fahy, 2009; Lammers et al., 2014; Moran et al., 1999; O'Neill et al., 2003; Ross et al., 2012; Shah et al., 2011). In contrast, Sharma et al. (2015) found that in the UK, a large proportion of long-term non-secure places in hospitals and in the community were occupied by former forensic patients. A third reason for the diverse findings can be the differing operationalizations across studies. Hence, it is challenging to find a common conclusion from international findings on LOS in forensic psychiatric care.

Countries seem to diversify in their jurisdictions and organization of the mental health system to such an extent that apart from matching operationalizations, it appears to be prudent that LOS is studied at a national level. This makes it possible to take legal factors and aspects of the mental health care system specific to that country into consideration. A bigger body of national research will facilitate a more valid comparison of factors affecting LOS at an international level in the future. This information could potentially be useful to identify patients who are at high risk of a longer LOS. Treatment could be adapted to offer special care for those patients. Also, this information might be used in the future to establish step-down or 'sequel' services designed for patients at risk of long LOS, thereby enhancing quality of treatment, treatment efficiency, and reducing costs.

The present study aims at creating an extensive overview of the characteristics of longer stay forensic inpatients. Patients with a relatively high LOS will be compared to patients with a relatively low LOS on sociodemographic data, legal data, and clinical data.

## **Method**

### **Setting**

The study was conducted in two facilities of the Dutch high secure forensic psychiatric center of the Pompefoundation, being a regular in-patient high security forensic psychiatric care clinic and an in-patient high security long-term forensic psychiatric care (LFPC) clinic. At present, the Pompefoundation is the sole forensic psychiatric center which offers LFPC in the Netherlands. Treatment goals of LFPC are mainly optimizing quality of life and general stabilization of patient's psychopathology, rather than resocialization as in regular forensic psychiatric care (RFPC). Patients can only be admitted to LFPC when firstly they have had

a prolonged treatment attempt in one or more RFPC hospitals. If during the first treatment attempt(s) the high risk of reoffending is assessed as unchanged after several years of treatment, the treatment team can request a transfer of an RFPC patient to a LFPC facility. An independent national body including judges, psychiatrists and psychologists decides on the placement and continuation of the placement in the LFPC at intervals.

## **Subjects**

All participants were male and either staying in LFPC ( $n = 61$ ) or in RFPC ( $n = 78$ ). According to the Dutch admission regulation to LFPC, all LFPC patients have been RFPC patients in the past, however as the current study is a cross-sectional study, all participants were included into the group of their current placement. Participants in LFPC were between 38 and 68 years old (Mean = 52.97, SD = 8.09, Median = 52.00) and were significantly older than patients in RFPC, who were between 24 and 79 years old (Mean = 44.01, SD = 10.97, Median = 43.00;  $t(137) = 5.34, p < .001, d = .17$ ). However, there was no difference in age at the time when participants were admitted to RFPC ( $t(134) = -.68, p = .50$ ; LFPC: Mean = 34.05, SD = 10.31, Median = 33.50; RFPC: Mean = 35.26, SD = 10.42, Median = 33.50). The mean age when participants in LFPC were admitted to a highly secure long-term forensic hospital was 45.10 years (SD = 7.71, Median = 45.00, range 34–66). They were all diagnosed with a serious mental disorder either on Axis I and/or Axis II defined according to the DSM-IV-TR (APA, 2000) and had committed at least one serious offense such as (attempted) manslaughter or a serious sexual offense.

The LOS in a regular forensic hospital was significantly higher for LFPC participants (Mean = 10.58, SD = 4.91, Median = 10.00, range 3–20) than for RFPC participants (Mean = 8.32, SD = 4.69, Median = 8.00, range 1–21;  $t(134) = 2.74, p < .01, d = .05$ ). Therefore, the total LOS in all sorts of highly secure forensic hospitals was significantly higher in LFPC patients (Mean = 18.43, SD = 5.49, Median = 19.00, range 7–32) than in RFPC patients (Mean = 8.32, SD = 4.69, Median = 8.00, range 1–21;  $t(134) = 11.59, p < .001, d = .50$ ). The mean LOS in a long-term forensic hospital of the participants in LFPC was 7.48 years (SD = 3.01, Median = 8.00, range 0–15).

## **Procedure**

This cross-sectional study was part of a longitudinal study on characteristics of patients in LFPC in the Netherlands. The internal committee of the institution gave ethical approval for the study. Privacy of the patients was assured by assigning a unique research number to each participant so that statistical analyses could be conducted on anonymous data. Data were collected from electronic patient records using a structured protocol on patients' characteristics.

Furthermore, the DUNDRUM toolkit (Kennedy, O'Neill, Flynn, Gill, & Davoren, 2010) was scored to assess security needs and patients' program completion and recovery. The researchers collecting the data were trained in advance in scoring the patients' characteristics and in scoring the DUNDRUM toolkit. The participants from the LFPC were randomly selected out of the present total cohort of 87 patients. Participants from the RFPC were the total cohort of the admitted patients to the high security forensic hospital between 2006 and 2013 that were staying at the hospital. Data were collected between November 2014 and December 2015.

### **Measures**

Patient characteristics were categorized into three subgroups: being sociodemographic data, clinical data, and legal data. Sociodemographic data included age, gender, country of birth, level of education, employment history prior to current admission. Clinical data included diagnosis using DSM-IV-TR Axis I and Axis II (APA, 2000), intelligence using Wechsler Adult Intelligence Scale (Wechsler, Coalson, & Raiford, 2008), whether a patient was sexually abused as a child, whether a patient had sexually abused others, parental psychiatric history, emotional neglect as a child, current psychiatric medication, most recent HCR-20 V2 scores (Webster et al., 1997), Psychopathy Checklist-Revised (PCL-R) scores (Hare, 1991; Dutch version: Vertommen, Verheul, De Ruiter, & Hildebrand, 2002), DUNDRUM-1, DUNDRUM-3 and DUNDRUM-4 scores (Kennedy et al., 2010). Missing items on the historical scale of the HCR-20 V2 were interpolated based on the mean in order to yield a score out of 20 for the historical scale and interpolated for the total score in order to yield a score out of 40. This was done up to a maximum total of three missing items in one case. Legal data included the index offense, total number of offenses during lifetime, type of offense at first conviction, age at first conviction, age at index offense, age at first custodial sentence, LOS in years in RFPC and LFPC, age at current admission to RFPC and LFPC, absconding from custody or during leave while in RFPC, and recidivism during stay in RFPC or between a discharge and a readmission to RFPC.

### ***Dangerousness understanding, recovery and urgency manual (the DUNDRUM QUARTET)***

The DUNDRUM toolkit (Kennedy et al., 2010) is a suit of structured professional judgment instruments designed to triage security needs (DUNDRUM-1), urgency needs for admission (DUNDRUM-2), program completion (DUNDRUM-3) and patient recovery (DUNDRUM-4). For the present cross-sectional study, only the DUNDRUM-1, -3, and -4 were scored. The DUNDRUM-1 is an 11 item static scale, nine items of which assess the appropriate level of therapeutic security for patients. The DUNDRUM-3 and DUNDRUM-4 are 7-item dynamic scales which assess current treatment completion (DUNDRUM-3) and recovery (DUNDRUM-4).

The items of each scale are scored on a five-point scale from 0 to 4, where 0 is rated when no security is needed or no mental disorder is present and 4 is rated when the highest level of security is needed. Validation studies have shown good psychometric qualities (Flynn, O'Neill, McInerney, & Kennedy, 2011; Freestone et al., 2015; O'Dwyer et al., 2011) and indicated that the DUNDRUM-1 items can predict the level of therapeutic security needed (Flynn et al., 2011; Freestone et al., 2015) and LOS (Davoren et al., 2015) while the DUNDRUM-3 and DUNDRUM-4 can predict moves between levels of therapeutic security (Davoren et al., 2012) and discharge (Davoren et al., 2013).

### ***Historical-clinical-risk management-20 (HCR-20)***

The HCR-20 (Webster et al., 1997) is a structured clinical judgment instrument to assess risk of violence in adult offenders. The instrument has three subscales: historical scale, clinical scale, and risk management scale assessing risk factors in the past, the present, and the future, respectively. All items are scored on a three-point scale, where 0 is rated when the risk factor is not present, 1 when the risk factor is present to some extent, and 2 when the risk factor is fully present. The historical items are static, while the clinical and risk items are dynamic and therefore sensitive to present changes, for instance due to clinical interventions. The psychometric characteristics have been studied thoroughly in Dutch forensic samples and are generally good (De Vogel & De Ruiter, 2006; De Vogel, De Ruiter, Hildebrand, Bos, & van de Ven, 2004).

### ***Psychopathy Checklist-Revised***

The PCL-R (Hare, 1991) is a 20-item checklist, measuring psychopathic trait variances. All items are rated on a three-point scale where 0 is rated when the risk factor is not present, 1 when the risk factor is present to some extent, and 2 when the risk factor is fully present. The total score ranges between 0 and 40, indicating to what extent psychopathic traits are present. Psychometric studies in Dutch forensic samples indicate acceptable to good validities and reliabilities (Hildebrand, De Ruiter, De Vogel, & Van der Wolf, 2002; Zwets, Hornsveld, Neumann, Muris, & van Marle, 2015).

### ***Statistical analyses***

Data were entered into SPSS version 20 (IBM, SPSS Statistics, 2011). Firstly, the two groups were compared on all variables. Continuous variables were compared with t-tests for independent samples. Ordinal or categorical data were compared with chi-squared tests. For a post hoc comparison of the significant results of the chi-square tests, a cellwise residual analysis was administered (García-Pérez & Núñez-Antón, 2003). A Bonferroni correction was administered on each post hoc comparison of the chi-square test. Factors which discriminated between the two groups in a category were entered in a binary logistic



regression analysis. To correct for an inflation of a type I error, a strict  $\alpha$ -level of .01 was used for the univariate comparisons and for the binary logistic regression analysis. The receiver operator characteristic area under the curve (AUC) was calculated as a measure of the ability of variables to discriminate between the two groups and as a constant comparator. An AUC with 95% confidence interval (95% CI) that does not overlap .5 is regarded as significant because an AUC of .5 represents random discrimination.

## Results

### *Sociodemographic characteristics*

Regarding sociodemographic characteristics, patients in RFPC only differed from LFPC patients in country of birth ( $\chi^2 (2, n = 127) = 8.71, p = .01$ , Cramer's  $V = .26$ ). In the LFPC group, 37 patients (63.8%) were born in the Netherlands, 18 patients (31.0%) in a Dutch Caribbean country, and 3 patients (5.2%) in the Middle East and North Africa (MENA; Balaam & Dillman, 2013). In the RFPC group, 57 patients (82.6%) were born in the Netherlands, 7 patients (10.1%) in the Dutch Caribbean and 5 patients (7.3%) in a MENA country. Twelve patients were excluded from this analysis because their country of birth and its cultures were too diverse to assign them to a group. Post-hoc comparisons showed there were more participants born in the Dutch Caribbean area in LFPC than in RFPC ( $\chi^2 (1, n = 25) = 8.70, p < .01$ ).

The two samples did not differ regarding the patients' highest level of education followed ( $\chi^2 (4, n = 133) = 4.32, p = .36$ ). Patients were divided into the following categories: special primary education or no education, primary education, lower vocational education, secondary education, and higher education. Six patients were excluded from this analysis for lack of information. Neither did the groups differ in employment history prior to current admission ( $\chi^2 (2, n = 139) = .94, p = .63$ ), the categories were stable employment history, unstable employment history, or no employment at all.

### *Clinical characteristics*

Table 1 shows that patients in RFPC differed from LFPC patients on several clinical characteristics. There were more patients in RFPC than LFPC diagnosed with a substance abuse disorder, both currently and formerly. More patients in LFPC than in RFPC had a psychotic vulnerability (defined as a lifetime diagnosis of schizophrenia, schizoaffective disorder or psychotic disorder NOS according to the DSM-IV-TR; APA, 2000), were emotionally neglected during childhood and were taking psychiatric medication. No differences were found between RFPC and LFPC patients' IQ scores, the number diagnosed on Axis I as compared to a main diagnosis on Axis II of the DSM-IV-TR, substance dependence disorder (both recent and lifetime classification), autistic spectrum disorder, sexual

**Table 1.** Comparison between regular forensic psychiatric care (RFPC) group and long-term forensic psychiatric care (LFPC) group on categorical clinical characteristics. Substance abuse/dependence disorders and Autism Spectrum Disorders were included according to the patient's DSM-IV-TR diagnosis. Missing cases are due to a lack of information in the patient's file.

Categorical variable	Patient group				Significance level	Effect size	
	RFPC		LFPC			$\chi^2$ (df)	$p$
<i>Specification</i>	<i>n</i>	(%)	<i>n</i>	(%)			
IQ scores	71		55		3.37 (1)	.07	
>85	50	(70.4)	30	(54.5)			
≤85	21	(29.6)	25	(45.5)			
Axis current main diagnosis	78		58		1.38 (1)	.24	
Axis I	49	(62.8)	42	(72.4)			
Axis II	29	(37.2)	16	(27.6)			
Substance abuse disorder recent	76		61		17.63 (1)	<.001**	-.36
Yes	24	(31.6)	2	(3.3)			
Substance abuse disorder lifetime	76		61		12.77 (1)	<.001**	-.31
Yes	47	(61.8)	19	(31.1)			
Substance dependence disorder recent	74		61		2.44 (1)	.12	
Yes	16	(21.6)	7	(11.5)			
Substance dependence disorder lifetime	74		61		2.16 (1)	.14	
Yes	36	(48.6)	22	(36.1)			
Autism spectrum disorder	78		60		3.56 (1)	.06	
Yes	6	(7.7)	11	(18.3)			
Sexual deviation	76		59		.96 (1)	.33	
Yes	21	(27.6)	12	(20.3)			
Psychotic vulnerability	78		61		7.86 (1)	.01*	.24
Yes	25	(32.1)	34	(55.7)			
Sexually abused	57		32		1.32 (1)	.25	
Yes	18	(31.6)	14	(43.8)			
Sexual abuser	76		60		.54 (1)	.46	
Yes	37	(48.7)	33	(55.0)			
Parental psychiatric history	42		25		4.75	.03	.27
Yes	17	(40.5)	17	(68.0)			
Emotional neglect	73		50		6.96	.01*	.24
Yes	40	(54.8)	39	(78.0)			
Psychiatric medication	78		61		10.62	<.01*	.28
Yes	42	(53.8)	49	(80.3)			
Classification on Axis I and Axis II	78		61		3.29	.07	
Classification(s) only on one axis	14	(17.9)	19	(31.1)			
Classification(s) on both axes	64	(82.1)	42	(68.9)			

\* $p \leq .01$ ; \*\* $p < .001$ .

deviation, whether sexually abused as a child, whether had ever sexually abused others, the number with parents with a psychiatric history, the number with a classification on both Axis I and Axis II of the DSM-IV-TR.

Table 2 shows that the dynamic clinical and risk-items of the HCR-20 (Webster et al., 1997) were significantly higher in LFPC patients than in RFPC patients as well as the total score of the HCR-20. Also total scores on security needs (DUNDRUM-1), program completion (DUNDRUM-3) and patient recovery (DUNDRUM-4; Kennedy et al., 2010) were all significantly higher in LFPC patients

**Table 2.** Comparison between regular forensic psychiatric care (RFPC) group and long-term forensic psychiatric care (LFPC) group on structured professional judgment measures of risk of violence (HCR-20), need for therapeutic security (DUNDRUM-1), progress in treatment program completion (DUNDRUM-3), and recovery (DUNDRUM-4).

Continuous variable	Patient group				Significance level			Effect size
	RFPC		LFPC		<i>t</i>	<i>df</i>	<i>p</i>	$\eta^2$
	<i>N</i>	Mean (SD)	<i>n</i>	Mean (SD)				
HCR-20 historical items score	78	14.72 (2.75)	61	15.72 (2.86)	2.10	137	.04	
HCR-20 clinical items score	78	4.72 (2.04)	61	5.90 (1.78)	3.59	137	<.001**	.09
HCR-20 risk items scores	77	9.09 (1.45)	61	9.89 (.45)	4.57	95.29	<.001**	.13
HCR-20 total score	77	28.56 (4.70)	61	31.56 (3.90)	4.01	136	<.001**	.11
PCL-R total score	74	20.59 (6.79)	31	22.33 (7.15)	1.18	103	.24	
DUNDRUM-1 total score	78	2.52 (.39)	61	2.78 (.39)	4.05	137	<.001**	.11
DUNDRUM-3 total score	78	2.12 (.88)	61	2.77 (.55)	5.30	131.30	<.001**	.17
DUNDRUM-4 total score	78	2.34 (.74)	61	3.05 (.36)	7.39	117.16	<.001**	.29

Notes: Note that higher scores indicate greater risk (HCR-20) and greater need for therapeutic security (DUNDRUM-1) with less progress (DUNDRUM-3 and DUNDRUM-4) clinical characteristics. Missing cases are due to a lack of information in the patient's file.

\* $p \leq .01$ ; \*\* $p < .001$ .

than in RFPC patients. The LFPC patients had significantly higher scores than RFPC patients for DUNDRUM-1 scores indicating a need for higher levels of therapeutic security. The LFPC patients also had higher scores on DUNDRUM-3 and DUNDRUM-4 indicating less progress in program completion and less progress in recovery. No difference was found on the PCL-R total score (Hare, 1991) or on the HCR-20 historical items.

### Legal characteristics

Comparisons on legal characteristics between RFPC and LFPC patients are shown in Table 3. There were more recidivists and more patients who tried to abscond during the current admission in LFPC than in RFPC. There were no differences found between RFPC and LFPC patients on index offense, offense type of first conviction, lifetime total offenses, age at first conviction, age at index offense or age at first custodial sentence.

### Prediction of LOS

Subsequently, each variable that significantly distinguished between the two groups was entered into a binary logistic regression analysis. In total, there were five logistic regression analyses computed. One with the significant sociodemographic characteristics (country of birth), the second with significant clinical characteristics (substance abuse disorder lifetime, psychotic vulnerability, emotional neglect, psychiatric medication), the third with significant risk scores

**Table 3.** Comparison between regular forensic psychiatric care (RFPC) group and long-term forensic psychiatric care (LFPC) group on legal characteristics. Missing cases are due to a lack of information in the patient's file.

Categorical variable	Patient group				Significance level	Effect size		
	RFPC	LFPC	RFPC	LFPC				
<i>Specification</i>	<i>n</i>	<i>n</i>	(%)	(%)	$\chi^2$ (df)	$p$	$\phi$	Cramer's V
Index offense	77	61	(100)	(100)	.79 (2)	.674		
Violence	45	38	(58.4)	(62.3)				
Sexual violence major (> 16 years)	12	11	(15.6)	(18.0)				
Sexual violence minor (≤ 16 years)	20	12	(26.0)	(19.7)				
Offense type of first conviction	78	61	(100)	(100)	5.13 (4)	.274		
Violence	31	27	(39.7)	(44.3)				
Sexual violence major (> 16 years)	4	9	(5.1)	(14.8)				
Sexual violence minor (≤ 16 years)	9	5	(11.5)	(8.2)				
Theft	19	10	(24.4)	(16.4)				
Other	15	10	(19.2)	(16.4)				
Recidivism	78	61	(100)	(100)	10.44 (1)	.001**	-.27	
Yes	10	22	(12.8)	(36.1)				
No	68	39	(87.2)	(63.9)				

  

Continuous variable	Patient group				Significance level	Effect size	
	RFPC	LFPC	RFPC	LFPC			
<i>Specification</i>	<i>n</i>	<i>n</i>	Mean (SD)	Mean (SD)	<i>t</i>	<i>p</i>	$\eta^2$
Total amount of offenses lifetime	78	61	12.46 (11.56)	13.67 (26.25)	.37	.72	
Age at first conviction	77	61	23.17 (9.05)	23.79 (9.81)	.38	.70	
Age at index offense	78	61	32.44 (10.09)	33.34 (10.39)	.52	.60	
Age at first custody sentence	77	61	26.14 (10.47)	24.74 (10.47)	-.78	.44	
Amount of absconding	78	61	.18 (.42)	.92 (1.44)	3.88	<.001**	.10

\* $p \leq .01$ ; \*\* $p < .001$ .



**Table 4.** Enter-model logistic regressions and omnibus model tests.

Variable	Omnibus model test			Model Summary			Goodness of fit, Hosmer and Lemeshow test			Correctly classified cases						
	$\chi^2$ (n)	df	p	Cox & Snell R <sup>2</sup>	Nagelkerke R <sup>2</sup>	Wald	df	p	OR	$\chi^2$	df	p	RFPC	LFPC	Total	
Sociodemographic characteristics	8.85 (127)	2	.01*	.07						.00	1	1.00	89.9	31.0	63.0	
Clinical characteristics	25.46 (121)	4	<.001**	.19		7.99	2	.02		9.50	8	.30	76.1	68.0	72.7	
Risk taxation	24.29 (139)	2	<.001**	.16		7.80	1	.01*	3.96	3.85	6	.70	66.7	57.4	62.6	
Patient needs	50.24 (139)	3	<.001**	.30		.01	1	.92	.92	7.71	8	.46	76.9	70.5	74.1	
Legal characteristics	29.38	2	<.001**	.19		3.84	1	.05	2.80	1.99	3	.58	74.4	63.9	69.8	
Variable																
Specification for categorical variables		b	SE	Wald	df			Significance level							95% CI for AUC	
									OR	Lower	Upper	AUC	p	Lower	Upper	
<i>Sociodemographic characteristics</i>																
Country of birth																
Netherlands				7.99	2			.02								
Dutch Caribbean country	1.38	.49		7.80	1			.01*	3.96	1.51	10.41					
Middle East and North Africa	-.08	.76		.01	1			.92	.92	.21	4.10					
<i>Clinical characteristics</i>																
Substance abuse disorder lifetime		-1.16	.42	7.61	1			.01*	.32	.14	.72	.35	<.01	.25	.44	
Psychotic vulnerability		.46	.49	.92	1			.34	1.59	.62	4.12	.62	.02	.52	.71	
Emotional neglect		1.16	.46	6.36	1			.01*	3.18	1.3	7.80	.62	.03	.52	.72	
Psychiatric medication		1.03	.53	3.84	1			.05	2.80	1.00	7.86	.63	.01	.54	.73	
<i>Risk taxation</i>																
HCR-20 clinical items score		.02	.11	3.24	1			.07	1.22	.98	1.51	.67	<.01	.57	.76	
HCR-20 risk items score		.91	.34	7.09	1			.01*	2.50	1.27	4.91	.66	<.01	.57	.75	
<i>Patient needs</i>																
DUNDRUM-1 total score		1.51	.59	6.54	1			.01*	4.55	1.42	14.52	.70	<.001	.62	.79	
DUNDRUM-3 total score		-.22	.42	.27	1			.60	.80	.35	1.83	.72	<.001	.64	.81	
DUNDRUM-4 total score		2.27	.61	13.88	1			<.001**	9.69	2.93	31.99	.80	<.001	.72	.87	
<i>Legal characteristics</i>																
Recidivism		1.25	.46	7.54	1			.01*	3.49	1.43	8.54	.62	.02	.52	.71	
Amount of absconding		1.06	.32	11.18	1			<.01**	2.88	1.55	5.34	.66	<.01	.57	.75	

Notes: OR = odds ratio; AUC = receiver operating characteristic area under the curve.

\* $p \leq .01$ ; \*\* $p < .001$ .

(HCR-20 Clinical items, HCR-20 Risk items; Webster et al., 1997), the fourth with significant patient needs scores (DUNDRUM-1, DUNDRUM-3, DUNDRUM-4; Kennedy et al., 2010), and the fifth with significant legal characteristics (recidivism, amount of absconding). The results are shown in Table 4. Each logistic regression model was significant overall. The following variables made a unique significant contribution to the models: Sociodemographic: 63% of cases correctly classified overall, patients born in a Dutch Caribbean Country (3.96 times more likely); clinical characteristics: 73% correctly classified overall, patients with no substance abuse disorder during lifetime (.32 times more likely;  $AUC = .35$ ,  $p < .01$ , 95% CI [.25, .44]), being emotionally neglected as a child (3.18 times more likely;  $AUC = .62$ ,  $p = .03$ , 95% CI [.52, .72]); risk scores: 63% correctly classified overall, higher HCR-20 risk item scores (2.50 times more likely;  $AUC = .66$ ,  $p < .01$ , 95% CI [.57, .75]); patient needs: 74% correctly classified overall, higher patient need for therapeutic security score (DUNDRUM-1; 4.55 times more likely;  $AUC = .70$ ,  $p < .001$ , 95% CI [.62, .79]), higher forensic recovery indicating less progress in recovery (DUNDRUM-4; 9.68 times more likely;  $AUC = .80$ ,  $p < .001$ , 95% CI [.72, .87]); legal characteristics: 70% correctly classified overall, being a recidivist (3.49 times more likely;  $AUC = .62$ ,  $p = .02$ , 95% CI [.52, .71]) and having tried to abscond (2.88 times more likely;  $AUC = .66$ ,  $p < .01$ , 95% CI [.57, .75]). These items were all more likely to be in the group of LFPC patients rather than in the group of RFPC patients.

## Discussion

We compared patients with a relatively long LOS in LFPC with patients with a shorter LOS in RFPC. Regarding sociodemographic data, there were more patients in LFPC born in a Dutch Caribbean country. Comparisons of clinical characteristics showed that there were more patients in LFPC than in RFPC with a psychotic vulnerability, taking psychiatric medication and more were emotionally neglected as a child. Substance abuse disorders were more often reported in RFPC patients. Furthermore, the more dynamic HCR-20 clinical and risk item scores as well as HCR-20 total scores (Webster et al., 1997) were higher in LFPC patients than in RFPC patients indicating a continuing higher risk of violence. Also security needs (DUNDRUM-1), program completion (DUNDRUM-3) and patient recovery (DUNDRUM-4; Kennedy et al., 2010) scores were higher in LFPC patients than RFPC patients indicating a greater seriousness of risk, lack of progress in treatment programs and lack of progress in recovery. Legal data showed that patients in LFPC more often had a history of recidivism and absconded more often from custody or during leave than RFPC patients.

Regarding the predictive analyses, regression modeling showed that LFPC patients were more likely to have been born in a Dutch Caribbean country, been emotionally neglected during childhood, a higher HCR-20 risk item score, a higher security needs score (DUNDRUM-1), a higher (less successful) recovery

score (DUNDRUM-4), be a recidivist and have absconded from custody or during leave and less likely to have had a substance abuse disorder.

Some of the current findings align with earlier findings. For instance, history of absconding and a psychotic disorder were also found to be related to a longer LOS by Andreasson et al. (2014). O'Neill et al. (2003) also found that substance abuse disorder was related to a shorter LOS. Furthermore, a higher patient recovery score (DUNDRUM-4), meaning that a patient has made less progress in his treatment several months prior to the study, was found to be related to a higher LOS which was also found by O'Neill et al. (2003). Davoren et al. (2015) also found that a higher DUNDRUM-1 triage security score predicted a longer LOS. Lower (better) scores in the DUNDRUM-3 program completion and DUNDRUM-4 recovery scores predicted moves to less secure settings (Davoren et al., 2012) and conditional discharge to the community (Davoren et al., 2013) as did the HCR-20 dynamic scales. Another Dutch study found that patients in LFPC are more often recidivists than patients in RFPC (Van der Kraan, Schekman, Nijman, Hulsbos, & Bulten, 2008) which aligns with the present findings.

However, several factors were expected to be related with LOS due to findings of earlier studies but could not be replicated in the present study, such as a younger age at the index offense (Moran et al., 1999), a younger age at the first documented delinquency (Ross et al., 2012), or a higher baseline risk of recidivism (Lammers et al., 2014).

Some of the characteristics associated with a higher LOS can be detected prior to treatment such as emotional neglect during childhood, substance abuse, country of birth, psychotic vulnerability, and a higher DUNDRUM-1 security needs profile. Other characteristics only become obvious during treatment, such as the dynamic HCR-20 clinical and risk items scores, DUNDRUM-4 patient recovery scores, DUNDRUM-3 program completion scores, recidivism, and absconding. Program completion was significantly worse in LFPC patients but in a regression model it was the recovery measure that had the highest significance. This may suggest that treatment completion and recovery have direct and indirect (mediated) effects which could be clarified with a prospective study.

Treatment in forensic psychiatry aims at a safe return to society, but these characteristics show that the risk of recidivism in this group of patients is still too high for a safe return to society or to a less secure place. Seemingly, the treatments currently offered are not effective for this certain group of patients. One possible explanation is that the treatments offered at the moment are not as effective for Dutch Caribbean patients as they are for Dutch patients. Also our treatment programs might be especially helpful for patients with a substance abuse disorder so that they can be discharged earlier than patients without a substance abuse disorder. Acknowledging the fact that factors determining security needs (DUNDRUM-1) are higher in the patients in LFPC, that they have been more often emotionally neglected in childhood and that a psychotic vulnerability is present more often, might also indicate that the overall

psychopathology among patients in LFPC who have higher LOS is more severe and that their psychopathology develops earlier in life. Their psychopathology might, therefore, be more difficult to treat effectively with the currently available treatment options.

There are some limitations to the present research. For instance, some of the clinical characteristics studied are part of the decision whether or not a patient gets admitted to LFPC, such as a higher risk of recidivism and little recovery during treatment. Therefore, those characteristics are more likely to be higher in LFPC patients than in RFPC patients. However, the decision for admission to a LFPC facility by the independent national organ is a case by case decision, taking those but also other factors into consideration. The present study investigated those factors on a broader scale, although a bias towards higher (less successful) recovery scores and higher risk scores in LFPC patients is likely.

Furthermore, the current study is a cross-sectional study which makes it more difficult to draw conclusions about which factors predict a longer LOS as some of the participants of the RFPC group might still be admitted to LFPC in the future. However, LFPC patients only constituted 8.6% of the total amount of patients in high security forensic psychiatric care in the Netherlands between 2009 and 2013 (Ministerie van Veiligheid en Justitie, 2014). Hence, only a small group of the current RFPC group is likely to be admitted to LFPC later on.

Also, all participants were staying in the same forensic psychiatric center. The hospitals can differ in their provided treatments which might result in a bias of treatment effects in the chosen study sample. However, the current hospital is the only Dutch forensic psychiatric hospital currently offering LFPC. Also admittance of patients to forensic psychiatric hospitals is organized on a national level in the Netherlands so no bias is expected in the current sample of patients prior to treatment. It is also important to keep in mind that the current findings are studied in a Dutch context which means that Dutch law and system of mental health care are applicable to the present sample.

Besides, data were exclusively gathered from patient files. The quality and completeness of files can differ, especially for older patient files. The manner in which information was documented by institutions, such as the ministry of justice and mental health care institutions, has undergone changes throughout the past decades. Therefore, some information could have been lost which could potentially have led to an underestimation of certain variables, such as the amount of previous convictions or employment history.

The present findings give some guidance for implications in the clinical field. A group of patients with certain characteristics might be at increased risk of a prolonged LOS. Therapists could use this information to be more aware that those patients run a higher risk of a longer LOS. Also, the information might be used in the future to establish step-down 'sequel' or additional services designed for patients at risk of a long LOS in order to reduce LOS, enhance treatment efficiency and reduce costs. However, the current findings also show that certain



factors are found to be associated with LOS in one country but not another. More international collaboration is still necessary to align research on LOS in forensic psychiatry to create a common ground on which results can be compared more easily in spite of the diverse jurisdictions in order to develop a best practice approach and effective treatments in (long-term) forensic psychiatry.

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## Disclosure statement

No potential conflict of interest was reported by the authors.

## References

- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR*. Washington, DC: American Psychiatric Association.
- Andreasson, H., Nyman, M., Krona, H., Meyer, L., Anckarsäter, H., Nilsson, T., & Hofvander, B. (2014). Predictors of length of stay in forensic psychiatry: The influence of perceived risk of violence. *International Journal of Law and Psychiatry*, 37, 635–642. doi:10.1016/j.ijlp.2014.02.038
- Balaam, D. N., & Dillman, B. L. (2013). *Introduction to International Political Economy*. Tacoma, Washington: Pearson.
- Brown, K., & Fahy, T. (2009). Medium secure units: Pathways of care and time to discharge over a four-year period in South London. *The Journal of Forensic Psychiatry & Psychology*, 20, 268–277. doi:10.1080/14789940802327291
- Davoren, M., Abidin, Z., Naughton, L., Gibbons, O., Nulty, A., Wright, B., & Kennedy, H. G. (2013). Prospective study of factors influencing conditional discharge from a forensic hospital: The DUNDRUM-3 programme completion and DUNDRUM-4 recovery structured professional judgement instruments and risk. *BMC Psychiatry*, 13(1), 1–16. doi:10.1186/1471-244x-13-185
- Davoren, M., Byrne, O., O'Connell, P., O'Neill, H., O'Reilly, K., & Kennedy, H. G. (2015). Factors affecting length of stay in forensic hospital setting: Need for therapeutic security and course of admission. *BMC Psychiatry*, 15(1), 1–15. doi:10.1186/s12888-015-0686-4
- Davoren, M., O'Dwyer, S., Abidin, Z., Naughton, L., Gibbons, O., Doyle, E., ... Kennedy, H. G. (2012). Prospective in-patient cohort study of moves between levels of therapeutic security: The DUNDRUM-1 triage security, DUNDRUM-3 programme completion and DUNDRUM-4 recovery scales and the HCR-20. *BMC Psychiatry*, 12(1), 1–12. doi:10.1186/1471-244x-12-80
- De Vogel, V., & De Ruiter, C. (2006). Structured professional judgment of violence risk in forensic clinical practice: A prospective study into the predictive validity of the Dutch HCR-20. *Psychology, Crime & Law*, 12, 321–336. doi:10.1080/10683160600569029
- De Vogel, V., De Ruiter, C., Hildebrand, M., Bos, B., & van de Ven, P. (2004). Type of discharge and risk of recidivism measured by the HCR-20: A Retrospective study in a Dutch

- sample of treated forensic psychiatric patients. *International Journal of Forensic Mental Health*, 3, 149–165. doi:10.1080/14999013.2004.10471204
- Dumont, M., Dumais, A., Briand, C., Côté, G., Lesage, A., & Dubreucq, J.-L. (2012). Clinical characteristics of patients deemed to require long-term hospitalization in a civil or forensic psychiatric setting. *International Journal of Forensic Mental Health*, 11, 110–118. doi:10.1080/14999013.2012.690019
- Edwards, J., Steed, P., & Murray, K. (2002). Clinical and forensic outcome 2 years and 5 years after admission to a medium secure unit. *The Journal of Forensic Psychiatry*, 13, 68–87. doi:10.1080/09585180210123294
- Expertisecentrum Forensische Psychiatrie. (2014). *Persoonlijkheidsstoornissen. Landelijk zorgprogramma voor forensisch psychiatrische patiënten met persoonlijkheidsstoornissen*. Retrieved from [http://www.efp.nl/web/images/uploads/publicaties/ZP\\_PerS\\_2.1.pdf](http://www.efp.nl/web/images/uploads/publicaties/ZP_PerS_2.1.pdf)
- Flynn, G., O'Neill, C., McInerney, C., & Kennedy, H. G. (2011). The DUNDRUM-1 structured professional judgment for triage to appropriate levels of therapeutic security: Retrospective-cohort validation study. *BMC Psychiatry*, 11(1), 1–11. doi:10.1186/1471-244x-11-43
- Freestone, M., Bull, D., Brown, R., Boast, N., Blazey, F., & Gilluley, P. (2015). Triage, decision-making and follow-up of patients referred to a UK forensic service: Validation of the DUNDRUM toolkit. *BMC Psychiatry*, 15(1), 1–11. doi:10.1186/s12888-015-0620-9
- García-Pérez, M. A., & Núñez-Antón, V. (2003). Cellwise residual analysis in two-way contingency tables. *Educational and Psychological Measurement*, 63, 825–839. doi:10.1177/0013164403251280
- Grove, P., MacLeod, J., & Godfrey, D. (1998). Forecasting the prison population. *OR. Insight*, 11, 3–9. doi:10.1057/ori.1998.2
- Hare, R. D. (1991). *The Hare Psychopathy Checklist-Revised [PCL-R]*. Toronto: Multi-Health Systems.
- Hildebrand, M., De Ruiter, C., De Vogel, V., & Van der Wolf, P. (2002). Reliability and factor structure of the Dutch language version of Hare's Psychopathy Checklist-Revised. *International Journal of Forensic Mental Health*, 1, 139–154. doi:10.1080/14999013.2002.10471169
- IBM, SPSS Statistics (2011). *SPSS (Version Version 20)*. Armonk, NY: International Business Machines Corp.
- Kennedy, H. G., O'Neill, C., Flynn, G., Gill, P., & Davoren, M. (2010). *The DUNDRUM toolkit. Dangerousness, understanding, recovery and urgency manual (The Dundrum Quartet) V1. 0.21 (18/03/10). Four structured professional judgment instruments for admission triage, urgency, treatment completion and recovery assessments*. Dublin: Trinity College Dublin.
- Lammers, S. M. M., Nijman, H. L. I., & Vrinten, M. (2014). *(Te) lang in de tbs? Een onderzoek naar patiënten die meer dan 15 jaar in de tbs-behandeling zijn* [Too long in TBS? A study on patients undergoing TBS treatment for more than 15 years]. Meppel: WODC, Ministerie van Veiligheid en Justitie.
- Macovei, M. (2000). *The right to liberty and security of the prison: A guide to the implementation of Article 5 of the European Convention on Human Rights* (Vol. 5). Strasbourg Cedex: Council of Europe.
- Maden, A., Friendship, C., McClintock, T., & Rutter, S. (1999). Outcome of admission to a medium secure psychiatric unit. 2. Role of ethnic origin. *The British Journal of Psychiatry*, 175, 317–321. doi:10.1192/bjp.175.4.317
- Margetić, B., Margetić, B. A., & Ivanec, D. (2014). Can personality traits affect detention length in a forensic institution? *Journal of Forensic Psychology Practice*, 14, 277–287. doi:10.1080/15228932.2014.931127
- McKenna, J. (1996). In-patient characteristics in a regional secure unit. *The Psychiatrist*, 20, 264–268. doi:10.1192/pb.20.5.264

- Mental Health Act (2001). *Irish statute book*. Office of the Attorney General 2001. Dublin: Round Hall.
- Ministerie van Veiligheid en Justitie. (2014). *Forensische zorg in getal, 2009–2013*. Retrieved from [https://www.rechtspraak.nl/SiteCollectionDocuments/dforzo-in-getal-2009-2013-def\\_tcm93-563267.pdf](https://www.rechtspraak.nl/SiteCollectionDocuments/dforzo-in-getal-2009-2013-def_tcm93-563267.pdf)
- Moran, M. J., Fragala, M. R., Wise, B. F., & Novak, T. L. (1999). Factors affecting length of stay on maximum security in a forensic psychiatric hospital. *International Journal of Offender Therapy and Comparative Criminology*, 43, 262–274. doi:10.1177/0306624x99433002
- Maßregelvollzugsgesetz – MRVG – of 1999, NRW. § 15 (2016). Retrieved from: [https://recht.nrw.de/lmi/owa/br\\_text\\_anzeigen?v\\_id=5320110406183667013](https://recht.nrw.de/lmi/owa/br_text_anzeigen?v_id=5320110406183667013)
- Nagtegaal, M. H., Horst, R. P. v. d., & Schönberger, H. J. M. (2011). *Inzicht in de verblijfsduur van tbs-gestelden : cijfers en mogelijke verklaringen* [Understanding the duration of forensic psychiatric patients: Numbers and possible explanations]. Meppel: WODC, Ministerie van Veiligheid en Justitie.
- O'Dwyer, S., Davoren, M., Abidin, Z., Doyle, E., McDonnell, K., & Kennedy, H. G. (2011). The DUNDRUM Quartet: Validation of structured professional judgement instruments DUNDRUM-3 assessment of programme completion and DUNDRUM-4 assessment of recovery in forensic mental health services. *BMC Research Notes*, 4(1), 1–12. doi:10.1186/1756-0500-4-229
- O'Neill, C., Heffernan, P., Goggins, R., Corcoran, C., Linehan, S., Duffy, D., ... Kennedy, H. G. (2003). Long-stay forensic psychiatric inpatients in the Republic of Ireland: Aggregated needs assessment. *Irish Journal of Psychological Medicine*, 20, 119–125. doi:10.1017/S0790966700007916
- Ross, T., Querengässer, J., Fontao, M. I., & Hoffmann, K. (2012). Predicting discharge in forensic psychiatry: The legal and psychosocial factors associated with long and short stays in forensic psychiatric hospitals. *International Journal of Law and Psychiatry*, 35, 213–221. doi:10.1016/j.ijlp.2012.02.011
- Rutherford, M., & Duggan, S. (2007). *Forensic mental health services: Facts and figures on current provision*. London: Sainsbury Centre for Mental Health.
- Shah, A., Waldron, G., Boast, N., Coid, J. W., & Ullrich, S. (2011). Factors associated with length of admission at a medium secure forensic psychiatric unit. *The Journal of Forensic Psychiatry & Psychology*, 22, 496–512. doi:10.1080/14789949.2011.594902
- Sharma, A., Dunn, W., O'Toole, C., & Kennedy, H. G. (2015). The virtual institution: Cross-sectional length of stay in general adult and forensic psychiatry beds. *International Journal of Mental Health Systems*, 9(1), 1–12. doi:10.1186/s13033-015-0017-7
- Thomson, L. (2010). Personality disorder and mental health legislation in the UK. *Advances in Psychiatric Treatment*, 16, 336–338. doi:10.1192/apt.bp.109.007849
- Van der Kraan, J., Schekman, M., Nijman, H., Hulsbos, H., & Bulten, E. (2008). Behandelbaarheid bij TBS-patiënten [Treatability of TBS patients]. *Sancties*, 5, 284–293.
- Vertommen, H., Verheul, R., De Ruiter, C., & Hildebrand, M. (2002). *De herziene versie van Hare's Psychopathie Checklist (PCL-R)* [The revised version of Hare's Psychopathy Checklist (PCL-R)]. Lisse: Swets Test.
- Webster, C., Douglas, K., Eaves, D., & Hart, S. D. (1997). *HCR-20: Assessing risk for violence (Version 2)*. Burnaby: Simon Fraser University.
- Wechsler, D., Coalson, D. L., & Raiford, S. E. (2008). *WAIS-IV: Wechsler adult intelligence scale*. San Antonio, TX: Pearson.
- Zwets, A. J., Hornsveld, R. H. J., Neumann, C., Muris, P., & van Marle, H. J. C. (2015). The four-factor model of the Psychopathy Checklist – Revised: Validation in a Dutch forensic inpatient sample. *International Journal of Law and Psychiatry*, 39, 13–22. doi:10.1016/j.ijlp.2015.01.016