

Appendix 5

CANFOR Reliability and Validity Paper

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The reliability and validity of the forensic Camberwell Assessment of Need (CANFOR): a needs assessment for forensic mental health service users

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Abstract

No instrument exists that measures the individual needs of forensic mental health service users (FMHSUs). The aim of this study was therefore to develop a valid and reliable individual needs assessment instrument for FMHSUs that incorporated staff and service user views and measured met and unmet needs. The Camberwell Assessment of Need was used as a template to develop CANFOR. Consensual and content validity were investigated with 50 forensic mental health professionals and 60 FMHSUs. Both were found to be satisfactory. Concurrent validity was tested using the Global Assessment of Functioning and a five-point needs scale, and again was found to be satisfactory. Reliability studies were carried out with 77 service users and 65 staff in high and medium security psychiatric services in the UK. Inter-rater reliability, rating whether a need was present or not, was high for service users (0.991) and staff (0.998). Similarly high reliability was found for unmet needs (0.985 and 0.972, respectively). Test–retest reliability was found to be moderately high for service users (0.795) and staff (0.852) when ratings were made two weeks apart. Similar levels were found for ratings of unmet needs (0.813 and 0.699, respectively). The average interview time was 23 minutes. CANFOR has good validity and reliability, and is suitable for further testing with other service user groups. Copyright © 2008 John Wiley & Sons, Ltd.

Key words: needs assessment, forensic mental health, reliability, validity, CANFOR

Background

The needs of forensic mental health service users (FMHSUs) continue to be the topic of much academic and clinical debate. Coupled with this, in the UK and elsewhere, there has been continuing emphasis on the recommendation to use needs assessments as a central component in service planning, development and

evaluation in order to deliver effective and efficient services (e.g. Cohen and Eastman, 2000; Department of Health and Home Office, 1992; White et al., 2006).

FMHSUs can and do have complex and multiple needs that change over time and which may well require support from a number of different services at any one time (e.g. Thomas et al., 2004; Thomas et al.,

2003). Being able to assess these needs in a standard way is therefore imperative, both for the delivery of effective treatment interventions and for the development of tailored aftercare packages. However, the means and methods of assessing the individual needs of this client group have, to some extent, been neglected with the focus instead being much more on the need to develop assessment tools focussing on security and risk issues (e.g. Collins and Davies, 2005; Maden *et al.*, 1993; Shaw *et al.*, 1994).

One scale that does include some need domains, the Level of Service Inventory – Revised (Andrews and Bonta, 1995), only considers criminogenic needs (i.e. needs that are associated with changes in the probability of recidivism), and omits more general (individual) needs due to their weak association with recidivism. However, the individual needs of FMHSUs also require assessment in a coherent and consistent fashion (Shaw, 2002); for a number of ethical, just, and plain decent reasons (Andrews *et al.*, 2006). Therefore this study aimed to develop a needs assessment that specifically focussed on identifying the health and social needs of FMHSUs.

Methods

Development of CANFOR

The Camberwell Assessment of Need (CAN: Phelan *et al.*, 1995; Slade *et al.*, 1999) was used as a template. While many of the CAN need domains were applicable to FMHSUs, not all of their needs were represented adequately or in sufficient depth. Therefore the CAN was adapted, with questions reworded and domains added. Revisions were carried out by an interdisciplinary team, covering community and forensic services, comprised of four of the authors (GT, MH, PM and JP) and one other experienced consultant psychiatrist. The original criteria of the CAN were preserved, i.e. that it should (1) have adequate psychometric properties, (2) be valid and reliable, (3) be able to be completed within 30 minutes, (4) be usable by a wide range of professionals, (5) be easily learned and used without extensive training, (6) be suitable for routine clinical practice and research, and (7) be applicable to a wide range of populations and settings.

CANFOR, like the other CAN instruments, was developed to be able to record the views of service users and staff separately for each need domain. The scoring of each need domain is therefore based directly on the

views of the interviewee. Any differences in perceptions of need (between service users and staff) are apparent by directly comparing the ratings.

A need is defined as being present when the interviewee indicates that there have been difficulties in a particular area over the last month. If a need is deemed present, the domain is then scored as either met or unmet. A met need is defined where a difficulty has been identified for which an appropriate intervention is currently being received. An unmet need is defined where a difficulty has been identified for which no interventions are currently being received, from either formal or informal sources, or that any interventions or support being received are not helping. If a need is not considered to be present it can be scored as no need or, in certain instances, not applicable. The total need score is defined as the sum of the number of met needs and unmet needs (Thomas *et al.*, 2003).

One of the authors (MH) piloted the draft on 20 service users and 17 staff members. Based on this piloting phase, revisions were then made to CANFOR in consultation with the research team. In particular one item, originally called 'concordance', was revised to address 'treatment' needs instead.

Participants

Studies were carried out in a medium security psychiatric hospital and a high security psychiatric hospital in the UK. Initial lists of all inpatients in the hospitals on determined census dates were collated. A sample size calculation suggested that a sample of 45 service users would be sufficient to estimate the inter-rater reliability to within a confidence interval of approximately ± 0.05 (i.e. from 0.9–1.00 assuming that it was about 0.9), and that a sample of 30 service users from each site would be able to estimate the test–retest reliability to within approximately ± 0.1 (i.e. from 0.65 to 0.85, assuming that it was about 0.7).

A stratified random sample for each hospital unit (ward) was selected by one of the authors (ST). Half of the service users on each unit were originally selected, taking every second name on the alphabetical bed listings. Individuals were excluded if they had an intellectual disability diagnosis, or where otherwise requested by the Responsible Medical Officers or clinical teams. The latter included an inability to give informed written consent and safety issues associated with completing the interviews. On exclusion, the next person on the list was approached. Eligible participants were

approached and given brief verbal and written details about the study, and then a time was arranged for the researcher to return, usually the following day, to answer any questions and to seek written consent. Their primary nurse, or a qualified member of staff who identified themselves as knowing the individual participants well, was then approached and interviewed separately. This process continued until either the requisite sample had been reached for the unit, or all of the potential participants had been approached. Ethical approval was obtained from the host institution and the Local Research Ethics Committees for the two hospitals.

Validity studies

Content validity was investigated using a brief questionnaire to assess the views of a convenience sample of FMHSUs in medium and high security psychiatric services. Participants were asked to rate each CANFOR domain for its relevance in relation to the individual needs of FMHSUs, using a four-point scale from 'not at all relevant' to 'very relevant'; and to identify the most and least relevant domains, whether any areas of need were not covered, and any other comments they had about the measure.

Consensual validity was explored by a survey of 50 forensic mental health professionals from a range of professional backgrounds in the UK. Those surveyed were a convenience sample of experts in the field, identified by members of the research team. They were sent a brief postal questionnaire that investigated their views about the need for CANFOR, ratings of relevance, comprehensiveness and length, and whether there were any missing need domains in the measure.

Two methods of investigating face validity were used. First, the Flesch ease of reading score (Grammatik Software, 1992) was calculated to indicate how difficult it was to understand the text used in CANFOR. Second, the staff survey included questions as to the utility and comprehensiveness of CANFOR in highlighting the major needs of FMHSUs.

Due to a lack of a published 'gold standard' to compare the CANFOR with, two approaches to establishing construct validity were used. First, the Global Assessment of Functioning (GAF) Scale (APA, 1994) was scored, with separate symptoms, disability and total GAF ratings rated. Ratings on each of the subscales were made according to a continuous scale ranging from 90 down to zero, with lower scores indicating

greater severity and/or lower functioning. In this instance, GAF scores represented the most severe level of symptoms and disability observed during the last month. Second, staff rated each service users overall level of need on a five-point scale (1 = no to low, 2 = low to moderate, 3 = moderate, 4 = moderate to high, and 5 = high level of overall need). The GAF and five-point need ratings were completed before CANFOR was completed.

Reliability studies

Four raters were used to test inter-rater reliability, comprising three social science graduates and a psychiatrist. No formal training was provided. All interviews were carried out with the interviewer and a second 'silent' rater in a quiet room with the interviewee. For the reliability studies, the interview comprised an interviewer who asked to respondents (FMHSUs or staff members) the questions and rated the responses, while the second rater sat silently in the room simultaneously scoring the responses to the questions independent of the interviewer. Interviews were timed by the interviewers.

Test-retest reliability was investigated by re-interviewing half of the service users, one or two weeks after the first interview. This time frame was selected following the assumption that needs would remain relatively stable over that time period (Streiner and Norman, 1995, p. 114). The same interviewer completed both interviews.

Statistical analysis

Summary descriptive statistics were calculated. For construct validity, the association between CANFOR scores, GAF scores and estimated need level were assessed using Kendall's tau-b rank correlation coefficient. Intra-class correlations (ICCs) were calculated, using a two-way mixed model defining agreement in terms of consistency, to assess both inter-rater and test-retest reliability for continuous scores (Bland and Altman, 1986) (need versus no need and unmet need versus met or no need). The ICCs represent the ratio of the variance of the true score between subjects and the total variance (Leese et al., 2001). Analyses were carried out in the Statistical Package for Social Sciences (SPSS version 15.0, 2006). The Flesch Readability test was computed using Grammatik Software (1992) and verified using the readability statistics option in Microsoft Word.

Results

Content validity

Sixty FMHSUs were interviewed. All items were thought to be at least moderately relevant. Additional items were suggested by two FMHSUs, but referred to interventions (psychotherapy and drug treatment) rather than needs.

Consensual validity

Forensic mental health professionals expressed that there was a need for such a measure and that CANFOR was relevant and useful to highlight individual need in FMHSUs. The consensus was that the instrument was adequate in length. All agreed that developing a shortened one-page version of CANFOR would be clinically useful. The only additional items suggested concerned risk-specific information, i.e. extreme levels of violence directed towards self or others. As CANFOR was developed as a screen to highlight problem areas, not to provide in-depth risk assessment and/or management data, these items were not added to the instrument.

Face validity

CANFOR had a Flesch ease of reading score of 59, which means that it is the preferred level for most readers, with an average word length of 1.63 syllables indicating that 'most readers could comprehend the vocabulary'. The general opinion of the forensic mental health professionals surveyed was that items included in CANFOR covered the major difficulties faced by FMHSUs in inpatient and community settings.

Reliability and validity study

One hundred and five FMHSUs were approached to participate in the reliability and validity sub-study. Twenty-six declined and two were excluded for safety reasons at the request of the Responsible Medical Officer. Refusers were significantly more likely than participants to be younger, male and resident in medium security psychiatric services.

The staff interviewed for this component of the study were all qualified mental health nurses, who reported having worked predominantly on the particular units and having known the individual participants for a minimum of six months (or sufficiently well where length of stay was less than six months). The characteristics of the FMHSUs are shown in Table 1.

Profile of needs

Staff rated FMHSUs as having an average of 8.7 total needs [standard deviation (SD) = 2.3] out of a possible 25, with 2.3 (SD = 1.8) of these needs considered to be unmet. A simple histogram of total need scores revealed a normal distribution (Figure 1), while total unmet need scores were positively skewed, with 63% of the sample being rated as having two or less unmet needs overall (Figure 2). Highest staff-rated needs (regardless of being met or unmet) were in the domains of daytime activities (95%), psychotic symptoms (83%) and information (77%). Highest levels of unmet need, according to staff perceptions, were in the areas of daytime activities (42%), psychotic symptoms (33%) and accommodation (26%).

By contrast, FMHSUs reported significantly less needs than staff ($t = 4.79$, $p < 0.01$), with an average of 6.8 needs (SD = 2.4) out of a possible 25. They reported that an average of 2.4 of these needs (SD = 2.1) were unmet. Needs were most commonly reported by FMHSUs in the areas of daytime activities (88%), physical health (62%) and psychotic symptoms (61%). Highest levels of unmet need were reported with accommodation (34%), daytime activities (23%) and information (25%). The distribution of total needs and unmet needs reported was consistent with the staff ratings displayed in Figures 1 and 2.

Construct validity

Total need scores on CANFOR, as rated by the primary nurse, were compared with GAF scores and the five-point need score. The GAF scale was completed for 60 of the FMHSUs and the estimated need score for the entire sample. The mean GAF symptoms score was 54.5 (SD = 21), and mean disability score of 63.9 (SD = 18.2). The mean overall need score, on the five-point scale, was 3.4 (SD = 1.04, range 1–5). The GAF total score, GAF symptoms score and ratings on the five-point needs scale followed a normal distribution. GAF disability scores were negatively skewed, with 30% of the sample being rated by primary nurses as functioning at the top end of the scale (score of 80 or higher).

Total needs were significantly associated with GAF symptom scores [$\tau = -0.27$, $N = 52$, 95% confidence interval (CI) = 0.07–0.469], GAF disability scores ($\tau = -0.24$, $N = 52$, 95% CI = 0.06–0.42) and GAF total scores ($\tau = -0.27$, $N = 52$, 95% CI = 0.07–0.46); with less severe symptoms, disability and overall functioning being associated with a lower number of overall needs.

Table 1. Characteristics of the high security and medium security sample

Characteristics	High security unit n = 52 (%)	Medium security unit n = 25 (%)	Total N = 77 (%)
<i>Gender</i>			
Male	31 (60)	22 (88)	53 (69)
<i>Age</i>			
Mean	39.54	37.12	38.75
Median	37	36	36
Standard deviation	11.40	10.69	11.16
Range	22–79	21–66	21–79
<i>Length of stay (months)</i>			
Mean	100.78	16.44	73.04
Median	87	15	37.50
SD	104.65	10.14	94.47
<i>Ethnicity¹</i>			
White	37 (71)	10 (40)	47 (61)
Other	15 (29)	15 (60)	30 (45)
<i>Diagnosis²</i>			
Schizophrenia, schizotypal and delusional disorders	37 (71)	24 (96)	61 (79)
Personality disorder	13 (25)	1 (4)	14 (18)
Mood affective disorders	2 (4)	–	2 (3)
<i>Source of admission</i>			
Prison	36 (69)	11 (44)	47 (61)
Medium security	11 (21)	3 (12)	14 (18)
High security	1 (2)	8 (32)	9 (12)
Other	4 (8)	3 (12)	7 (9)
<i>Section of MHA (1983)</i>			
Section 3	8 (15)	2 (8)	10 (13)
Section 35	1 (2)	–	1 (1)
Section 37 (inc. Notional)	4 (8)	5 (20)	9 (12)
Section 38	3 (6)	–	3 (4)
Section 37/41	26 (50)	16 (64)	42 (55)
Section 47/49	7 (14)	–	7 (9)
Section 48/49	–	1 (4)	1 (1)
CPIA (1964 or 1991)	2 (4)	1 (4)	3 (4)
Section 45a	1 (2)	–	1 (1)
<i>Legal category (according to case files)</i>			
Mental illness	32 (62)	24 (96)	56 (73)
Psychopathic disorder	12 (23)	–	12 (16)
Mental illness and psychopathic disorder	8 (15)	1 (4)	9 (12)
<i>Index offence³</i>			
Homicide	21 (40)	5 (20)	26 (34)
Violence	9 (17)	12 (48)	21 (27)
Sexual offence	4 (8)	3 (12)	7 (9)
Arson	9 (17)	–	9 (12)
No index offence	5 (10)	–	5 (6)
Other	4 (8)	5 (20)	9 (12)

¹Based on self-report of patient.²ICD-10 category diagnoses from case files (WHO, 1992).³Where there was more than one index offence recorded the most serious offence was reported.

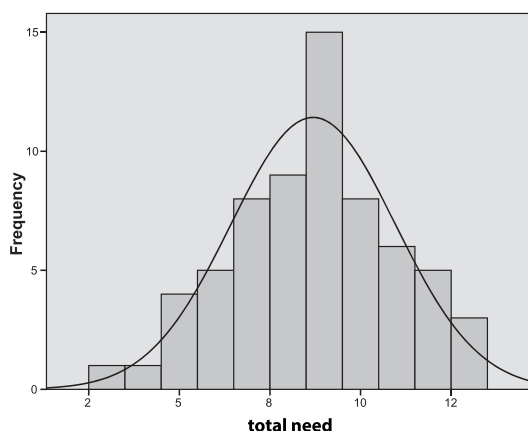


Figure 1. Histogram of total number of staff rated needs.

There was a significant positive correlation between the total needs score on CANFOR and the five-point need score ($\tau = 0.37$, $N = 62$, 95% CI = 0.19–0.55).

Unmet needs were weakly associated with GAF symptom scores ($\tau = -0.210$, $N = 52$, 95% CI = -0.01 – 0.42), GAF disability scores ($\tau = -0.118$, $N = 52$, 95% CI = -0.03 – 0.324) and GAF total scores ($\tau = -0.182$, $N = 52$, 95% CI = -0.03 – 0.39); with higher GAF scores (showing increased levels of functional ability) being related to lower levels of unmet need. There was also a positive correlation between unmet needs and the five-point needs score ($\tau = 0.176$, $N = 62$, 95% CI = -0.01 – 0.37).

Reliability studies

Seventy-seven service users and 65 staff were interviewed at Time 1. Due to staffing difficulties the remaining 12 staff interviews were not completed within a timeframe that would lead to meaningful comparison.

Inter-rater reliability

Fifty-one service user and 38 staff interviews were silently rated by a second person in the room at Time 1. ICCs for total needs score and total unmet need scores indicated a high level of agreement between raters for both staff and FMHSU interviews (Table 2).

Test–retest reliability

Thirty-two FMHSUs and 32 staff were interviewed at Time 2. CANFOR data were complete for 27 of the

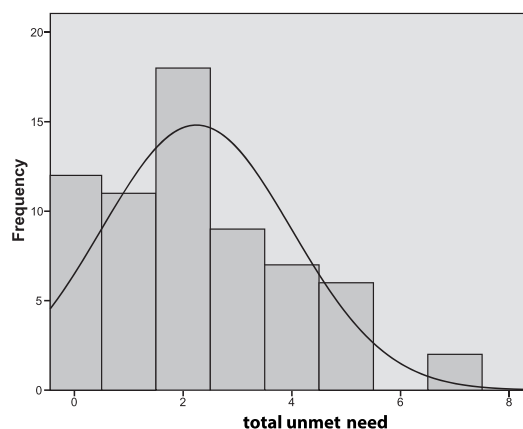


Figure 2. Histogram of total number of staff rated unmet needs.

Table 2. Inter-rater and test–retest reliability for total CANFOR scores

Total number of needs	Intraclass correlation coefficient (ICC)	
	User rating	Staff rating
<i>Inter-rater reliability</i>	<i>n = 51</i>	<i>n = 38</i>
Needs, whether met or unmet	0.991	0.998
Unmet needs	0.985	0.972
<i>Test–retest reliability</i>	<i>n = 30</i>	<i>n = 27</i>
Needs, whether met or unmet	0.795	0.852
Unmet needs	0.813	0.699

staff and 30 of the FMHSUs re-interviewed at Time 2. ICCs for total need scores and total unmet needs were moderate to high (Table 2).

Domain specific reliability coefficients

ICCs were also calculated for each of the 25 CANFOR domains. ICCs were calculated in relation to overall agreement about the presence of a need (regardless of whether it was met or unmet) and agreement on ratings of unmet needs only for staff and FMHSU interviews separately (Tables 3 and 4).

Discussion

This study aimed to develop and test the reliability and validity of an individual needs assessment for forensic mental health service users. CANFOR was developed to highlight frequent problem areas for FMHSUs. It

Table 3. Reliability of each CANFOR domain based on interviews with staff

CANFOR domains	Presence of a need		Rating an unmet need	
	Inter-rater	Test–retest	Inter-rater	Test–retest
Accommodation	0.98	0.89	0.92	0.70
Food	1	0.64	0.92	0
Living environment	1	0.78	1	0
Self care	1	0.31	1	0
Daytime activities	1	0.79	1	0.88
Physical health	0.96	0.83	0.79	0
Psychotic symptoms	1	0.95	1	0.43
Information	0.97	−0.22	1	0
Psychological distress	0.96	0.64	0.66	0
Safety to self (self-harm)	1	0.94	1	0.91
Safety to others (violence)	0.98	0.60	0.92	−0.13
Alcohol	1	0.31	0.92	−0.11
Drugs	0.98	0.68	0.92	0
Company	1	0.70	1	0.82
Intimate relationships	1	0.57	1	−0.13
Sexual expression	0.98	0.87	0.88	0.79
Childcare	1	0.68	1	1
Basic education	1	0.84	1	0
Telephone	1	1	1	0
Transport	1	0	1	0
Money	1	0.79	1	1
Benefits	0.97	0	0.80	0
Treatment	0.98	0.76	0.80	0
Sexual offences	0.95	0.82	0	1
Arson	1	0.68	–	0.79

Note: Inter-rater reliability with 38 staff, test–retest reliability with 27 staff.

does not seek to go into any detail about the identified problem domains. Where particular difficulties are identified it is recommended that further assessments are carried out to detail specific risks and the need for specialized interventions.

Validity studies

In spite of a lack of a ‘gold standard’ comparator at the time of development, the validity studies suggest that there is a need for an individual needs assessment for FMHSUs and that CANFOR may have some utility in this respect.

Inter-rater reliability studies

CANFOR demonstrates high levels of inter-rater reliability with both staff and service user interviews. Domain specific analyses suggested that raters agreed

least when interviewing staff about psychological distress and physical health; and about treatment and self-harm when interviewing FMHSUs. Additional attention may need to be paid to these areas when assessing needs.

Test–retest reliability

Overall, the coefficients for test–retest reliability with the FMHSU participants were moderate to high. Lowest consistency between ratings when interviewing FMHSUs at two close time intervals were found for money, physical health, sexual expression and psychotic symptoms. The lowest consistency between ratings when interviewing staff about their service users was found for violence, alcohol, intimate relationships and psychotic symptoms. Reasons for these inconsistencies are not immediately clear from the data. There has

Table 4. Reliability of each CANFOR domain based on interviews with service users

CANFOR domains	Presence of a need		Rating an unmet need	
	Inter-rater	Test–retest	Inter-rater	Test–retest
Accommodation	1	0.75	1	0.55
Food	0.98	0.97	1	0
Living environment	1	−0.10	0	0
Self care	0	0	0	0
Daytime activities	0.99	0.68	0.97	0.83
Physical health	0.98	0.67	0.93	−0.07
Psychotic symptoms	1	0.79	1	0.36
Information	0.98	0.49	0.98	0.60
Psychological distress	1	0.92	1	0.87
Safety to self (self-harm)	0.91	0.34	0.84	0.62
Safety to others (violence)	0.99	0.63	0.94	0.63
Alcohol	0.80	0.66	0	0.79
Drugs	1	1	0	0
Company	0.98	0.64	0.80	0.49
Intimate relationships	1	0.79	1	0.79
Sexual expression	1	0.33	1	0.33
Childcare	0.95	0.68	0.95	0.66
Basic education	1	0.76	1	0.88
Telephone	0.97	−0.07	0.85	0
Transport	1	−0.07	1	0
Money	0.99	−0.10	0.94	−0.07
Benefits	0.96	0.85	0.96	0.52
Treatment	0.96	0.56	0.83	0
Sexual offences	0.97	1	1	0
Arson	1	0	0	0

Note: Inter-rater reliability with 51 service users, test–retest reliability with 30 service users.

been some suggestion that mood state should be taken into account when interpreting subjective measures relating to quality of life based on self-report (e.g. Holloway and Carson, 1999; Ruggeri *et al.*, 2003). It may be that these domains are more susceptible to changes in psychopathology among the FMHSUs; hence the changes in reported need between Time 1 and Time 2. Similarly, the low consistency in certain need domains for staff interviews may be indicative of changes in presentation of the FMHSUs. Alternatively, it may be that being involved in the research simply led them to identify need areas for their patients, which they then acted upon before they were re-interviewed. Further study investigating these issues in relation to ‘sensitivity to change’ may therefore be indicated. This remains an area for further scientific inquiry.

In terms of making ratings as accurate and consistent as possible for both clinical and research use; some recent research has suggested that there may be differences in the perceptions of, and ratings made by, people from different professional backgrounds (Davies *et al.*, 2006), due to differences in their clinical frames of reference, any specialist training received and levels of experience. Ecob *et al.* (2004) suggest the need for specialized training to address any adjustments required to counter such effects. Due to the additional complexities of FMHSUs, and addressing identified needs within the wider framework of risk and accountability (Andrews and Bonta, 2003; Cohen and Eastman, 2000), some formalized training about how to score CANFOR may address some of the differences between raters, and lead to greater consistency and therefore practical utility.

CANFOR offers one potential approach to assessing the individual needs of FMHSUs in a systematic and simple way and allows comparability with other CAN assessments and populations. A book describing the three versions of CANFOR, along with a guide to training, is now available (Thomas et al., 2003), translations of the CANFOR scale are underway in several other countries including Spain and Japan, and the CAN website contains further details about CANFOR.

Further research is required to ascertain its suitability in correctional and community services, with larger samples covering wider geographical areas and different services. Further work is also warranted to examine the relationships between need, risk and outcome in the short and longer term (e.g. Andrews et al., 2006) in order that the best possible care and treatment can be provided to patients while at the same time protecting the wider community.

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Declaration of Interests

The authors have no competing interests.

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