

PRE-PRINT MANUSCRIPT**Cite as:**

Tarren-Sweeney, M. (2013). The Brief Assessment Checklists (BAC-C, BAC-A): Mental health screening measures for school-aged children and adolescents in foster, kinship, residential and adoptive care. *Children and Youth Services Review*. 35, 771-779.

Abstract

More than half of children and young people in foster, kinship, and residential care, as well as those subsequently adopted from care, have mental health difficulties that require clinical formulation and intervention. While an increasing number of alternate care jurisdictions are instituting universal mental health screening, existing measures may not adequately screen for a range of attachment- and trauma-related mental health difficulties observed among these populations. The Brief Assessment Checklist for Children (BAC-C), and the Brief Assessment Checklist for Adolescents (BAC-A) are 20-item caregiver-report psychiatric rating scales designed to: 1. Screen for and monitor clinically-meaningful mental health difficulties experienced by children and adolescents in various types of care; and 2. Be safely administered and interpreted by health and social care professionals other than child and adolescent mental health clinicians. The BAC-C/A were also designed to be used as brief casework monitoring tools by foster care and adoption agencies, and for treatment monitoring in CAMHS. The BAC-C and BAC-A were derived from the Assessment Checklist for Children (ACC, 120 items) and Assessment Checklist for Adolescents (ACA, 105 items) respectively. Internal consistency of BAC-C (N=347) and BAC-A (N=230) scores were 0.89 and 0.87 respectively. The BAC-C/A were highly accurate in screening for clinical range ACC and ACA scores (area under the curve (AUC) ranging from 0.96 to 0.99), as well as for CBCL clinical range scores (AUCs: BAC-C = 0.89 to 0.92; BAC-A = 0.93 to 0.94). They were moderately accurate in screening for children that caregivers reported had been referred to mental health services (AUCs: BAC-C = 0.74; BAC-A = 0.79). Initial BAC-C/A psychometric properties compare favourably with that of existing screening instruments, including the Strengths and Difficulties Questionnaire and the Brief Problem Monitor (CBCL short form).

Keywords

Mental health screening; developmental psychopathology; attachment and trauma difficulties; foster care; adoption; Assessment Checklist for Children

1. Introduction

The present paper describes the rationale, development and screening accuracy of two 20-item caregiver-report measures, designed to screen for clinically-meaningful mental health difficulties among children and adolescents in foster, kinship, residential and adoptive care – the Brief Assessment Checklist for Children (BAC-C), and the Brief Assessment Checklist for Adolescents (BAC-A).

1.1 The mental health of children in various types of alternate care

Surveys have consistently found that a child in care is more likely than not to have psychological difficulties of sufficient scale or severity to require mental health services, regardless of which country they reside in (Tarren-Sweeney, 2008a). More than twenty population studies in North America, Europe and Australia have measured the mental health of children in care using caregiver-report broad-spectrum (i.e. not restricted to single symptom categories) rating scales – primarily the Child Behavior Checklist (CBCL) (Achenbach & Rescorla, 2001), the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 2001), and the Rutter Scales (Elander & Rutter, 1996). These studies have consistently found that the scale of their mental health difficulties more closely resembles that of clinic-referred children, than of children at large (Armsden, Pecora, Payne, & Szatkiewicz, 2000; Burns et al., 2004; Cappelletty, Brown, & Shumate, 2005; Heflinger, Simpkins, & Combs-Orme, 2000; Pilowsky, 1995; Tarren-Sweeney & Hazell, 2006). Around half of children in care score in the clinical range on one or more CBCL broadband or syndrome scales, while around three quarters score above one or more borderline range cut-points. Studies have also estimated high prevalence of DSM-III-R and DSM-IV Conduct Disorder (17%-45%), Attention-deficit Hyperactivity Disorder (10%-30%), Depression (4%-36%), Post Traumatic Stress Disorder (40%-50%), and Generalized Anxiety (or DSM-III-R Overanxious) Disorder (4%-26%) among mixed samples of children and young people in foster and residential care (Blower, Addo, Hodgson, Lamington, & Towlson, 2004; Dubner & Motta, 1999; Famularo & Augustyn, 1996; McCann, Wilson, & Dunn, 1996; McMillen et al., 2005; Stein, Rae-Grant, Ackland, & Avison, 1994). Children in residential care have greater mental health problems than those in family-type foster care (Hukkanen, Sourander, Bergroth, & Piha, 1999) while those in kinship care have less problems (Holtan, Ronning, Handegard, & Sourander, 2005). The extent to which these differences are attributable to different care experiences, versus selection, is unclear. Although children adopted from care enjoy greater placement stability than those who remain in care, studies carried out in England suggest as many as 60% of children manifest mental health difficulties six years after being adopted from care (Rushton, 2004; Selwyn, Sturgess, Quinton, & Baxter, 2006).

1.1.1 Characteristic difficulties not measured by standard assessment checklists. The Assessment Checklist for Children (ACC) (for ages 4 to 11 years) and the Assessment Checklist for Adolescents (ACA) (for ages 12 to 17 years) are caregiver-report

psychiatric rating scales that measure behaviours, emotional states, traits, and manners of relating to others, as manifested by children and young people in care, and related populations (including those adopted from care)(Tarren-Sweeney, 2007). They were designed to measure a broad range of mental health difficulties observed among children and young people in care that are not adequately measured by standard rating instruments, such as the CBCL, SDQ and Conners scales. These consist of: a number of interpersonal, attachment-related difficulties; insecure relating; social, behavioural and emotional dysregulation; trauma-related anxiety and dissociation; abnormal responses to pain; overeating and related food maintenance behaviours; sexual behaviour problems; self-injury; and suicidal behaviours and discourse. The ACC and ACA were initially designed to measure these difficulties in the longitudinal Children in Care Study (CICS, n=347), carried out in New South Wales, Australia. Findings from the CICS baseline survey suggest that around half of children in care manifest one or more forms of clinically meaningful attachment-related interpersonal behaviour difficulties, and sizeable proportions display clinically significant self-injury (7%) and abnormal responses to pain (5%) (Tarren-Sweeney & Hazell, 2006). A pattern of excessive eating and food maintenance behaviour without concurrent obesity was also identified, resembling the behavioral correlates of Hyperphagic Short Stature (Psychosocial Dwarfism) (Tarren-Sweeney, 2006). Up to a third of children presented with problematic sexual behaviour, which for some is possibly mediated by attachment difficulties (Friedrich et al., 2005) (Tarren-Sweeney, 2008b). Since the ACC was first distributed in 2007, it has been employed in over 20 studies in Europe, North America and Australasia, and is increasingly used as a clinical assessment tool by specialised mental health services for children and young people in care – particularly in Britain and Australia (Chambers, Saunders, New, Williams, & Stachurska, 2010; DeJong, 2010). The ACA was only recently developed, and will be distributed to registered users in 2013.

1.2 Mental health screening for children in alternate care, and those adopted from care

1.2.1 Screening policy and guidelines. In the developed world, many jurisdictions do not have either universal or targeted mental health screening or assessment for children and young people in care. An increasing number of national and state jurisdictions are, however, instituting universal health assessment that includes mental health screening following entry into alternate care – and in some instances, at further defined intervals. In England and Wales and in the Australian state of New South Wales, statutory health assessments that include mental health and behavioural screening were introduced in the last decade, partly as a response to high profile government enquiries into child protection and alternate care. In England, statutory requirements for health screening and monitoring by both health services and local authorities (the social care agencies) go so far as to specify that screening for 4 to 16 year-olds must include the SDQ. Local authorities have a statutory requirement to

monitor the mental health of children following entry into care using the SDQ, and to submit these data to the national government (Department for Children Schools and Families & Department of Health, 2009).

A recent '*Best practices for mental health in child welfare consensus*' conference produced a set of mental health guidelines for child welfare agencies, including two guidelines for mental health screening of children entering alternate care (Romanelli et al., 2009). The first proposed that all children and adolescents should be screened during their first six days in care for risk of harm to themselves or others, likelihood of running away, and mental ill-health and substance use. The second guideline proposed that all children and adolescents should be screened a second time during their first 30 days in care, for 'ongoing mental health needs', using "...a feasible, evidence-based screening instrument..." (Romanelli et al., 2009, p. 172). The American Academy of Child and Adolescent Psychiatry and the Child Welfare League of America (AACAP/CLWA) have published a joint policy statement, in which they recommend *immediate* mental health and drug and alcohol screening for all children and young people who enter care (within one day of placement); followed by universal, comprehensive mental health and drug and alcohol assessment within the first 60 days after placement; and followed thereafter by periodic, individualised re-assessment (American Academy of Child and Adolescent Psychiatry & Child Welfare League of America, 2003). The notable difference between these two sets of guidelines is that the AACAP/CLWA proposes that all children and young people in care should have a *comprehensive* mental health assessment.

1.2.2 Existing screening measures for school-aged children and adolescents. While there are many child and adolescent mental health assessment measures, there are relatively few brief measures designed to provide a broad screen for mental health difficulties (as distinct from screeners for single symptom categories). Most of the measures that fit this description are designed for early detection of emotional and behavioural difficulties among infants and pre-school children. Three measures that fit this description for school-aged children and adolescents are the Strengths and Difficulties Questionnaire (SDQ), Brief Problem Monitor (BPM), and the Behavioral and Emotional Screening System (BESS). The SDQ is a brief screening measure of mental health difficulties and prosocial behaviour (Goodman, 2001), that utilises parent-report (ages 3-4 & 4-16), teacher-report (ages 3-4 & 4-16), and adolescent self-report (ages 11-17) forms. The SDQ has 25 items, consisting of 20 symptom items that constitute a total difficulties scale and four clinical sub-scales (emotional symptoms, conduct problems, hyperactivity-inattention, and peer problems) and five prosocial behaviour items. The instrument also includes questions designed to measure how a child's mental health difficulties impact on their functioning and well-being, and what burden these place on others. Despite its brevity, the SDQ has strong psychometric properties (particularly for the teacher version) and has demonstrated screening utility (Stone, Otten, Engels, Vermulst, & Janssens, 2010). It is also readily

accessible in that it has no user restrictions and is distributed freely as a non-commercial instrument. For all of these reasons the SDQ has become the most widely used and well recognised child and adolescent screening measure.

The BPM is a 22-item cross-informant version of the CBCL (and its equivalent teacher- and self-report forms), that was developed recently to monitor children's functioning and response to therapeutic interventions (Achenbach, McConaughy, Iyanova, & Rescorla, 2011). Nineteen items were derived from the CBCL internalising (6 items) and externalising (7 items) broadband scales, and the attention problems syndrome scale (6 items), and three are respondent-nominated 'additional items'. Although it was not expressly designed for use as a screening instrument, the BPM's brevity will likely see it increasingly used for that purpose, particularly if it is shown to have comparable or better screening utility to the SDQ. However, the BPM contains no items from the Social problems and Thought problems syndrome scales, which children and young people in care score highly on.

The BESS is also a relatively new screening instrument. The BESS Parent form is a 30-item short form version of the BASC-2 Parent Rating Scale (Dowdy, Kamphaus, Abdou, & Twyford, In Press). The BESS provides a single total problems score for screening purposes for pre-school aged children through to Year 12 adolescents. The BESS also has teacher-report and self-report (from Grade 3) versions. The BESS's screening utility is not yet well established.

1.3 Rationale for developing the Brief Assessment Checklists

Available mental health screening instruments for school-aged children and adolescents are designed to screen for the symptoms and disorders most commonly endured among the population at large, particularly anxiety, depression, peer socialisation difficulties, inattention/overactivity, aggression and other conduct problems, and oppositional-defiant behaviour. No instrument has been designed to screen for additional characteristic difficulties experienced by children and young people in care (described earlier in this paper) that the ACC and ACA were designed to measure. Just as there is a need for clinicians to have tools that contribute to their comprehensive assessment of these difficulties, there is also an evident need for tools that accurately screen for these difficulties.

There are two reasons why the ACC and ACA are not suitable for use as screening and casework monitoring measures. Firstly, they have too many items (120 and 105 respectively) to qualify as brief, easy-to-complete measures. Secondly, given the nature of some of the problems measured by these checklists and the labels given to their empirically-derived scales, it is the developer's belief that the ACC and ACA cannot be safely used by people other than qualified child and adolescent mental health professionals. Without adequate training in clinical and psychosocial-developmental formulation, users are likely to misinterpret the meaning of high scale scores, and children are more likely to be labelled as having particular attachment- and/or trauma-related difficulties, based on a single source of information.

Consequently, use of the ACC and ACA is restricted to qualified clinicians and researchers. Yet, child welfare and social care agencies have a legitimate need to carry out mental health screening and monitoring for vulnerable children and young people in their statutory care, particularly in jurisdictions that do not have a proactive primary care mental health service for children in care. Furthermore, primary health care workers who are responsible for carrying out health screening may not have adequate training in mental health assessment to interpret the meaning of ACC and ACA score profiles.

Together this constitutes a rationale for developing brief screening versions of the ACC and ACA. The aim of the present study was to derive brief mental health screening measures for children and adolescents that: 1. Have high screening accuracy; 2. Provide a single total difficulties score i.e. without any constituent subscales; and 3. Can be safely used and interpreted by social care and health professionals other than child mental health clinicians.

2. Method

The BAC-C and BAC-A were respectively derived from the Assessment Checklist for Children (ACC) (Tarren-Sweeney, 2007) and Assessment Checklist for Adolescents (ACA) (Tarren-Sweeney, 2013), using the same CICS data sets used to develop the parent instruments, and employing the same administration format as the parent instruments. The CICS obtained mental health, socialisation and risk exposure estimates for eligible children, via state-wide mail surveys of foster parents and kinship carers, and from the state child welfare database. The surveys measured a large number of developmental, pre-care and in-care study factors. In addition to ACC and ACA scores, the CICS estimated participants' mental health from caregiver-reported CBCL scores (Tarren-Sweeney & Hazell, 2006).

2.1 Structure and psychometric properties of the source measures (ACC and ACA)

The ACC has 120 items, consisting of: 93 clinical items that contribute to ten clinical scales (derived empirically through factor analysis); nine *other* clinical items; and 18 low self-esteem items. The ten clinical scales are labelled: I. Sexual behaviour; II. Pseudomature interpersonal behaviour; III. Non-reciprocal interpersonal behaviour; IV. Indiscriminate interpersonal behaviour; V. Insecure interpersonal behaviour; VI. Anxious – distrustful behaviour; VII. Abnormal pain response; VIII. Food maintenance behaviour; IX. Self-injury; and X. Suicide discourse. The scales do not load on to any higher order factor structure. ACC total clinical scores of 27 and above constitute a *clinical range* that is highly predictive of psychiatric impairment, while scores in the range of 21 to 26 constitute a sub-clinical *elevated range*, indicating possible psychiatric impairment and a need for further mental health assessment, or periodic monitoring.

The ACA has 105 items, consisting of: 72 clinical items that contribute to seven clinical scales (derived empirically through factor analysis); 15 *other* clinical items; and 18 low self-esteem items. The seven clinical scales are labelled: I. Non-reciprocal interpersonal behaviour; II. Social instability / behavioural dysregulation; III. Emotional dysregulation / distorted social cognition; IV. Dissociation / trauma symptoms; V. Food maintenance behaviour; VI. Sexual behaviour; and VII. Suicide discourse. The ACA scales also do not load on to any higher order factor structure. ACA total clinical scores of 24 and above constitute a *clinical range*, while scores in the range of 17 to 23 constitute a sub-clinical *elevated range*.

The ACC and ACA's clinical content were systematically derived using combinations of deductive and inductive strategies, with the aim of identifying all clinically significant problems experienced by children and young people in alternate care that are not adequately measured by the CBCL. Content validity was reviewed by clinicians and foster parents, and the construct validity of both instruments is strongly supported by estimates of factorial and concurrent validity. The ACC and ACA also demonstrate criterion-related validity, namely that: 1. scores are highly sensitive to children's risk exposure (ACC); 2. scores are strongly differentiated by children's age at entry into care (ACC); and 3. the instruments differentiate between clinic-referred and non-referred children and young people in care (ACC and ACA). Their clinical scales have high internal consistency (Cronbach's alpha: ACC = 0.70 - 0.96; ACA = 0.73 - 0.95) (Tarren-Sweeney, 2007).

2.2 Administration format for the Assessment Checklist measures

The Assessment Checklist measures employ a three-point response scale (0-1-2), as used by the Revised Rutter Scales ("does not apply", "applies somewhat", "certainly applies") (Hogg, Rutter, & Richman, 1997), the CBCL and its companion instruments ("not true", "somewhat or sometimes true", "very true or often true") (Achenbach & Rescorla, 2001), and the Strengths and Difficulties Questionnaire ("not true", "somewhat true", "certainly true"). The Assessment Checklist measures were designed to detect infrequent events of critical problems such as suicide attempts and discourse, age-inappropriate sexual behaviour, and self-injury. Detecting single or isolated behaviours is important if they are markers for risk of harm, or if the events have clinical significance. Conversely, it is not useful to detect isolated instances of less critical problems, such as peer conflict. The measures differentiate between these two types of items by assigning them to separate parts, each of which employs a different three-step response scale:

Part 1¹ uses the following instructions for less critical / higher incidence problems:

¹ Part 1 instructions for the BAC-C and ACC refer to 'your child', while those for the BAC-A and ACA refer to 'this young person'.

“Circle 0 if the statement is *not true* for your child, in the last 4 to 6 months”

“Circle 1 if the statement is *partly true* for your child, in the last 4 to 6 months”

“Circle 2 if the statement is *mostly true* for your child, in the last 4 to 6 months”

Part 2 uses the following instructions for more critical / lower incidence problems:

“Circle 0 if the behaviour *did not occur* in the last 4 to 6 months”

“Circle 1 if the behaviour *occurred once* in the last 4 to 6 months”

“Circle 2 if the behaviour *occurred more than once* in the last 4 to 6 months”

2.3 Study participants

The BAC-C was derived from caregiver-reported ACC scores obtained for 347 children (aged 4 to 11 years, 176 boys and 171 girls) residing in long-term foster (N=297) and kinship (N=50) care. These children constituted the CICS baseline sample. The children were highly disadvantaged in terms of their exposure to social adversity. On average they experienced 3.5 confirmed maltreatment events, with 1.6 years elapsing between the first recorded event and their entry into care. The children’s mean age at entry into care was 3.5 years; mean time in care was 4.3 years; and their median and mean number of placements was 2 and 3.1 respectively. ACC item scores distributions in the present sample are likely to be reasonably representative for 4 to 11 year-olds across the aggregate target population, as the sample includes a mix of: children placed at an early age in long-term, stable foster placements (resembling the developmental conditions of adoption from care); children in kinship care; children with more typical foster care histories; and children who in previous times would have been considered ‘unfosterable’ and have resided in residential care (NSW closed all of its residential care centres in the decade preceding the CICS baseline survey).

The BAC-A was derived from caregiver-reported ACA scores obtained for 230 young people (aged 11 to 18 years, mean age = 15.3 years) in long-term alternate care, participating in two related studies: the CICS follow-up survey (n=85); and the CICS adolescent survey (n=147). The former group were all participants in the aforementioned CICS baseline survey, while the latter is an independent sample recruited for a separate cross-sectional survey. Gender was unevenly distributed (54% boys and 46% girls). Their mean age at entry into care was 5.0 years and mean time in care was 10.4 years. A total of 64% of young people had *clinic referred* status, as defined by one or more of the following criteria: 1. prescribed psychometric medication; 2. caregiver receiving behavioural support or other carer intervention or young person receiving individual or group psychotherapy or counselling; and 3. caregiver actively seeking referral to a mental health service.

A number of indications suggest that this combined adolescent sample slightly underestimates the scale of mental health difficulties of young people in care. The sample excludes young people who were not residing in family-type care, including those living independently and in residential care (small residential care services were gradually reintroduced in NSW in the decade between the CICS baseline and follow-

up surveys). A comparison of child versus adolescent score distributions suggests that the likely aggregate population prevalence of mental health difficulties is around 1.2 times greater than that measured in the combined CICS adolescent sample.

2.4 BAC-C and BAC-A item selection

The Brief Assessment checklists were purposely designed to contain no more than 20 problem items, with a view to matching the number of problem items contained in the SDQ. This is because the SDQ's widespread use and acceptability for mental health screening for children is due in large part to its brevity. Items were selected on their ability to discriminate between normal and clinical range scores on the ACC and CBCL. Items were initially selected for further analysis based on high correlations with the ACC/ACA/CBCL total scores, as well as the strength of their factor loadings on the ACC/ACA sub-scales. Higher prevalence items tended to have greater discriminatory ability i.e. to be both sensitive and specific. Low prevalence items however, tended to be clinically specific (i.e. were mostly scored by children with clinical-level difficulties across a range of symptom scales), but lacked sensitivity (i.e. many children with clinical-level difficulties did not score on these items). This generated a pool of the most promising items. From this pool, various item combinations were then examined collectively (i.e. using their total scores) on their ability to discriminate between normal and clinical range scores on the various ACC and ACA low prevalence sub-scales (since several of these sub-scales had not contributed any items to the pool). Because high scores on the low prevalence scales almost always occur alongside other mental health difficulties, the item pools tended to be quite accurate in screening for low prevalence difficulties. However, item selection required some trade-offs between items that could discriminate across multiple syndromes, and items that increase screening accuracy for a single sub-scale.

3. Results

BAC-C and BAC-A mean item scores, estimated item population prevalence (estimated percent scoring 1 or 2), and item correlations with BAC-C/BAC-A and ACC/ACA total scores, are listed in Tables 1 and 2 respectively. BAC-A mean item scores are unweighted (i.e. these are the sample means), while the population item prevalences are weighted estimates (CICS sample prevalence multiplied by 1.2). BAC-C sample item (and estimated population) prevalence ranged from 14% to 68%, and the estimated population prevalence of BAC-A items ranged from 8% to 68%.

Mean (standard deviation) BAC-C total difficulties scores for the aggregate 4-11 year-old sample (N=347), boys (N=176), and girls (N=171) were 10.0 (8.0), 9.9 (7.6), and 10.2 (8.4) respectively, suggesting the score distributions did not vary by gender. Mean (standard deviation) BAC-A total difficulties scores for the aggregate 11-18 year-old sample (N=230), boys (N=125), and girls (N=105) were 8.5 (7.6), 9.0 (7.7), and 7.8 (7.4) respectively, suggesting a slight gender variation in the adolescent score distributions. Consistent with previously reported age analyses of ACC (Tarren-

Sweeney, 2007) and ACA scores (Tarren-Sweeney, 2013): 1. Older children scored slightly higher on the BAC-C than younger children (age – total score correlation = 0.16), with this age effect being confounded by children’s age at entry into care (older children were more likely to have entered care at older ages, and with greater exposure to pre-care maltreatment); and 2. No age effect was located among BAC-A scores (age – total score correlation = - 0.02).

The internal consistency (Cronbach’s alpha) of BAC-C and BAC-A scores were 0.89 and 0.87 respectively. The internal consistency of the derived parent-report BPM total score in the CICS child and adolescent samples was 0.88 (17 items) and 0.91 (19 items) respectively, which is similar to that previously reported for a large U.S. normative sample ($N=3200$, $\alpha=0.92$) (Achenbach et al., 2011). BAC-C/A internal consistencies are thus somewhat comparable to that of the parent-report BPM, while they compare favourably to a large number of published estimates of the internal consistency of the SDQ parent-report total difficulties scale (weighted mean SDQ total difficulties alpha = 0.80, range = 0.53-0.84) (Stone et al., 2010).

Very high correlations were found between BAC-C and ACC total scores ($r = 0.96$) and BAC-A and ACA total scores ($r = 0.94$). Similarly high correlations were found between BPM scores (generated from sample CBCL scores) and CBCL scores for the child ($r = 0.93$) and adolescent ($r = 0.94$) samples. Correlations of BAC-C and BAC-A total scores with the CBCL total problem score were 0.82 and 0.88 respectively. By contrast, a weighted mean correlation of parent-report SDQ total difficulties scores with CBCL total problems scores for 4 to 12 year-olds, estimated across several studies, was 0.76 (range = 0.70 to 0.87) (Stone et al., 2010), while the correlation of parent-report BESS scores with CBCL total problems scores in a recent survey of primary-school children ($n=99$) was 0.63 (Dowdy et al., In Press). The present findings suggest the BAC-C/A total scores approximate the CBCL total problem score (a measure of global psychopathology) at least as well as the SDQ total difficulties score, but not as well as the BPM (which is derived from the CBCL). The results also suggest the BAC-C/A total difficulties scores provide comparable estimation of global psychopathology to that suggested by CBCL, ACC and ACA total scores.

Correlations of BAC-C and BAC-A total scores with relevant ACC and ACA clinical scales and with CBCL syndrome, DSM-oriented and BPM scales are listed in Table 3. BAC-C/A total scores had moderate to high correlation (0.67 to 0.88) with the ACC and ACA scales that measure commonly experienced difficulties, and moderate correlation (0.27 to 0.63) with scales measuring lower prevalence difficulties. There were mostly moderate to high correlations of BAC-C/A total scores with CBCL syndrome and DSM-oriented scale scores. The notable exceptions were quite low correlations with the two CBCL somatic scales. This is largely accounted for by a relatively low prevalence (compared to other symptoms) of reported somatic problems among children and adolescents in the CICS, and low correlations of CBCL

somatic complaints / problems scores with other CBCL scale scores (Tarren-Sweeney & Hazell, 2006).

3.1 Screening accuracy

A series of Receiver Operating Characteristics (ROC) analyses were carried out to identify the screening accuracy of the BAC-C/A instruments, as well as optimal screening cut-points, in relation to various clinical case identification criteria. An instrument's screening accuracy is measured by the *area under the ROC curve* (AUC), which is expressed as a proportion. An instrument that predicts no better than chance will have an AUC value in the vicinity of 0.5, while a 'perfect' screening instrument has an AUC of 1.0. Unless an instrument has a score cut-point that is 100% accurate (i.e. incurs no false positive or false negative results), then every screening cut-point involves a trade-off between *sensitivity* (the proportion of clinical cases who are positively screened i.e. score at or above the screening cut-point) and *specificity* (the proportion of non-cases who are negatively screened i.e. score below the screening cut-point). Selecting optimal cut-points therefore requires subjective judgement about the relative benefits and costs of incorrectly identifying clinical cases versus non-cases.

The screening accuracies of the BAC-C and BAC-A for identifying clinical caseness as defined by CBCL and ACC clinical range scores, are set out in Tables 4 and 5 respectively. The tables list AUCs and sensitivity and specificity of selected cut-points, as well as specificity restricted to children without elevated / borderline range scores (i.e. using a more conservative definition of *non-caseness*). Both instruments were *highly accurate* in screening for clinical and 'elevated or clinical' range ACC and ACA scores, with AUCs ranging from 0.96 to 0.99. They were also *moderately accurate* in screening for CBCL clinical and 'borderline or clinical' range scores, with AUCs ranging from 0.89 to 0.92 for the BAC-C and 0.93 to 0.94 for the BAC-A. Their screening accuracy for identifying CBCL total scores in the clinical range (AUC = 0.92 and 0.94) compares favourably with the accuracy of parent-report SDQ total difficulties scores in predicting clinical range CBCL total scores (AUC = 0.85), in a health screening study of 7-12 year-old Dutch children (N=711) (Mathilde R. Crone, personal communication, 1st Nov 2012; see also (Crone, Vogels, Hoekstra, Treffers, & Reijneveld, 2008).

The comparative screening accuracy of the BPM total score for identifying child and adolescent ACC / ACA / CBCL clinical scores is also listed in Tables 4 and 5. Among children, the BPM was slightly more accurate than the BAC-C in screening for CBCL clinical range scores, while the BAC-C was notably more accurate than the BPM in screening for ACC clinical range scores. The BAC-C was about as accurate as the BPM in identifying if a child had *any ACC or CBCL* clinical range score (AUCs = 0.94 and 0.93 respectively). Among adolescents, the BPM had comparable accuracy to the BAC-A in screening for CBCL clinical range scores, while the BAC-A was considerably more accurate than the BPM in screening for ACA clinical range

scores. The BAC-A was also more accurate than the BPM in identifying if a young person had *any* ACA or CBCL clinical range score (AUCs = 0.95 and 0.91 respectively).

The screening accuracies of the BAC-C, BAC-A, CBCL, BPM, ACC and ACA total difficulties scores for identifying caregiver-reported clinical referral status (reported use of mental health services within last year or actively seeking a mental health service; reported mental health diagnosis; and reported psychiatric / behavioural medication) are compared in Table 6. It should be noted that the reported diagnoses and behavioural medication data for the child and adolescent samples were strongly weighted towards Attention-deficit/Hyperactivity Disorder (ADHD), but that few participants presented with ‘pure’ ADHD symptomatology (Tarren-Sweeney, 2012). While these reference criteria provide only proxy estimations of clinical caseness, the findings suggest the Brief Assessment Checklists are likely to be as good at identifying children’s clinical referral status, as the much lengthier CBCL, ACC and ACA checklists.

3.2 Optimal cut-point

In most instances the goal of mental health screening is simply to find as many children as possible who are experiencing clinically meaningful mental health difficulties, using a relatively brief and non-intrusive assessment procedure. In this context, screening is only effective when it correctly identifies the vast majority of clinical cases, and conversely, is counterproductive and harmful when it fails to detect sizeable proportions of clinical cases. Therefore, when screening is the first stage of a two- or multi-stage assessment process, sensitivity is more important than specificity (except where there are seriously adverse social or emotional consequences for false positive screening e.g. for a life threatening illness). There are several reasons why this is particularly true for the BAC-C/A target populations. First, there are more serious implications for children with mental health problems remaining undetected in the care system, than for children without clinical level difficulties being referred for further assessment. Second, while false positive screens can be reassigned as non-cases when they are referred for the next stage of assessment, false negative screens are more likely to remain undetected. Finally, because children in care have such high prevalence of clinical level mental health difficulties (above 50%), loss of specificity within this population translates as fewer false positive screens and higher positive predictive value (the proportion of positive screens who are true cases), than occurs with mental health screening of children and young people at large.

The ROC analyses set out in Tables 4 and 5 provide the necessary information for selecting optimal screening cut-points. The most useful available reference criteria for establishing a child’s need for further, comprehensive assessment are 1. having *any* ACC/ACA sub-scale or total score in the clinical range, and 2. having any CBCL syndrome or total score in the clinical range – since these criteria cast the widest net for clinical caseness as measured by these two instruments. For both the BAC-C and

BAC-A, a score of 5 or higher (5+) represents the optimal screening cut-point for maximising sensitivity without excessive trade-off in specificity. The study sample proportions of children and adolescents who screen positive using a 5+ cut-point, are 67% and 61% respectively.² The 5+ cut-point detected 98% of clinical cases defined by ACC and ACA scores, and 92% to 93% of clinical cases defined by CBCL scores. This is achieved at the cost of misidentifying 25% of ACC / ACA non-cases and 35% of CBCL non-cases. Importantly however, the majority of those who were false negative screens had at least one mental health score in the elevated (ACC) or borderline clinical (CBCL) range. For these children and young people, further clinical assessment is warranted.

4. Discussion

The present findings describe initial psychometric properties for the Brief Assessment Checklists, as estimated from the ACC and ACA development data. These initial data are encouraging, suggesting the BAC-C and BAC-A are likely to provide accurate mental health screening for children and young people in various types of care, which can be safely administered and interpreted by health and social care professional other than child and adolescent mental health clinicians. However, their screening properties need to be further established in studies with independent samples of children residing in various forms of care, preferably measured against gold standard measures of clinical caseness.

A structural limitation of the BAC-C/A relative to the other screening measures is the lack of teacher- and self-report versions. Teacher versions of the ACC and ACA have not been developed because these instruments measure a range of difficulties that are unlikely to be reliably observed and reported on by teachers. An adolescent self-report version of the ACA has not been developed because some of its items are likely to be very emotionally confronting for young people (may cause some people undue distress), and also may not be reliably measured through self-report. In regards to the BAC-C/A, a lack of multi-informant data is less critical for screening purposes than it is for comprehensive assessment.

Nonetheless, these measures stand to improve on existing brief, screening instruments when used with children in care, because they screen for attachment- and trauma-related psychopathology that is fairly specific to child welfare and alternate care populations. Furthermore, these measures provide accurate screening for mental health difficulties that are commonly experienced among children at large. These data therefore suggest the BAC-C and BAC-A can be used as sole screening measures for children and young people in care, rather than in combination with the BPM or SDQ

² The proportions who screen positive using 4+, 6+ and 7+ cut-points are 74%, 67% and 58% on the BAC-C, and 65%, 57%, and 52% on the BAC-A.

i.e. using two brief measures in combination is likely to only marginally increase screening sensitivity. The BAC-C/A also have potential use as casework monitoring tools for foster care and adoption agencies, as well as for treatment monitoring and evaluation.

While the Brief Assessment Checklists have the potential to increase the accuracy and relevance of mental health screening for children and young people in care, we should be mindful that this does not legitimise universal mental health screening as representing unqualified *best practice* – as distinct from best practice *within the constraints of limited mental health resources*. There is compelling evidence to support the argument that, given the availability of an adequately trained and specialised workforce, children in care would be better served by universal, comprehensive assessment – bypassing the need for mental health screening (with the exception of screening for immediate risk of harm). Almost all children in care are exposed to systemic, adverse pressures on their development and well-being, and they have vulnerabilities that are not necessarily revealed by their mental health presentations. Many of these pressures can be profoundly distressing, and undermine children’s felt security. Much of this risk can be identified and intercepted, and their effects prevented and remediated, through thorough assessment. The author(s) would argue that we need to shift towards a new standard of psychological practice, informed by more detailed assessment of attachment- and trauma-related problems, and a wider developmental and contextual focus than that typically employed in mental health clinical assessments, within what might be termed a *clinical / psychosocial-developmental* scope of practice. In essence, specialised assessment of these children requires a shift from a relatively narrow, ‘mechanical’ focus on identifying children’s symptoms and disorders – to seeking a comprehensive understanding of their felt experience, their relationships, family / placement processes, and systemic and care-related pressures on their development.

The Brief Assessment Checklists and scoring sheets can be downloaded at www.childpsych.org.uk

Acknowledgement

The Children in Care study was funded and approved by the NSW Department of Family and Community Services.

References

- Achenbach, T, McConaughy, S, Iyanova, M, & Rescorla, L. (2011) Manual for the ASEBA Brief Problem Monitor (BPM). Burlington, VT: ASEBA.
- Achenbach, T, & Rescorla, L. (2001). *Manual for ASEBA school-age forms and profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families.
- American Academy of Child and Adolescent Psychiatry, & Child Welfare League of America. (2003). Policy statement: AACAP/CWLA policy statement on mental health and use of alcohol and other drugs, screening and assessment of children in foster care. Retrieved 18th October, 2012
- Armsden, G., Pecora, P. J., Payne, V. H., & Szatkiewicz, J. P. (2000). Children placed in long-term foster care: An intake profile using the child behavior checklist/4-18. [yes]. *Journal of Emotional & Behavioral Disorders*, 8(1), 49-64.
- Blower, A, Addo, A, Hodgson, J, Lamington, L, & Towlson, K. (2004). Mental Health of 'Looked after' Children: A Needs Assessment. *Clinical Child Psychology and Psychiatry*, 9, 117-129.
- Burns, Barbara J., Phillips, S, Wagner, H, Barth, R. P., Kolko, D, Campbell, Y. (2004). Mental health need and access to mental health services by youths involved with child welfare: A national survey. *Journal of the American Academy of Child & Adolescent Psychiatry*, 43(8), 960-970.
- Cappelletty, Gordon, Brown, Melissa, & Shumate, Sarah. (2005). Correlates of the Randolph Attachment Disorder Questionnaire (RADQ) in a sample of children in foster placement. *Child and Adolescent Social Work Journal*, 22(1), 71-84.
- Chambers, M, Saunders, A, New, B, Williams, C, & Stachurska, A. (2010). Assessment of children coming into care: Processes, pitfalls and partnerships. *Clinical Child Psychology and Psychiatry*, 15(4), 511-527.
- Crone, M, Vogels, A, Hoekstra, F, Treffers, P, & Reijneveld, S. (2008). A comparison of four scoring methods based on the parent-report Strengths and Difficulties Questionnaire as used in the Dutch preventative child health care system. *BMC Public Health*, 8, 106.
- DeJong, Margaret. (2010). Some reflections on the use of psychiatric diagnosis in the looked after or 'in care' child population. *Clinical Child Psychology and Psychiatry*, 15(4), 589-599.
- Department for Children Schools and Families, & Department of Health. (2009). *Statutory guidance on promoting the health and well-being of looked after children*. London: Department for Children, Schools and Families and Department of Health.
- Dowdy, E, Kamphaus, R, Abdou, A, & Twyford, J. (In Press). Detection of symptoms of prevalent mental health disorders of childhood with the parent form of the Behavioral Emotional Screening System. *Assessment for Effective Intervention*.
- Dubner, Allison E., & Motta, Robert W. (1999). Sexually and physically abused foster care children and posttraumatic stress disorder. [yes]. *Journal of Consulting and Clinical Psychology*, 67(3), 367-373.
- Elander, J, & Rutter, M. (1996). Use and development of the Rutter parents' and teachers' scales. [no]. *International Journal of Methods in Psychiatric Research*, 6(2), 63-78.
- Famularo, R., & Augustyn, M. (1996). Persistence of pediatric post traumatic stress disorder after 2 years. [yes]. *Child Abuse and Neglect*, 20(12).

- Friedrich, W.N., Baker, Amy, Parker, R, Schneiderman, M, Gries, L, & Archer, M. (2005). Youth with problematic sexualised behaviors in the child welfare system: A one-year longitudinal study. *Sexual Abuse, 17*(4), 391-406.
- Goodman, R. (2001). Psychometric properties of the Strengths and Difficulties Questionnaire. [yes]. *Journal of the American Academy of Child & Adolescent Psychiatry, 40*, 1337-1345.
- Heflinger, Craig Anne, Simpkins, Celeste G., & Combs-Orme, Terri. (2000). Using the CBCL to determine the clinical status of children in state custody. [yes]. *Children & Youth Services Review, 22*(1), 55-73.
- Hogg, C, Rutter, M., & Richman, N. (1997). Emotional and behavioural problems in children: The Revised Rutter Scales. In I. Schlare (Ed.), *Child psychology portfolio*. Windsor, UK: NFER-Nelson.
- Holtan, A, Ronning, J, Handegard, B, & Sourander, A. (2005). A comparison of mental health problems in kinship and nonkinship foster care. *European Child and Adolescent Psychiatry, 14*(4), 200-207.
- Hukkanen, Raija, Sourander, Andre, Bergroth, Lasse, & Piha, Jorma. (1999). Psychosocial factors and adequacy of services for children in children's homes. *European Child and Adolescent Psychiatry, 8*, 268-275.
- McCann, J, Wilson, S, & Dunn, G. (1996). Prevalence of psychiatric disorders in young people in the care system. *British Medical Journal, 313*, 1529-1530.
- McMillen, J, Curtis, Zima, Bonnie T., Scott, L, Auslander, W, Munson, M, Ollie, M. (2005). Prevalence of psychiatric disorders among older youths in the foster care system. *Journal of the American Academy of Child & Adolescent Psychiatry, 44*(1), 88-95.
- Pilowsky, Daniel. (1995). Psychopathology among children placed in family foster care. [yes]. *Psychiatric Services, 46*(9), 906-910.
- Romanelli, L, Landsverk, J, Levitt, J, Leslie, L. K., Hurley, M, Bellonci, C. (2009). Best practices for mental health in child welfare: Screening, assessment, and treatment guidelines. *Child Welfare, 88*(1), 163-188.
- Rushton, Alan. (2004). A scoping and scanning review of research on the adoption of children placed from foster care. [yes]. *Clinical Child Psychology & Psychiatry, 9*(1), 89-106.
- Selwyn, Julie, Sturgess, Wendy, Quinton, David, & Baxter, C. (2006). *Costs and outcomes of non-infant adoptions*. London: BAAF.
- Stein, Eleanor, Rae-Grant, Naomi, Ackland, Susan, & Avison, William. (1994). Psychiatric disorders of children "in care": Methodology and demographic correlates. [yes]. *Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie, 39*(6), 341-347.
- Stone, L, Otten, R, Engels, R, Vermulst, A, & Janssens, J. (2010). Psychometric properties of the parent and teacher versions of the Strengths and Difficulties Questionnaire for 4- to 12-year olds: A review. *Clinical Child and Family Psychology Review, 13*, 254-274.
- Tarren-Sweeney, Michael. (2006). Patterns of aberrant eating among pre-adolescent children in foster care. *Journal of Abnormal Child Psychology, 34*, 623-634.
- Tarren-Sweeney, Michael. (2007). The Assessment Checklist for Children - ACC: A behavioral rating scale for children in foster, kinship and residential care. *Children & Youth Services Review, 29*, 672-691.
- Tarren-Sweeney, Michael. (2008a). The mental health of children in out-of-home care. *Current Opinion in Psychiatry, 21*, 345-349.
- Tarren-Sweeney, Michael. (2008b). Predictors of problematic sexual behavior among children with complex maltreatment histories. *Child Maltreatment, 13*(2), 182-198.

- Tarren-Sweeney, Michael. (2012). An investigation of complex attachment- and trauma-related symptomatology among children in foster and kinship care. *Unpublished manuscript*.
- Tarren-Sweeney, Michael. (2013). The Assessment Checklist for Adolescents – ACA: A scale for measuring the mental health of young people in foster, kinship, residential and adoptive care. *Children and Youth Services Review*, 35, 384-393.
- Tarren-Sweeney, Michael, & Hazell, Philip. (2006). The mental health of children in foster and kinship care in New South Wales, Australia. *Journal of Paediatrics & Child Health*, 42, 91-99.

Table 1. Brief Assessment Checklist for Children (BAC-C) item characteristics

Item	Item mean score		Prevalence % ^a	Item – ACC correlation ^b	Item – BAC-C correlation ^c
	Girls	Boys			
1. Can't concentrate, short attention span	.84	1.16	66	.53	.52
2. Craves affection	1.06	.90	64	.60	.65
3. Distressed or troubled by traumatic memories	.40	.40	28	.53	.57
4. Does not show pain if physically hurt	.16	.23	15	.40	.39
5. Eats too much	.37	.35	25	.43	.39
6. Fears you will reject her/him	.42	.38	31	.54	.59
7. Hides feelings	.22	.19	37	.64	.65
8. Is convinced that friends will reject her/him	.29	.22	20	.61	.61
9. Lacks guilt or empathy	.53	.63	39	.61	.63
10. Prefers to be with adults, rather than children	.54	.34	32	.53	.55
11. Relates to strangers 'as if they were family'	.73	.69	47	.56	.63
12. Seems insecure	.53	.56	44	.62	.66
13. Sexual behaviour not appropriate for her/his age	.27	.17	14	.55	.55
14. Startles easily ('jumpy')	.49	.38	33	.58	.58
15. Suspicious	.24	.34	22	.61	.61
16. Too dramatic (false emotions)	.61	.41	35	.61	.65
17. Too friendly with strangers	1.02	1.00	68	.49	.55
18. Too jealous	.57	.47	40	.59	.63
19. Treats you as though you were the child, and she/he was the parent	.40	.29	26	.47	.50
20. Uncaring (shows little concern for others)	.29	.53	31	.54	.56

^a Item prevalence = percentage of children with item score of 1 or 2^b Correlation of the item score and the ACC total clinical score^c Correlation of the item score and the BAC-C total score**Table 2.** Brief Assessment Checklist for Adolescents (BAC-A) item characteristics

Item	Item mean score (unweighted)		Prevalence % ^a (weighted)	Item – ACA correlation ^b	Item – BAC-A correlation ^c
	Girls	Boys			
1. Appears dazed, 'spaced out' (like in a trance)	.34	.25	24	.50	.47
2. Constantly seeking excitement or 'thrills'	.32	.34	30	.49	.51
3. Craves affection	.80	.57	46	.54	.57
4. Does not share with friends	.30	.43	29	.48	.51
5. Does not show affection	.42	.52	37	.33	.41
6. Feels victimised or misunderstood	.28	.46	37	.60	.60
7. Gorges food	.31	.50	28	.60	.56
8. Hides feelings	.79	.80	56	.47	.53
9. Impulsive (acts rashly, without thinking)	.68	.95	68	.67	.75
10. Intense reaction to criticism	.58	.65	41	.63	.67
11. Lacks guilt or empathy	.62	.76	50	.69	.74
12. Relates to strangers 'as if they were family'	.36	.42	30	.56	.60
13. Resists being comforted when hurt	.31	.39	30	.38	.42
14. Sexual behaviour not appropriate for her/his age	.19	.14	8	.51	.48
15. Shows intense and inappropriate anger	.42	.63	47	.70	.74
16. Sudden or extreme mood changes	.42	.35	34	.57	.63
17. Too friendly with strangers	.61	.52	50	.48	.57
18. Too jealous	.40	.42	26	.63	.62
19. Tries too hard to please other young people	.53	.47	40	.54	.56
20. Withdrawn	.39	.44	28	.39	.43

^a Weighted item prevalence = percentage of CICS study participants with item score of 1 or 2, multiplied by 1.2 (i.e. estimated population prevalence)^b Correlation of the item score and the ACA total clinical score^c Correlation of the item score and the BAC-A total score

Table 3. Correlations of BAC-C and BAC-A total scores with ACC, ACA and CBCL scale scores

	BAC-C	BAC-A		BAC-C	BAC-A
ACC and ACA scales			CBCL scales		
Total clinical	.96	.94	Total problems	.82	.88
Sexual behaviour	.63	.46	Anxious / depressed	.61	.65
Non-reciprocal	.79	.73	Withdrawn / depressed	.57	.61
Food maintenance	.51	.55	Somatic complaints	.41	.38
Suicide discourse	.32	.27	Social problems	.71	.75
Low self-esteem	.75	.68	Thought problems	.73	.71
ACC-only scales			Attention problems	.66	.69
Pseudomature	.76		Rule-breaking behaviour	.70	.72
Indiscriminate	.79		Aggressive behaviour	.69	.83
Insecure	.82				
Anxious-distrustful	.67		DSM Affective problems	.62	.58
Abnormal pain response	.53		DSM Anxiety problems	.58	.61
Self-Injury	.44		DSM Somatic problems	.34	.29
ACA-only scales			DSM Attention deficit / hyp.	.64	.72
Social –behavioural dysregulation		.88	DSM Oppositional defiant	.61	.71
Dissociation / trauma symptoms		.51	DSM Conduct problems	.63	.78
Dysregulated emotion / Distorted social cognition		.80			
			Brief Problem Monitor (BPM)	.74	.83

Table 4. BAC-C screening accuracy (sensitivity, specificity and area under the ROC curve) for identifying ACC and CBCL clinical range scores (N=347, ages 4 to 11)

Caseness criteria: ACC / CBCL scores in clinical range	Estimated ^a population prevalence	Area under ^b ROC curve (95% CI)	BAC-C ^c screening cut-point	Sensitivity % (estimated # of cases correctly identified per 1000 children)	Specificity % (estimated # of non- cases correctly identified per 1000 children)	Specificity for <i>elevated / borderline</i> range (estimated # of non-cases correctly identified per 1000 children)	BPM ^d AUC
ACC total score in clinical range	44.7%	0.99 (0.98-1.00)	4+	100% (447/447)	46.4% (257/553)	56.7% (257/453)	0.90
			5+	100% (447/447)	59.4% (328/553)	72.0% (326/453)	
			6+	100% (447/447)	68.2% (377/553)	81.5% (369/453)	
			7+	100% (447/447)	75.0% (415/553)	87.9% (398/453)	
ACC total score in elevated <i>or</i> clinical range	54.7%	0.98 (0.97-0.99)	4+	100% (547/547)	56.7% (257/453)		0.89
			5+	99.5% (544/547)	72.0% (326/453)		
			6+	98.4% (538/547)	81.5% (369/453)		
			7+	96.8% (529/547)	87.9% (398/453)		
<i>Any</i> ACC total or sub- scale score in clinical range	57.6%	0.97 (0.96-0.99)	4+	98.5% (567/576)	58.5% (248/424)	84.5% (204/242)	0.88
			5+	97.5% (562/576)	74.2% (315/424)	95.2% (230/242)	
			6+	96.0% (553/576)	83.7% (355/424)	96.4% (233/242)	
			7+	94.0% (541/576)	89.8% (381/424)	97.6% (236/242)	
CBCL total problem score in clinical range	46.4%	0.92 (0.89-0.95)	4+	98.1% (455/464)	46.2% (248/536)	53.9% (222/412)	0.96
			5+	96.9% (450/464)	58.6% (314/536)	66.4% (274/412)	
			6+	93.8% (435/464)	65.1% (349/536)	73.4% (302/412)	
			7+	93.2% (432/464)	71.5% (383/536)	80.4% (331/412)	
CBCL total problem score in borderline <i>or</i> clinical range	58.8%	0.91 (0.88-0.94)	4+	94.1% (553/588)	53.9% (222/412)		0.98
			5+	90.7% (533/588)	66.4% (274/412)		
			6+	87.3% (513/588)	73.4% (302/412)		
			7+	85.8% (505/588)	80.4% (331/412)		
<i>Any</i> CBCL syndrome or total problem score in clinical range	57.1%	0.89 (0.86-0.93)	4+	93.9% (536/571)	51.7% (222/429)	67.4% (190/282)	0.94
			5+	91.4% (522/571)	65.1% (279/429)	75.5% (213/282)	
			6+	87.9% (502/571)	71.8% (308/429)	82.7% (233/282)	
			7+	86.4% (493/571)	78.5% (337/429)	86.7% (244/282)	

^a Proportion of children in the study sample with scores in the ACC/CBCL clinical, elevated and borderline ranges. The CICS baseline study sample provides a reasonable estimation of the distribution of mental health difficulties across the whole care population (foster, kinship, residential, and adopted from care)

^b Screening accuracy measured as Area under the Receiver Operating Characteristics (ROC) curve (AUC).

^c Proportion of children who are positive screens for each cut-point: 4+ = 74%; 5+ = 67%; 6+ = 62%; 7+ = 58%

^d Comparative AUC value for the BPM (CBCL short form, 17 items)

Table 5. BAC-A screening accuracy (sensitivity, specificity and area under the ROC curve) for identifying ACA and CBCL clinical range scores (N=230, ages 12 to 18)

Caseness criteria: ACA / CBCL scores in clinical range	Study prevalence (estimated population prevalence) ^a	Area under ^b ROC curve (95% CI)	BAC-A ^c screening cut-point	Sensitivity % (estimated # of cases correctly identified per 1000 children)	Specificity % (estimated # of non-cases correctly identified per 1000 children)	Specificity for <i>elevated</i> / <i>borderline</i> range (estimated # of non-cases correctly identified per 1000 children)	BPM ^d AUC
ACA total score in clinical range	36.5% (44.7%)	0.99 (0.99-1.00)	4+	100% (447/447)	55.5% (307/553)	65.9% (291/442)	0.91
			5+	100% (447/447)	61.6% (341/553)	73.2% (324/442)	
			6+	100% (447/447)	67.1% (371/553)	78.9% (349/442)	
			7+	98.8% (442/447)	75.3% (416/553)	87.8% (387/442)	
ACA total score in elevated <i>or</i> clinical range	46.5% (55.8%)	0.99 (0.99-1.00)	4+	100% (558/558)	73.2% (324/442)		0.91
			5+	100% (558/558)	73.2% (324/442)		
			6+	99.1% (553/558)	78.9% (349/442)		
			7+	97.2% (542/558)	87.8% (387/442)		
Any ACA total or sub-scale score in clinical range	49.0% (58.8%)	0.96 (0.94-0.98)	4+	98.2% (577/588)	67.5% (278/412)	86.6% (197/228)	0.89
			5+	98.2% (577/588)	75.2% (310/412)	91.5% (209/228)	
			6+	93.8% (552/588)	77.8% (321/412)	95.1% (217/228)	
			7+	87.6% (515/588)	82.9% (342/412)	95.1% (217/228)	
CBCL total problem score in clinical range	37.8% (45.4%)	0.94 (0.91-0.97)	4+	98.9% (449/454)	55.9% (305/546)	66.1% (275/416)	0.91
			5+	96.6% (439/454)	60.8% (332/546)	70.0% (291/416)	
			6+	95.4% (433/454)	65.7% (359/546)	74.6% (310/416)	
			7+	94.3% (422/454)	74.1% (406/546)	83.1% (346/416)	
CBCL total problem score in borderline <i>or</i> clinical range	48.7% (58.4%)	0.94 (0.90-0.96)	4+	97.3% (568/584)	66.1% (275/416)		0.91
			5+	93.8% (548/584)	70.0% (291/416)		
			6+	91.1% (532/584)	74.6% (310/416)		
			7+	88.4% (516/584)	83.1% (346/416)		
Any CBCL syndrome or total problem score in clinical range	44.8% (53.8%)	0.93 (0.90-0.96)	4+	96.1% (517/538)	60.6% (280/462)	72.3% (210/290)	0.94
			5+	93.2% (501/538)	65.4% (302/462)	76.6% (222/290)	
			6+	91.3% (491/538)	70.1% (324/462)	79.8% (231/290)	
			7+	89.3% (480/538)	78.8% (364/462)	85.1% (247/290)	

^a Proportion of adolescents in the CICS with scores in the ACC/CBCL clinical, elevated and borderline ranges. The CICS follow-up and adolescent study samples under-represent the distribution of mental health difficulties of young people in the care system. Population prevalence rates were estimated by multiplying study prevalence rates by 1.2.

^b Screening accuracy measured as Area under the Receiver Operating Characteristics (ROC) curve (AUC).

^c Proportion of children who are positive screens for each cut-point: 4+ = 65%; 5+ = 61%; 6+ = 57%; 7+ = 52%

^d Comparative AUC value for the BPM (CBCL short form, 19 items)

Table 6. Screening accuracy (area under the ROC curve) for identifying caregiver-reported mental health service use and diagnoses: Comparison of BAC-C, BAC-A, BPM, ACC, ACA, and CBCL total scores

	Area Under the ROC Curve (95% CI)		
	Reported mental health service use ^a	Reported diagnosis ^b	Reported medication ^c
<i>Child sample (N=347, age 4-11)</i>			
BAC-C (20 items)	0.74 (0.69-0.80)	0.73 (0.67-0.78)	0.63 (0.55-0.71)
BPM (17 items)	0.75 (0.70-0.81)	0.78 (0.73-0.83)	0.71 (0.63-0.78)
ACC (102 items)	0.75 (0.70-0.81)	0.75 (0.69-0.80)	0.65 (0.57-0.73)
CBCL (120 items)	0.78 (0.73-0.83)	0.78 (0.73-0.83)	0.69 (0.62-0.76)
<i>Adolescent sample (N=230, age 12-18)</i>			
BAC-A (20 items)	0.79 (0.73-0.85)	0.77 (0.72-0.84)	0.79 (0.72-0.85)
BPM (19 items)	0.79 (0.73-0.85)	0.78 (0.72-0.84)	0.83 (0.78-0.89)
ACA (87 items)	0.82 (0.76-0.88)	0.81 (0.75-0.86)	0.80 (0.74-0.87)
CBCL (120 items)	0.81 (0.75-0.87)	0.80 (0.74-0.86)	0.82 (0.76-0.89)

^a Caregiver-reported use of mental health services within last year *or* was actively seeking a mental health service

^b Caregiver report of child's mental health diagnosis

^c Caregiver-report psychiatric / behavioural medication