

Name of Tool	Level of Service/Case Management Inventory (LS/CMI)
Category	General Risk Assessment (Validated)
Author / Publisher	Andrews, Bonta and Wormith
Year	2004

### Description

- The LS/CMI is a measure of risk and need factors with a case management component.
- It includes five assessment sections, three summary sections and three case management sections. Section 1 (General Risk/Needs Section) consists of 43 items that are grouped into 8 subsections (the Central 8). Other assessment sections include: Specific Risk/Need Factors, Prison Experience: Institutional Factors, Other Client Issues: Social, Health and Mental Health, and Special Responsivity Considerations. Structural issues like poverty, race, gender and age are addressed in the 'Responsivity Considerations' section ([Wormith and Bonta, 2018](#)).
- Risk is categorised into five levels; 'very low', 'low', 'moderate', 'high' and 'very high.'
- It is designed to assist professionals in management and treatment planning in justice, forensic, correctional, prevention, and related agencies.
- The LS/CMI is normed on Canadian and North American probation and institutional populations for males and females. Supplementary norms provided for use in Singapore and the UK.
- There is a feature in the instrument allowing the assessor to override the initial risk level ([Guay and Parent, 2017](#)).

### Age Appropriateness

16+

### Assessor Qualifications

Assessors must possess advanced training, certification and experience in psychological assessment or a related discipline, or satisfactorily complete a training course certified by the publishers. Can be used by a large range of professionals including social work and probation services.

### Strengths

- Combines risk assessment and case management in a single assessment tool.
- It expands the traditional risk/need assessment instrument to a more comprehensive assessment by including non-criminogenic needs, prison experience and responsivity considerations.
- Assessors are able to identify strengths in the individual and his/her circumstances.
- It allows for a professional override of risk level based on an assessment of strengths and specific risk factors that are not captured in Section 1.

- The LS/CMI utilised normative data from circa 20,000 females in inmate and community settings in four countries in order to address gender-specific risk and responsivity issues., including mothering concerns, adult victimisation issues and protective strengths.

### Empirical Grounding



- Developed in part from the LSI-R, a well validated tool with the developments informed by further research and consultation with practitioners. The LS instruments are grounded in the ‘General Personality and Cognitive Social Learning’ theory, maintaining that behaviour such as criminal conduct is learned from interactions with others. It is a general theory, advancing the argument that the Central Eight risk/need features apply across gender, age and race. (Andrews, Bonta and Wormith, 2004; [Wormith and Bonta, 2018](#)).
- Section 1 was informed by a re-analysis of LSI-R item data following research in Ontario, Canada that became called the LSI-Ontario Version. When the LSI-R was developed, GPCSL theory had not fully matured. For instance, the Emotional/Personal subcomponents of the LSI-R was overly concerned with general feelings of emotional distress and psychotic illness and underemphasised antisocial personality features. Grounding in the ‘Central Eight’ and the inclusion of a case management system formed the basis for the development of the LS/CMI ([Wormith and Bonta, 2018](#)).

### Inter-Rater Reliability



a) UK Research

None at present.

b) International Research

- [Rettinger and Andrews \(2010\)](#) – the LS/CMI attained moderate to high inter-rater reliability estimates ranging from .65 for ‘financial problems’ to .91 for the composite general risk/need score in a sample of females.
- [Labrecque et al. \(2017\)](#) found that 21 items demonstrated good or strong levels of inter-rater agreement with an ICC exceeding .60. Seven items, however, gave an inadequate level of consistency, with an ICC of below .50. Three of these items are in the ‘Companions’ section; the remaining four items are across the Antisocial pattern, procriminal attitudes/orientation, leisure and family/martial sections. It is suggested that training around these items should be strengthened to address this.

### Validation History

#### General Predictive Accuracy



a) UK Research

None at present.

## b) International Research

- In order to test the tool in Pakistan, [Bhutta and Wormith \(2016\)](#) translated the LS/CMI into the national language, Urdu, and adjusted some of the items (e.g. education subscale modified to align with the lower literacy rate than that of Western countries). The revised tool was administered to 55 adults released on probation and found to be a useful indicator of recidivism. The only notable difference was that female probationers tended to score higher on the general risk/needs score, which the authors suggested could be a reflection of a cultural or gender bias.

- [Gordon, Kelty and Julian \(2015\)](#) tested the LS/CMI on individuals who offended in Australia and found that its total scoring yielded a significant although weak predictive utility with an AUC of .62. On this basis, the authors caution that the LS/CMI may not be the most suitable tool for measuring risk in Australia.

- The LS/CMI was adapted into a French version by [Guay \(2016\)](#). This version was utilised in a study by [Guay and Parent \(2017\)](#) to assess 3646 individuals with a sentence of less than two years. Good predictive accuracy was shown for new arrests and new convictions (AUC range of .70-.77 and .72-.77 respectively), with the exception of new convictions for other crimes (AUC equal to .66).

- [Wormith, Hogg and Guzzo \(2012\)](#) - moderate to large correlations observed between the General Risk/Need Score and general recidivism (.47), violent recidivism (.28) and sexual recidivism (.17).


- [Wormith et al. \(2007\)](#) - in a 10-year follow-up sample of 61 adult males, LS/CMI attained moderate accuracy (AUC) for the prediction of recidivism (any new conviction (.65), non-violent conviction (.62), violent conviction (.68) and any re-incarceration (.69). This tool was unable to predict sexual convictions (.49).

- A study by [Spence and Haas \(2015\)](#) in West Virginia found risk scores are strongly predictive of recidivism, even when controlling for other factors such as age, gender, and ethnicity.


- On average, logistic regression models predict that each 1 point increase in total risk score increases the odds of arrest by about 3-4% and the odds of incarceration by about 5-9%.


- LS/CMI risk scores are the strongest predictor of recidivism for both Day Report Centre clients and Department Of Corrections inmates. Using only LS/CMI

	<p>risk scores, it is possible to correctly predict recidivism in 60-70% of cases. The inclusion of other variables (i.e., age, race, etc.) increases predictive accuracy of recidivism.</p> <ul style="list-style-type: none"> <li>• <a href="#">Caldwell et al. (2018)</a> evaluated predictive validity of 19,344 probationer records in Nebraska over a five and a half year period. It was found that the LS/CMI predicted outcomes better for minorities (those who did not identify as White Europeans or were White but of Hispanic descent) than non-minorities (White European Americans or those of non-Hispanic descent). An experiment was conducted to explore whether officers showed prejudice in their scoring; findings showed total risk scores remained stable across different racial groups.</li> <li>• <a href="#">Olver and Kingston (2019)</a> found that the LS/CMI (called the LSI-Ontario Version in this paper) predicted violent and general recidivism in the overall sample and among specific diagnostic groups (schizophrenia, anxiety disorders and mood disorders). Predictive accuracy for violence specifically was smaller although still significant, suggesting the need to use a violence-specific tool in conjunction with this one.</li> </ul>
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Validation History	
Applicability: Females	
a) UK Research	None at present.
b) International Research	<ul style="list-style-type: none"> <li>• <a href="#">Dyck and colleagues (2018)</a> looked at the predictive validity of the LS/CMI with 136 Atlantic Canadian individuals. Whilst it was found to be a strong predictor of recidivism for males (AUC=.75), it was even better for females (AUC=.94) over an average of 3.42 year follow-up period.</li> <li>• <a href="#">Andrews et al. (2012)</a> - the LS/CMI composite score had a mean AUC of .83 for recidivism across five different samples of females. With gender found to have a significant effect on the validity of substance abuse, this was controlled for in analyses, resulting in an AUC of .79.</li> <li>• <a href="#">Rettinger and Andrews (2010)</a> - in a 57-month follow-up, the LS/CMI was able to discriminate between different risk categories for females within prison and community settings. Of the 411 women in the study, the higher risk females were responsible for 74% of all new offences. The</li> </ul>

	LS/CMI general risk/need component generated AUC scores for both general and violent recidivism of .87 and .86 respectively.
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Validation History	
Applicability: Ethnic Minorities	
a) UK Research	None at present.
b) International Research	<ul style="list-style-type: none"> <li>• In a meta-analysis involving samples of Aboriginal individuals, the central eight risk factors attained small to moderate mean effect sizes in relation to general recidivism ranging from .19 (family/marital) to .56 (criminal history). Smaller mean effect sizes were observed for violent recidivism (<a href="#">Gutierrez et al., 2013</a>).</li> <li>• <a href="#">Wormith, Hogg and Guzzo (2015)</a> applied the LS/CMI to 9692 Aboriginal and 24, 758 non-Aboriginal individuals. Predictive accuracy was demonstrated for both sets, with AUC scores in the range of .64 for Aboriginals and .74 for the remainder. The authors advise that assessors should consider special circumstances when carrying out interviews with Aboriginal individuals, such as cultural heritage, jargon and dialect, communication styles and relational expectations.</li> </ul>

Validation History	
Applicability: Mental Disorders	
a) UK Research	None at present.
b) International Research	<ul style="list-style-type: none"> <li>• Andrews (1995) found that those diagnosed with mental disorders categorised as ‘high / very high risk’ on the LS/CMI had recidivism rates of up to 73% for any re-offending compared to 17% who were rated as ‘very low’ risk.</li> <li>• Within a larger study, <a href="#">Girard and Wormith (2004)</a> included a sub-sample of 169 prison inmates with mental health problems (depression, psychosis, previous suicide threats/attempts). This sub-sample was found to score significantly higher on the General Risk/Need total score than those without mental health issues (mean effect sizes of 21.95 and 19.48 respectively).</li> </ul>

### Contribution to Risk Practice

- The developers of the tool indicated that the LS/CMI provides a 'gender-informed' assessment for risk, needs and responsivity issues; thus, it can be used across various settings without the need for separate gender-specific assessments.
- The LS/CMI aids the assessor in identifying risk, need and responsivity factors relevant to the individual's likelihood of re-offending and of other issues relevant to a holistic case management plan.
- Many of the factors identified within the assessment can act as targets for treatment/change and the tool can aid assessors in determining the level of monitoring and supervision required with regards to the formulation of case management plans.
- LS/CMI has an ability to highlight the strengths of the individual. These are factors that would actively enable the individual to desist from further offending and enables assessors to provide further information on these strengths in relation to potential clinical override of the level of risk generated from Section 1.
- Assessors are given the chance to elaborate on factors which have been highlighted as a strength in the 'General Risk/Needs' section (Andrews, et al. 2004: 153).
- Literature also describes how the LS/CMI may be used in recommendations for sentencing (see [Wolbransky et al., 2012](#)). A study looking at the correspondence between presentence risk evaluations and sentencing outcomes of 165 individuals using the LS/CM, LSI\_R and HCR-20 found that sentencing outcomes were associated with risk assessment scores. ([Jung et al., 2015](#)).

### Other Considerations

- When testing the internal consistency of the LS/CMI, [Gordon, Kelty and Julian \(2015\)](#) looked at how well items in the LS/CMI correlated with the overall score. Twelve items were removed as a result of this test. Further, it was highlighted that five of the items within the LS/CMI could be considered 'double-barrelled' questions: for instance, asking about both youth and adult criminal history in the same item. It is, thus, suggested that these items are separated to allow them to be adequately measured in this sample (Australian individuals aged 18-67 completing community-based sentences).
- The clinical/professional override feature was the focus of [Guay and Parent's \(2017\)](#) study of 3646 individuals who offended in Quebec. In 144 of 3646 cases, the clinical override was used to reduce the level of recidivism; whilst in 93 instances, the measure was used to increase it. It is concluded that the 'upward overrides' (i.e. increased level of threat) had greater predictive accuracy than 'downwards overrides' to a lower risk level. On this basis, it is recommended that further research is carried out on protective factors and the situations allowing for a 'downward override.' The results also showed that the clinical override feature decreased the predictive accuracy of the LS/CMI, apart from in cases of convictions for new crimes.
- [Wormith, Hogg and Guzzo \(2012\)](#) found that when assessors applied the override this tended to be to increase rather than decrease risk level. It was found that this reduced the predictive validity of the scale by excessively increasing risk. For instance, 263 individuals who committed sexual offences were initially in the low risk category and were thereafter overridden to medium, high or very high risk. Despite this, they actually recidivated (24.2% for medium risk; 19% for high risk; 5.9% for very high risk) at a lower rate than individuals deemed to be at low-risk (31.7%).
- Following on from this and similar findings from other studies, [Wormith and Bonta \(2018\)](#) highlight cautious use of the professional override. It is recommended that any 'excessive' use – defined as more than 5% of cases – should be quickly addressed to avoid prediction of recidivism being compromised.

- The LS/CMI does not measure religiosity (religious belief or feeling) or spirituality. A study by [Bhutta and Wormith \(2016\)](#) in the highly devout country of Pakistan added a measure of religiosity to the LS/CMI to test if the inclusion of this improved the predictive accuracy of the instrument. They, however, concluded that the addition of this to the instrument is unlikely to improve its ability to predict recidivism.
- The LS/CMI was pilot tested as the LSI-OR (Andrews, Bonta and Wormith, 1995) for a number of years prior to its publication in 2004.
- Recent independent research (not author-affiliated) has been conducted on LS/CMI. These include a study investigating the predictive validity of gang and non-gang members ([Guay, 2012](#)); an examination of the need principle and effect of treatment on change of LS/CMI scores ([Holliday, et al. 2012](#)); and a comparison on LS/CMI of psychopathic and neuropathic (characterised by frontal lobe deficits and psychosis) individuals who committed homicide ([Gilligan and Lennings, 2011](#)).