

## **SEX OFFENDER SENTENCING IN WASHINGTON STATE: PREDICTING RECIDIVISM BASED ON THE LSI-R**

The 2004 Legislature directed the Washington State Institute for Public Policy (Institute) to conduct a comprehensive analysis and evaluation of the impact and effectiveness of current sex offender sentencing policies.<sup>1</sup> Because this is an extensive topic, we are publishing a series of reports.

Two previous reports in this sex offender sentencing series addressed the prediction of felony sex recidivism.<sup>2</sup> Thus far, we have found that the prediction tool used by the the End of Sentence Review Committee has little to no predictive accuracy.<sup>3</sup> In addition, we determined a “static” risk tool being developed by the Institute for the Department of Corrections (DOC) predicts felony and violent felony recidivism moderately well but does not accurately predict felony sex recidivism.<sup>4</sup>

One additional risk tool used by DOC warrants review: the Level of Service Inventory-Revised (LSI-R). A 2003 Institute study found that this instrument is not a strong predictor of felony and violent felony recidivism for Washington State offenders.<sup>5</sup>

**This report analyzes the relative accuracy of the LSI-R in predicting felony sex recidivism for Washington State sex offenders.**

### **SUMMARY**

In 1999, the Washington State Department of Corrections began using a risk for reoffense tool, the Level of Service Inventory-Revised (LSI-R), as part of the offender risk classification system. A 2003 Institute study found that this instrument is not a strong predictor of felony and violent felony recidivism for Washington State offenders.

This report analyzes the relative accuracy of the LSI-R in predicting felony sex recidivism for Washington State sex offenders.

### **Findings**

- For sex offenders, the LSI-R score predicts felony sex recidivism with weak accuracy.
- Five items on the LSI-R can be combined to predict felony sex recidivism with moderate accuracy.
- Based on these five items, 4 percent of the study sample can be placed in a high risk group with an 11 percent chance of recidivating with a felony sex offense.

These results are encouraging, since they indicate that moderate predictive accuracy for felony sex recidivism is possible. The question remains for Washington State: Can a more accurate prediction tool be created?

Answering this question requires the following:

1. A rigorous review of existing sex offender risk assessment research;
2. Involvement of staff who will use the tool; and
3. Statistical analyses of key items to create a tool with the highest predictive accuracy.

<sup>1</sup> ESHB 2400, Chapter 176, Laws of 2004.

<sup>2</sup> R. Barnoski, 2006, *Sex Offender Sentencing in Washington State: Predicting Recidivism Based on Demographics and Criminal History*, Olympia: Washington State Institute for Public Policy (Document No. 06-01-1207); and R. Barnoski, 2006, *Sex Offender Sentencing in Washington State: Sex Offender Risk Level Classification Tool and Recidivism*, Olympia: Washington State Institute for Public Policy (Document No. 06-01-1204).

<sup>3</sup> *Sex Offender Risk Level Classification Tool*.

<sup>4</sup> *Predicting Recidivism Based on Demographics and Criminal History*.

<sup>5</sup> R. Barnoski, 2003, *Washington's Offender Accountability Act: An Analysis of the Department of Corrections' Risk Assessment*, Olympia: Washington State Institute for Public Policy, Document No. 03-12-1202.

This report focuses on predicting felony sex recidivism.<sup>6</sup> Measuring sex offense recidivism requires that the offender have a five-year time period in the community and one additional year for processing in the courts.<sup>7</sup> Because DOC began using the LSI-R in 1999, recidivism rates can be calculated for offenders placed in the community during that year. That is, 1999 is the only year LSI-R and felony sex recidivism data are both available, due to the recidivism measurement requirements.

**Exhibit 1** displays the felony sex recidivism rates for sex offenders with and without an LSI-R. During 1999, 1,102 sex offenders were placed in the community following confinement in prison or jail or were sentenced to community supervision. An LSI-R was administered by DOC staff within 90 days of community placement to 602 (55 percent) of these offenders.

Sex offenders with an LSI-R have higher felony sex recidivism rates (3.8 percent) than those without an LSI-R (2.4 percent); this is statistically significant at the 0.18 probability level. That is, sex offenders with LSI-R scores have a higher chance of reoffending.

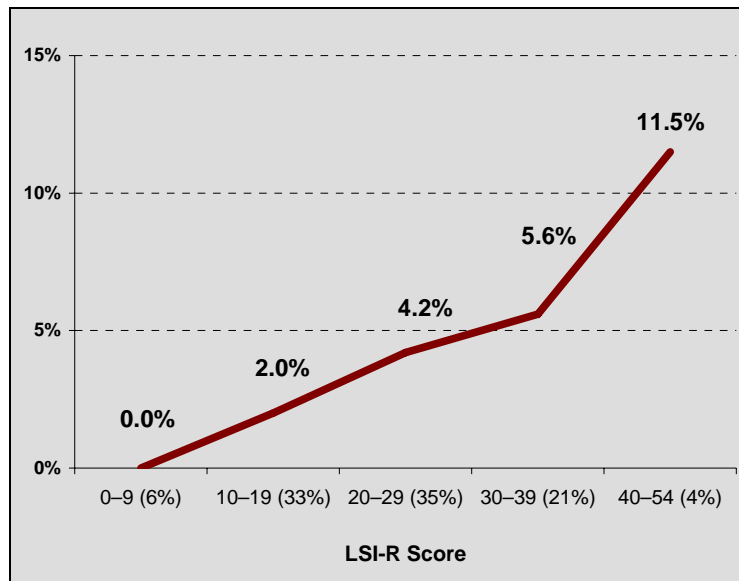
**Exhibit 1**  
5-Year Felony Sex Recidivism Rates of Sex Offenders With and Without an LSI-R

	Number of Offenders	Percent of Offenders	5-Year Felony Sex Recidivism*
With LSI-R	602	55%	3.8%
Without LSI-R	500	45%	2.4%
Total	1,102	100%	3.2%

\* Statistically significant at the 0.18 probability level.

**Exhibit 2** shows the relationship between felony sex recidivism rates and LSI-R scores. The number in parentheses is the percentage of sex offenders in the study sample with that range of scores. For example, 6 percent of sex offenders had an LSI-R score between 0 and 9, and these offenders had a felony sex recidivism rate of 0 percent. In comparison, 4 percent of the sex offenders with an LSI-R score of 40 to 54 had an 11.5 percent recidivism rate.

**Exhibit 2**  
5-Year Felony Sex Recidivism Rates By LSI-R Score



The best measure of predictive accuracy between recidivism and the risk-level categories is the Area Under the Receiver Operating Characteristic (AUC).<sup>8</sup> An AUC can vary between .500 and 1.00. AUCs in the .500s indicate little to no predictive accuracy, .600s weak, .700s moderate, and those above .800 have strong predictive accuracy.<sup>9</sup>

The AUC for Exhibit 1 is 0.650, indicating that the LSI-R score has weak predictive accuracy for felony sex recidivism. However, some of the individual items on the LSI-R may have stronger predictive accuracy.

<sup>6</sup> Felony sex recidivism is defined as a conviction for a felony sex offense in a Washington State court.

<sup>7</sup> R. Barnoski, 2005, *Sex Offender Sentencing in Washington State: Measuring Recidivism*, Olympia: Washington State Institute for Public Policy, Document No. 05-08-1202.

<sup>8</sup> M.E. Rice & G.T. Harris, 2005, Comparing Effect Sizes in Follow-Up Studies: ROC Area, Cohen's d, and r, *Law and Human Behavior* 29(5): 615-620. V.L. Quinsey, G.T. Harris, M.E. Rice, & C.A. Cormier, 2005, *Violent Offenders: Appraising and Managing Risk, Second Edition*, Washington, DC: American Psychological Association.

<sup>9</sup> T.G. Tape, 2003, *Interpreting Diagnostic Tests, The Area Under the ROC Curve*, Omaha: University of Nebraska Medical Center, see: <http://jim.unmc.edu/dxtests/roc3.htm>.

**Technical Appendix A** shows the AUCs for each item on the LSI-R.<sup>10</sup> Twelve items have AUCs in the 0.600s indicating weak accuracy in predicting felony sex recidivism; the remaining items have little to no predictive accuracy. Multivariate statistical analyses, stepwise logistic regression, were used to determine if these individual LSI-R items can be combined to form a better predictor of felony sex recidivism. Five items were retained in the prediction equation.<sup>11</sup>

**Exhibit 3** shows the five items included in the resulting felony sex recidivism prediction equation. The most influential item in the equation measures whether the offender was “ever punished for institutional misconduct.” The item measuring “financial problems” has an odds ratio of less than 1.0, indicating that having financial problems was associated with a lower felony sex recidivism rate—the opposite of what one might expect. The AUC for predicting felony sex recidivism from these items is 0.778, indicating moderate predictive accuracy.

**Exhibit 3**  
**Combination of LSI-R Items Best Predicting**  
**5-Year Felony Sex Recidivism**  
**AUC = 0.778**

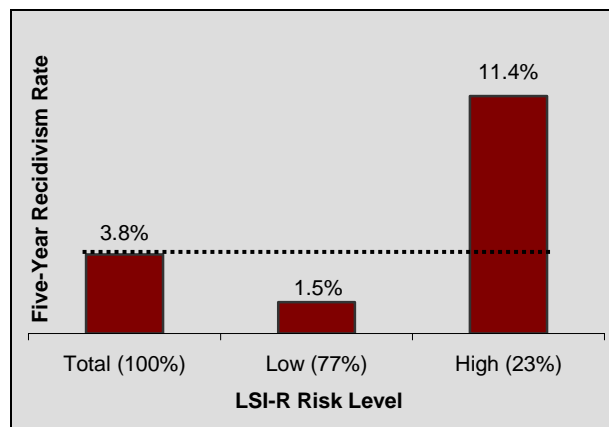
LSI-R Item	Odds Ratio	Prob. Level	Std. Est.
8. Ever punished for institutional misconduct	3.7	0.02	0.36
23. Dissatisfaction with marital or equivalent situation	1.7	0.03	0.26
21. Financial problems score	0.4	0.05	-0.24
53. Poor attitude toward sentence	2.2	0.10	0.22
26. Criminal family/spouse	2.1	0.11	0.21

Prob. Level = probability level  
 Std. Est. = Standardized parameter estimate

**Exhibit 4** displays the felony sex recidivism rates for offenders classified as either low or high risk for sexual reoffending based on the prediction equation in Exhibit 3. It was not possible to form a moderate risk group. The felony sex recidivism rate for the

total sample is 3.8 percent; the low risk group’s rate is 1.5 percent, and the high risk group’s rate is 11.4 percent. Seventy-seven percent of the sample is in the low risk group, and 23 percent is in the high risk group.

**Exhibit 4**  
**Recidivism Rates Based on Multivariate Analysis**  
**for LSI-R’s Low- and High-Risk Groups**



**Discussion.** The results of the multivariate analysis of the individual LSI-R items are encouraging, since the AUC indicates moderate predictive accuracy for felony sex recidivism. That is, items from the LSI-R may contribute to a better predictor of felony sex recidivism. However, this question still remains for Washington State: Can a more accurate prediction tool be created?

Answering this question requires the following:

1. A rigorous review of existing sex offender risk assessment research;
2. Involvement of staff who will use the tool; and
3. Statistical analyses of key items to create a tool with the highest predictive accuracy.

<sup>10</sup> Most LSI-R items have a yes or no response with a yes counted as one risk point and a no counted as zero points. The items with a four-point response are ordered so that higher scores coincide with less satisfactory or higher risk responses. In addition, the LSI-R scoring manual converts all of these four-point responses to yes/no responses when computing the LSI-R total score. These are labeled item scores in this report.

<sup>11</sup> Only items with a probability level below 0.15 are retained in the stepwise regression.

**Technical Appendix A**  
**Predictive Accuracy of Individual LSI-R Items**  
**For Washington State Sex Offenders**

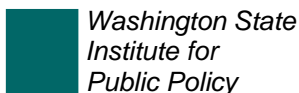
LSI-R Item	AUC	LSI-R Item	AUC
8. Ever Punished for Miss Conduct	0.660	16. Education Less Than Grade 12	0.553
53. Poor Attitude Toward Sentence	0.628	19. Peer Interactions	0.550
23. Dissatisfaction Family	0.627	20. Authority Interactions	0.550
24. Non-Rewarding Parents	0.627	37. Alcohol Problem Ever	0.547
25. Non-Rewarding Relatives Score	0.627	28. Moved Three or More Times in a Year	0.546
29. Live in High Crime Area	0.614	40. Current Drug Problem	0.546
51. Supportive of Crime	0.612	41. Law Violations Problem	0.546
51. Supportive of Crime Score	0.611	27. Unsatisfactory Accommodation Score	0.545
9. Violation/Charge on Supervision	0.607	39. Current Alcohol Problem	0.543
24. Non-Rewarding Parents Score	0.603	11. Currently Unemployed	0.542
31. Better Use of Time	0.602	52. Unfavorable Attitude to Convention Score	0.539
26. Criminal Family/Spouse	0.601	50. Psychological Indicators	0.537
23. Dissatisfaction Family Score	0.592	6. Ever Incarcerated	0.536
31. Better Use of Time Score	0.591	46. Emotional/Personal Moderate Inference	0.535
35. Absence of Non-criminal Acquaintances	0.589	12. Frequently Unemployed	0.531
33. Some Criminal Acquaintances	0.587	4. Three or More Present Offenses	0.528
52. Unfavorable Attitude Toward Convention	0.578	40. Current Drug Problem Score	0.527
34. Some Criminal Friends	0.577	22. Reliance on Social Assistance	0.526
5. Arrested Under Age 16	0.576	21. Financial Problems Score	0.525
38. Drug Problem Ever	0.576	10. Record of Assault/Violence	0.524
19. Peer Interactions Score	0.576	30. Lack of Leisure/Recreation	0.522
20. Authority Interactions Score	0.576	47. Active Psychosis	0.522
43. School/Work Problems	0.575	39. Current Alcohol Problem Score	0.518
27. Unsatisfactory Accommodation	0.573	18. Participation or Performance Score	0.515
13. Never Employed a Full Year	0.571	3. Three or More Prior Adult Convictions	0.514
17. Suspended or Expelled	0.571	25. Non Rewarding Relatives	0.514
45. Other Drug Alcohol Indicators	0.570	32. Social Isolate	0.513
54. Poor Attitude Toward Supervision	0.569	18. Participation or Performance	0.510
1. At Least One Prior Adult Conviction	0.568	7. Escape History	0.508
14. Ever Been Fired	0.563	44. Medical Problems	0.507
2. Two or More Prior Adult Convictions	0.558	48. Mental Health Past Treatment	0.502
36. Absence of Non-criminal Friends	0.557	15. Education Less Than Grade 10	0.501
49. Mental Health Current	0.556	21. Financial Problems	0.500
42. Martial/Family Problems	0.554		

AUC = Area Under the Receiver Operating Characteristic

Most LSI-R items have a yes or no response with a yes counted as one risk point and a no counted as zero points. The items with a four-point response are ordered so that higher scores coincide with less satisfactory or higher risk responses. In addition, the LSI-R scoring manual converts all of these four-point responses to yes/no responses when computing the LSI-R total score. These are labeled item scores in this report (e.g. item 25 “Non-Rewarding Relative Score” is a yes/no version of item 25 “Non-Rewarding Relative”).

For further information, contact Robert Barnoski at  
(360) 586-2744 or [barney@wsipp.wa.gov](mailto:barney@wsipp.wa.gov)

Document No. 06-02-1201



The Washington State Legislature created the Washington State Institute for Public Policy in 1983. A Board of Directors—representing the legislature, the governor, and public universities—governs the Institute and guides the development of all activities. The Institute’s mission is to carry out practical research, at legislative direction, on issues of importance to Washington State.