

Estimating Risk of Alcohol Dependence Using Alcohol Screening Scores

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Appendix A. Supplementary Material on SSLR analysis

In this study, SSLRs are calculated by dividing the proportion of alcohol dependent patients in the sample who have a screening score in a given risk zone, by the proportion of patients in the sample without alcohol dependence who have a screening score in the same risk zone (Equations, Table A).

The SSLR for a given risk zone summarizes how many times more (or less) likely persons with alcohol dependence are to have that particular screening result than those without alcohol dependence

SSLRs were calculated for each risk zone and capture both the sensitivity and specificity for a given risk zone, thus similarly providing means for quantifying the diagnostic ability of a screening test.

Sensitivity is the true-positive rate, or the proportion of people with a disease who have a positive test result. Specificity is the true-negative rate, or the proportion of people without a disease who have a negative test result. The SSLR of a given risk zone corresponds to the change in sensitivity divided by the change in specificity over the defined score interval. In other words, the SSLR corresponds to the slope of the Receiver Operating Characteristic (ROC) curve between the lower and upper score bounds of the risk zone (1,2). ROC curves plot the fraction of true positives (sensitivity) versus the fraction of false positives (1-specificity) corresponding with each possible outcome of the screening test (i.e. at

each cut-point defining a risk zone or at each possible screening score). Thus, the SSLR incorporates the sensitivity and specificity of the test for a given risk zone and is independent of the disease prevalence.

Post-screening Probability of Alcohol Dependence

The prescreening probability (prevalence) of alcohol dependence in the study sample was converted to prescreening odds and multiplied by the SSLR of a given risk zone to get the post-screening odds, then converted back to probability to provide the post-screening probability of alcohol dependence for that risk zone. (Equations, Table A)

1. BLACK, W. C. & ARMSTRONG, P. (1986) Communicating the significance of radiologic test results: the likelihood ratio, *AJR Am J Roentgenol*, 147, 1313-8.
2. CHOI, B. C. (1998) Slopes of a receiver operating characteristic curve and likelihood ratios for a diagnostic test, *Am J Epidemiol*, 148, 1127-32.

Table A. Equations for stratum-specific likelihood ratio analyses.

Calculating stratum-specific likelihood ratios (SSLRs)				
$\text{SSLR} = \frac{\text{probability of result given disease}}{\text{probability of result given no disease}}$				
Screening Score Intervals	Disease +	Disease -	Total	SSLR
Zone 1	a	b	a+b	(a/x)/(b/y)
Zone 2	c	d	c+d	(c/x)/(d/y)
Zone 3	e	f	e+f	(e/x)/(f/y)
Total	x	y	n	
Calculating posttest probabilities using SSLRs				

Pretest probability = $x/n = p$

Pretest odds = $p/(1-p)$

Posttest odds = pretest odds \times SSLR

Posttest probability = $\text{posttest odds}/(\text{posttest odds}+1)$

Disease (+): Number of patients with a score in given zone who met diagnostic criteria for alcohol dependence in the past year.

Disease (-): Number of patients with a score in given zone who did not meet diagnostic criteria for alcohol dependence in the past year.