HS 267 Checklist

Pre-requisite material: measurement scales; data table structure (variable, value, observation); SPSS basics (variable creation, data entry, basic menus); basic exploratory and descriptive analysis (stemplot; frequency analysis, mean, standard deviation, median, quartiles; boxplots); Normal probabilities; confidence interval basics; hypothesis testing basics; one- sample, paired sample, and two-sample *t* procedures.

Inference about a proportion (Lab 1)

a. Conditions: single sample, binary response
b. Parameter *p*; Point estimator $\hat{p}$
c. (1 – α/2)100% confidence interval for *p* (plus-four or Wilson's), margin of error *m*; interpretation
d. Test of H_0: $p = p_0$ (hypothesis statements; z or exact test, *P*-value; interpretation)
e. Sample size to limit margin of error *m*

Comparing two proportions (Lab 2)

a. Conditions: independent samples, binary response variable
b. Parameter *RR*; point estimator $\hat{RR} = \frac{\hat{p}_1}{\hat{p}_2}$; interpretation
c. Relative Risk (relative effect) vs. Risk Difference (absolute effect)
d. (1 – α/2)100% CI for *RR* (traditional method; interpretation)
f. Test of H_0: *RR* = 1 (hypotheses; chi-square or exact test, *P*-value; interpretation)
e. Systematic error (bias)
f. Small sample procedures (expected frequencies; Fisher's exact test)

Cohort and naturalist samples (Lab 3)

a. Conditions: cohort or naturalistic sample, categorical exposure, categorical outcome (disease)
b. Chi-square distribution (characteristics, chi-square table, *df*, relation to *z*)
c. 2-by-2 cross-tabulation, $\hat{p}_1, \hat{p}_2, \hat{RR}$, chi-square test of association
d. Sample size requirement determinants (WinPEPI, interpretation)
e. R-by-C cross-table analysis (row proportions, chi-square test)

Case-control samples (Lab 4)

a. Conditions: case-control sample, binary, ordinal, or categorical exposure; categorical disease
b. Parameter *OR*; Point estimator $\hat{O}R = \frac{a_1 \cdot b_2}{b_1 \cdot a_2}$ (independent samples) or $\hat{O}R = \frac{b}{c}$ (matched-pairs), confidence interval; interpretation
c. Test of H_0: *OR* = 1, independent samples
d. Test of H_0: *OR* = 1, matched-pairs
e. Test for trend

Stratified tables: confounding and interaction (Lab 5)

a. Conditions: cohort or case-control samples; binary exposure, binary response, categorical potential confounders (stratified tables)
b. Confounding and interaction (definitions, methods of control)
c. Inspection of crude and stratified table RRs (cohort) or ORs (case-control)
d. Mantel-Haenszel summary RR (cohort) or OR (case-control); CI; and *P*-value
e. Test for interaction of RRs (or ORs): hypotheses; tests statistic, P-value, interpretation

Correlation and regression (Lab 6)

a. Conditions: quantitative explanatory variable, quantitative response variable
b. Inspection of scatterplot (direction, form, strength, outliers)
c. Correlation coefficient: parameter ρ; estimator *r* (interpretation; significance test)
d. Coefficient of determination r^2 (model fit)
e. Regression coefficients: parameters α and β; estimators *a* and *b* (interpretation; CI for β)
f. Nonlinear relations (inspection; outlier removal; transformation; range restriction)

Multiple regression (Lab 7)

a. Conditions: quantitative or dummy explanatory variable; quantitative response variable; quantitative or dummy potential confounders
b. Univariate description of data
c. Bivariate descriptions (simple regression model; correlation matrix)
d. Multivariate models (parameters β_i; estimators b_i; CIs for β_i
e. Variable selection (unconfounded slope estimate; model fit; parsimony)