

***PHLT 8560 Advanced Analysis of Secondary Data***

**Meta-Analysis Assignment Guidelines and Scenarios**

**Assignment: Conducting a Meta-Analysis**

**Assignment Guidelines**

Please review the following instructions and scenarios to complete the Module 5 Assignment *Conducting a Meta-Analysis*:

- a. For each scenario below there are data from 3 individual studies which need to be analyzed using SPSS according to the instructions found in the module Learning Resources.
- b. For each individual study, the effect size is automatically calculated by SPSS.
- c. SPSS will calculate many parameters of the meta-analysis, but you need to report and interpret only the following:
  - a. The overall effect size of the analysis based on fixed and random effect models
  - b. The 95% CI
  - c. The *p* value
  - d. The heterogeneity of the analysis.
- d. Overall effect size interpretation for SMD models: you need to calculate the SMD difference between the two groups, which is Hedge's *g*. A positive Hedge's *g* value means that Group 2 has overall **higher** mean value than Group 1 and a negative Hedge's *g* value means that Group 2 has overall **lower** mean value than Group 1.
- e. Overall effect size interpretation for risk/odds ratio models: you need to calculate the Odds ratio average for the two groups. An odds ratio of:
  - 1 (or close to 1.0) indicates that the odds of exposure among group 1 are the same as, or similar to, the odds of exposure among group 2. The exposure is not associated with the outcome (e.g. disease).

- *Greater than 1.0* indicates that the odds of exposure among group 1 are greater than the odds of exposure among group 2. The exposure might be a risk factor for the outcome (e.g. disease).
  - *Less than 1.0* indicates that the odds of exposure among group 1 are lower than the odds of exposure among group 2. The exposure might be a protective factor against the outcome (e.g. disease).
- f. When reporting an overall effect size remember to also report the  $p$  value of the overall effect size and the correspondent 95% CI.

**Important Note:** when conducting a meta-analysis, we need to consider to what extent the results of studies are consistent. If confidence intervals for the results of individual have poor overlap, this generally indicates the presence of *statistical heterogeneity*. Using SPSS you are able to run a statistical test for heterogeneity ( $I^2$  and  $\text{Tau}^2$ ). For this assignment, you can interpret only  $I^2$ . A rough guide to interpretation is as follows:

- 0% to 40%: might not be important heterogeneity;
- 30% to 60%: may represent moderate heterogeneity\*;
- 50% to 90%: may represent substantial heterogeneity\*;
- 75% to 100%: considerable heterogeneity\*.

\* The importance of the observed value of  $I^2$  depends on (i) magnitude and direction of effects and (ii) strength of evidence for heterogeneity (e.g. a confidence interval for  $I^2$ ).

## Assignment Scenarios

Please select 1 of the following scenarios to complete this assignment:

Research topic 1: The effect of gender on systolic pressure (in mm Hg.). You will need to use the Continuous meta-analysis model. Please use the Metaanalysis\_Continuous\_outcome.sav dataset and calculate and report the overall effect size (Hedge's  $g$ ), correspondent  $p$ , 95%CI and  $I^2$ .

	Males (Group 1)			Females (Group 2)		
	Mean	SD	Sample size	Mean	SD	Sample Size
Study 1	125	7	3298	110	14	2800
Study 2	130	12	2100	114	16	1900
Study 3	120	21	600	123	30	510

Research topic 2: The effect of smoking on colorectal cancer by gender (binary outcome yes/no). You will need to use the Binary meta-analysis model. Please use the Metaanalysis\_BinaryOddsratio\_outcome.sav dataset and calculate and report the overall effect size (odds ratio), correspondent  $p$ , 95%CI and  $I^2$ .

	Smoking (Group 1)		Non-Smoking (Group 2)	
	Events (cancer yes)	Non- Events (cancer no)	Events (cancer yes)	Non-Events (cancer no)
Study 3	450	365	121	280
Study 4	62	105	60	93
Study 5	750	675	503	1450