**Department of Mathematics and Statistics Colloquium**

# *Pairwise Comparisons and Testing Homogeneity of Odds Ratios in Stratified $2 \times 2$ Contingency Tables*

**Sanduni Palliyage**

**James Madison University**

**Abstract:** In the analysis of stratified 2x2 categorical data, the question often is about the association patterns as measured by the odds ratios. The commonly used tests such as Breslow-Day (1980) and Cochran-Mantel-Haenszel (1954) allow to test hypotheses about the odds ratios being equal and given that about all strata exhibiting the independence of classification variables or not. In many research areas, for example in personalized medicine, such information could be insufficient, and information about particular stratum (or strata) exhibiting association would be needed.

Four multiple comparison procedures are adapted to be used for the comparison of odds ratio in a similar way that they have been proposed and used for the comparison of means in several populations. The results are compared in an extensive simulation study.

For testing homogeneity of odds ratios across strata, Breslow-Day test (1980) is widely used. A new test called Range test is proposed for testing equal odds ratios across strata. A simulation study is conducted to compare the performance of the Breslow-Day test and the Range test. Range test is based on a statistic that has intuitive interpretation, which is not the case of the Breslow-Day test. One disadvantage of Breslow-Day test is that the power decreases as most of the odds ratios are close to the common odds ratio. The proposed Range test outperforms Breslow-Day test when most of the odds ratios cluster around one value. Otherwise, Range test can be used as an equivalent for the Breslow-Day test.

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# *Strategies Used by Transition-to-Proof Course Students When Selecting Proof Methods*

**Hyejin Park**

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**Abstract:** Proof and proving are central to the practice of mathematics. One of the major instructional goals of an undergraduate mathematics program is to build students' capacity to read, understand, construct, and evaluate proofs. In this talk, I will discuss strategies that transition-to-proof course students develop and use in selecting proof methods when they are tasked with proving or disproving different mathematical statements. The understanding of how students make decisions about proof methods helps instructors of transition-to-proof courses when it comes to teaching proof methods.

**Monday, September 7 at 3:10 pm on WebEX**