

## Determining Effect Size Benchmarks for CME Effectiveness

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\*Cohen. J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.





1. Drexel et al. Int J Chron Obstruct Pulmon Dis 2011; 6: 297–307. 2. Mansouri & Lockyer. J Contin Educ Health Prof 2007;27:6-15.







# Overall EIS (by format) June 2010 – Sept 2013

<sup>1</sup>Cohen J 1988. Small effect = .2, Medium effect = .5, Large effect = .8



1. Cohen. J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.

2. Mansouri & Lockyer. J Contin Educ Health Prof 2007;27:6-15.

3. Drexel et al. Int J Chron Obstruct Pulmon Dis 2011; 6: 297–307.

4. Casebeer et al. BMC Med Educ 2010;10: 42.



## **Questions I want to answer**

- ? What is a good CME effect size?
- ? Why is my effect size different than benchmarks?

✓ How do my outcomes methods / questions affect my effect size?

- What affect does adding / subtracting certain CME elements have on my effect size?
- ✓ Why is one format more / less effective than another?

Assuming I'm calculating effect size correctly

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# With >140,000 CME activities per year, why don't we have more effect size data?

- Lack of expertise?
- Lack of time?
- Lack of funding?





# **Calculating effect size**

- Can be done using only MS Excel<sup>®</sup> and free, online resources
- Approach dependent upon variable type:
  - ordinal (e.g., clinical practice strategy)
  - categorical (e.g., case vignette)



#### Example paper survey question (clinical practice strategy)

Using bevacizumab-based combo therapy for non-squamous NSCLC



Current vs. planned use of bevacizumab-based combo therapy in nonsquamous NSCLC (n = 22)



# Calculating effect size for an ordinal variable (e.g., clinical practice strategy)

- Calculate average and standard deviation for each group (e.g., pre- and post-activity)
  - Pre-activity: mean (SD) = 2.5 (1.3)
  - Post-activity: mean (SD) = 3.1 (1.2)
- Plug these values into an online calculator (http://www.uccs.edu/~lbecker/)





#### **Example ARS question (case vignette)**

Frontline therapy for a former smoker with symptomatic advanced stage adenocarcinoma of the lung (EGFR+)





# Calculating effect size for a categorical variable (e.g., case vignette)

- Determine number correct for each group (e.g., pre- and post-activity)
  - Pre-activity: .51\*65 = 33 correct / 32 incorrect
  - Post-activity: .75\*65 = 49 correct / 16 incorrect
- Plug these values into online calculator (www.vassarstats.net)
  - Click "frequency data"
  - Click "Chi-Square, Cramer's V and Lambda"

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#### VassarStats: Website for Statistical Computation

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- Utilities
- Clinical
- Research
- Calculators
- Probabilities
- Distributions
- Frequency Data
- Proportions
- Ordinal Data
- Correlation & Regression
- t-Tests & Procedures
- ANOVA
- ANCOVA
- Miscellanea
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#### Data Entry

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A <sub>2</sub>	49	16				65
A <sub>3</sub>						
A4						
A5						
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# Calculating effect size for a categorical variable, continued

- Visit <u>www.lyonsmorris.com/ma1/index.cfm</u>
- Select "Correlation coefficient (r) to Effect Size"
- Enter Cramer's V (.2551)

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## **Determining overall effect size for a CME activity**

- Take average of all effect sizes (Cohen's d) at each outcome level
  - Report overall effect size if you have at least four questions
  - Only combine effect sizes for the same question type
- Keep a database of effect sizes to develop benchmarks



## What about these issues?

- Calculating a mean and standard deviation for an ordinal variable
- Converting Cramer's V to Cohen's d
- Minimum requirement of questions required to calculate an aggregate effect size



## And what about these limitations?\*

- Heterogeneity in assessments
- Variable quality across assessments
- Lack of valid and reliable CME evaluation tools
- Lack of standardization in CME research

## • No standardized terminology

\*Marinopoulos SS, et al. Effectiveness of Continuing Medical Education. Evidence Report/Technology Assessment No. 149 (Prepared by the Johns Hopkins Evidence-based Practice Center, under Contract No. 290-02-0018.) AHRQ Publication No. 07-E006. Rockville, MD: Agency for Healthcare Research and Quality. January 2007.



- Is effect size accessible to all CME providers?
- Have I described an acceptable approach to effect size calculations?
- Can we aggregate effect size data from individual CME providers to establish benchmarks?



## Feedback and comments welcome:

## www.assessCME.wordpress.com