



THE UNIVERSITY OF ARIZONA COLLEGE OF PHARMACY

Center for Health Outcomes  
& Pharmacoeconomic Research

# Meta-Analysis Training Program

*Learn to design, conduct,  
interpret, and publish robust  
meta-analyses!*

June 18-20, 2018

The University of Arizona  
College of Pharmacy  
Tucson, Arizona

Sponsored by

The University of Arizona  
College of Pharmacy

In partnership with  
American College of  
Clinical Pharmacy



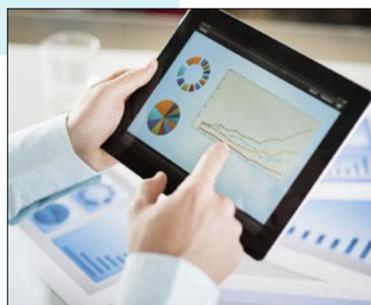
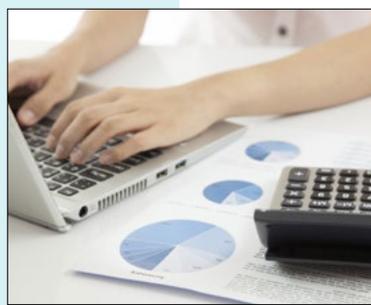
# An Overview of the Meta-Analysis Program

**This 3-day, hands-on course will enable participants to:**

- ▶ Evaluate published meta-analyses
- ▶ Identify and address bias in meta-analyses
- ▶ Design a study protocol for meta-analysis
- ▶ Optimize searches for data sets
- ▶ Design and build an extraction database
- ▶ Quantify and interpret heterogeneity
- ▶ Differentiate fixed and random-effects models
- ▶ Incorporate sub-group analysis and meta-regression
- ▶ Interpret, critique, and summarize results for publication

**Who should attend?**

- ▶ Personnel in healthcare policy, pharmaceutical and biomedical industries, or academic research with an entry to intermediate knowledge level
- ▶ Participants should bring their own laptops installed with Excel to complete interactive exercises



## Training Program Faculty

**Ivo Abraham, PhD, RN**

*Professor of Pharmacy Practice & Science  
The University of Arizona College of Pharmacy*

**Jason Hurwitz, PhD**

*Research Scientist  
Center for Health Outcomes & PharmacoEconomic Research  
The University of Arizona College of Pharmacy*

**Christopher S Lee, PhD, RN, FAHA**

*Professor and Associate Dean for Research  
Connell School of Nursing  
Boston College*

**Jennifer Martin, MA**

*Associate Librarian, Arizona Health Sciences Library  
Clinical Instructor, Department of Pharmacy Practice & Science  
The University of Arizona College of Pharmacy*

**Marion Slack, PhD**

*Professor, Department of Pharmacy Practice & Science  
The University of Arizona College of Pharmacy*

### **WORKSHOP REQUIREMENTS**

Participants need to bring a laptop with Excel to participate in workshops.

Monday, June 18, 2018

# Meta-Analysis Training Program

## Agenda

- |                |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8:00-8:30 am   | <b>Breakfast, registration, welcome and Introduction</b>                                                                                                                                                                                                                                                                                                                                                                                    |
| 8:30-9:00      | <b>Value of Meta-Analysis: Why do it?</b><br><i>Ivo Abraham, PhD, RN</i> <ul style="list-style-type: none"><li>• Discuss the use and importance of meta-analysis</li><li>• Identify advantages and disadvantages of meta-analysis</li></ul>                                                                                                                                                                                                 |
| 9:00-10:00     | <b>Meta-Analysis Review</b><br><i>Marion Slack, PhD</i> <ul style="list-style-type: none"><li>• Using a published meta-analysis, identify techniques, terminology, and core concepts</li><li>• Discuss effect size and use of PRISMA criteria</li></ul>                                                                                                                                                                                     |
| 10:00-10:15    | <b>Break</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 10:15-12:15 pm | <b>Literature Search Techniques for Meta-Analysis</b><br><i>Jennifer Martin, MA</i> <ul style="list-style-type: none"><li>• Identify appropriate databases</li><li>• Develop database search strategies</li><li>• Describe methods to document strategies</li><li>• Conduct a series of database searches; evaluate the strategies and results</li></ul>                                                                                    |
| 12:15-1:15     | <b>Lunch</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1:15-2:45      | <b>Protocols for Meta-Analysis</b><br><i>Marion Slack, PhD</i> <ul style="list-style-type: none"><li>• Define criteria to develop a protocol with purpose statement</li><li>• Discuss use of PICOS + E (population, intervention, comparator, outcome(s) of interest, study design, and exclusion criteria)</li><li>• Develop items for a screening and data extraction tool</li></ul>                                                      |
| 2:45-3:00      | <b>Break</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 3:00-4:30      | <b>Screening Studies and Data Extraction</b><br><i>Jason Hurwitz, PhD and Marion Slack, PhD</i> <ul style="list-style-type: none"><li>• Identify candidate studies from literature utilizing a screening tool</li><li>• Obtain data for a meta-analysis using the data extraction tool</li><li>• Incorporate study data into a small data set for meta-analysis and interpret results (effect estimates, forest and funnel plots)</li></ul> |
| 4:30-4:45      | <b>Complete daily evaluation</b>                                                                                                                                                                                                                                                                                                                                                                                                            |



8:00-8:30 am

**Breakfast**

8:30-10:30

**Within- and Between-Study Estimates of Effect and Variability**

*Christopher S Lee, PhD, RN, FAHA, FAAN, FHFSa*

- Describe estimates of effect and precision using means, binary data, correlations, and point estimates
- Calculate variance, standard error, confidence intervals, and effect sizes

10:30-10:45

**Break**

10:45-12:00 pm

**Fixed and Random Effects Models**

*Christopher S Lee, PhD, RN, FAHA, FAAN, FHFSa*

- Discuss the assumptions that underlie fixed and random effects models
- Compare procedures and products associated with fixed and random effects models
- Calculate weights for each study using fixed and random models, and calculate a summary effect
- Compare and contrast fixed and random effects model results

12:00-1:00

**Lunch**

1:00-1:45

**Fixed and Random Effects Models** (continued)

1:45-2:30

**Quantifying and Interpreting Heterogeneity**

*Christopher S Lee, PhD, RN, FAHA, FAAN, FHFSa*

- Compare and contrast metrics of total dispersion ( $Q$ ), total to excess dispersion ( $Q-df$ ), between-study variance ( $\tau^2$ ), and signal-to-noise ratio ( $I^2$ )
- Conduct a random effects meta-analysis
- Interpret the summary effect and the metrics of heterogeneity

2:30-2:45

**Break**

2:45-3:30

**Quantifying and Interpreting Heterogeneity** (continued)

3:30-4:30

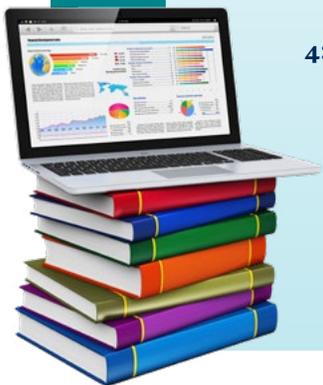
**Special Topics: Network Meta-Analysis**

*Ivo Abraham, PhD, RN*

- Compare and contrast approaches of direct and indirect treatment comparisons using meta-analytic approaches
- Discuss the benefits of network meta-analysis
- List potential criticisms of network meta-analysis

4:30-4:45

**Complete daily evaluation**



8:00-8:30 am

**Breakfast**

8:30-10:30

## **Examining Bias in Meta-Analysis**

*Christopher S Lee, PhD, RN, FAHA, FAAN, FHFSa*

- Explain publication bias using funnel plots, contour-enhanced plots, and non-parametric trim and fill
- Discuss tests for small study effects
- Describe classic and Orwin's fail-safe N
- Interpret the results of tests of publication bias
- Describe the results of Egger's test of small study effects
- Analyze published meta-analyses that use trim and fill and fail-safe N

10:30-10:45

**Break**

10:45-11:20

## **Special Topics: Meta-Analysis of Data Sets & Single Case Research**

*Jason Hurwitz, PhD*

- Compare and contrast issues in analyzing data from publications vs from original data sets for separate studies
- Describe why multilevel modeling is needed to analyze nested data
- Demonstrate techniques for pooling a series of n-of-1 trials
- Discuss how single case research generates practice based evidence

11:20-11:45

**Jeopardy Game: What Have You Learned?**

11:45-12:45 pm

**Lunch**

12:45-1:45

## **Sub-group Analysis and Meta-Regression**

*Christopher S Lee, PhD, RN, FAHA, FAAN, FHFSa*

- Describe situations when subgroup analyses are appropriate
- Identify procedures and products associated with sub-group analysis
- Describe incorporation of covariates using meta-regression
- Discuss interpreting data output from multivariate meta-regression

1:45-2:45

## **Evaluating Published Meta-Analyses**

*Jason Hurwitz, PhD*

- Discuss the process to critique and evaluate meta-analyses
- Review and critique a well done and a flawed meta-analysis
- Learn to use common evaluation tools (AMSTAR, PRISMA, MARS)

2:45-3:00

**Break**

3:00-3:30

**Evaluating Published Meta-Analyses** (continued)

3:30-4:15

## **Special Topics: Meta-Analysis - Special Considerations**

*Christopher S Lee, PhD, RN, FAHA, FAAN, FHFSa*

- Describe the hierarchical summary receiver operating characteristic (HSROC)
- Discuss evaluating sensitivity & specificity with diagnostic odds ratios
- Identify issues involving cross-over trials or cluster-randomized trials

4:15-4:30

**Complete daily evaluation and close of program**



# Registration

## Venue

All sessions will be held at The University of Arizona College of Pharmacy.  
Drachman Hall-Pulido Center  
1295 N. Martin Ave.  
Tucson, AZ

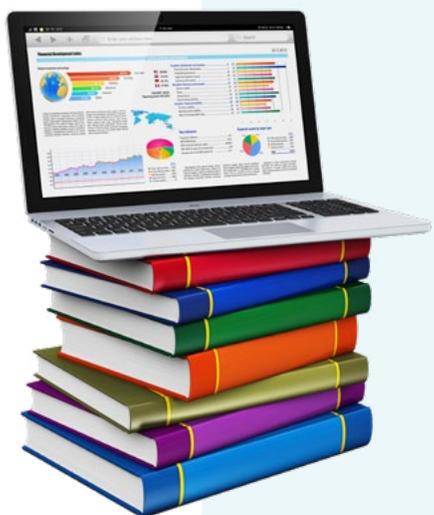
## Lodging

Area hotels offer lodging at reasonable rates and close proximity to the college

**Tucson Marriott University Park**  
520-792-4100

**Arizona Inn**  
800-933-1098

**Aloft Tucson University**  
520-908-6800



Please use the online registration process at <https://events.pharmacy.arizona.edu/metaanalysis> OR complete the registration form and return it with your payment. The registration fee includes all sessions, training materials, daily breakfast, lunch, breaks, and a certificate of completion.

**REFUND POLICY:** A refund (less \$450 cancellation fee) will be available for cancellations received in writing by June 1, 2018.

*Registration fees paid to The University of Arizona Foundation are not considered a tax-deductible gift contribution.*

Persons with a disability may request a reasonable accommodation, such as sign language interpreter, by contacting the Office of Continuing Education, 520-626-3020, email: [continuinged@pharmacy.arizona.edu](mailto:continuinged@pharmacy.arizona.edu). Requests should be made as early as possible to allow time to arrange the accommodation.

## For further information:

Office of Continuing Education  
The University of Arizona  
College of Pharmacy  
PO Box 210202  
Tucson, Arizona 85721-0202

Phone: (520) 626-3020

Email: [continuinged@pharmacy.arizona.edu](mailto:continuinged@pharmacy.arizona.edu)

Web address: [www.pharmacy.arizona.edu/hope](http://www.pharmacy.arizona.edu/hope)

Follow us [@AzHEOR](https://twitter.com/AzHEOR)

# Online Registration

<https://events.pharmacy.arizona.edu/metaanalysis>

If not using the online system,  
please return registration form below:

## Registration Form

Meta-Analysis Training Program • June 18-20, 2018

NAME \_\_\_\_\_

DEGREE \_\_\_\_\_ POSITION \_\_\_\_\_

AFFILIATION \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP CODE \_\_\_\_\_

TELEPHONE \_\_\_\_\_

EMAIL ADDRESS \_\_\_\_\_

- Registration fee:**  Professional: \$2,000       ACCP Member: \$1,600  
 Trainee (Fellows/Residents/Graduate students): \$750  
 University of Arizona Employee/Student

**Please indicate method of payment:**

Check made payable to the **The University of Arizona Foundation**

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**Email:** [continuinged@pharmacy.arizona.edu](mailto:continuinged@pharmacy.arizona.edu)