

## Systematic reviews of diagnostic accuracy studies (online course)

### *Background*

The number of diagnostic technologies is rapidly growing, alongside the costs associated with testing. Selecting diagnostic tests for clinical practice and finding their place in a diagnostic pathway usually calls for the evaluation of their accuracy. Diagnostic accuracy studies evaluate how well a test performs in distinguishing people with and without a target condition; some studies also compare the accuracy of multiple tests. Critically summarizing such studies in a systematic review is beneficial for those seeking the best evidence about the use of diagnostic tests. Reviews of diagnostic accuracy studies can be more challenging to perform and interpret than reviews of interventions. This is because of the large variation in review questions and study designs, the consideration of paired accuracy statistics, and the need to use more complex statistical approaches for meta-analysis.

In this course, we will discuss and practice the methods relevant for each step of the review process: formulating review questions, searching for diagnostic accuracy studies, assessing the methodological quality of included studies (using the QUADAS-2 tool and the QUADAS-C extension), meta-analysis of paired accuracy statistics (bivariate meta-regression model of sensitivity and specificity), and interpreting review findings. This two- or three-day online course consists of presentations and collaborative small group exercises. For participants interested in learning how to perform a meta-analysis, an optional 3<sup>rd</sup> day provides computer exercises using the statistical software package *R*.

### *Learning objectives*

Participants will be introduced to the concepts and different steps of a systematic review of diagnostic accuracy studies. At the end of the course, the participant is able to:

- List the key steps of a systematic review of diagnostic accuracy studies
- Formulate a focused review question addressing a diagnostic problem
- Understand the key issues in building a search strategy to identify relevant diagnostic accuracy studies
- Design a data extraction form for diagnostic accuracy studies
- Explain the main sources of bias in a diagnostic accuracy study and the concept of ‘concerns regarding applicability’
- Assess the risk of bias and concerns regarding applicability in a diagnostic accuracy study using the QUADAS-2 and QUADAS-C tools
- Explain the assumptions of the bivariate random effects model for meta-analyzing diagnostic accuracy data
- Interpret the results of the bivariate model with and without covariates
- Interpret the main review findings
- Assess the certainty of evidence according to the GRADE (Grading of recommendations assessment, development and evaluation) approach
- Fit basic bivariate random effects models using a statistical package in *R* (optional day 3)

### Target audience

Anyone willing to perform a diagnostic accuracy review or anyone interested in critically appraising and interpreting the results of a diagnostic accuracy review.

### Prerequisites

Participants are expected to have basic knowledge about what systematic reviews are and familiarity with common expressions of test accuracy (sensitivity & specificity, predictive values, and receiver operating characteristic curves).

For those interested in attending the optional 3<sup>rd</sup> day of computer exercises using *R*, an understanding of the basic commands in *R* is anticipated (basic tutorials will be provided).

### Topics

<b>Day 1</b> 9:30-17:00 CET*	Introduction to diagnostic accuracy reviews Formulating a review question and developing the protocol Searching for diagnostic accuracy studies Developing a data-extraction form
<b>Day 2</b> 9:00-17:00 CET*	Assessing risk of bias and concerns regarding applicability Basic principles of meta-analysis of diagnostic accuracy studies Exploring heterogeneity Interpreting review findings Assessing the certainty of evidence (using GRADE)
<b>Day 3 (optional)</b> 10:00-16:00 CET*	Bivariate meta-analysis and meta regression (hands-on <i>R</i> computer exercise)

CET: Central European Time Zone.

\*Times are indicative. A definitive program will be sent by mail before the start of the course.

### Workshop Style

This workshop will consist of presentations, interactive small group exercises with ample room for discussion, and computer exercises. Participants will be asked to do some preparatory work before the workshop and to do some self-study during the workshop.

Participants attending the optional 3<sup>rd</sup> day are asked to have the statistical *R* package installed on their computer (guidance will be provided).

### Faculty

- Lotty Hooft, Cochrane Netherlands and Julius Center, Utrecht
- Rene Spijker, Cochrane Netherlands and Julius Center, Utrecht
- Anneke Damen, Cochrane Netherlands and Julius Center, Utrecht
- Kevin Jenniskens, Cochrane Netherlands and Julius Center, Utrecht
- Mariska Leeftang, Dept. of Epidemiology and Data Science, Amsterdam UMC, Amsterdam
- Hans Reitsma, Cochrane Netherlands and Julius Center, Utrecht
- Bada Yang, Cochrane Netherlands and Julius Center, Utrecht, course coordinator

### Language

English

### ***Dates & cancellation***

See our [website](#) for exact dates.

A full refund will be available if you notify us by email up to and including 30 calendar days before the date of the event. In case an unforeseen event would force the organization to cancel the course as a whole, the organization will fully reimburse the participants' registration fees.

NB: For this course a minimum number of participants is required. Fourteen calendar days before the first day of the course we will decide whether the course will go continue as planned.

### ***Course fees***

The course fee amounts € 595,- for a 2-day course (Days 1 and 2) and € 895.- for a 3-day course.

### ***Registration and additional information***

To register for the course or to receive additional information, you can contact the course organizer at Cochrane Netherlands at [PAOJuliusCenter@umcutrecht.nl](mailto:PAOJuliusCenter@umcutrecht.nl).

For more information on the content of the course, you can send an e-mail with your question(s) to [cochrane@umcutrecht.nl](mailto:cochrane@umcutrecht.nl).

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