

# *Tuberculosis Diagnostic Research: Beyond the Basics*



*An intensive course on TB diagnostic research methods - from basics to advanced techniques*

December 13 - 15, 2010  
Chennai, India

Hosted by



## **Course coordinators**

Dr V Kumaraswami, MD  
Director, TRC, Chennai

Dr Madhukar Pai, MD, PhD  
McGill University, Montreal, Canada

## **Course Faculty**

Dr Andrew Ramsay, PhD, TDR/WHO, Geneva  
Dr Soumya Swaminathan, MD, TDR/WHO, Geneva  
Dr Karen Steingart, MD, UCSF, San Francisco  
Mr Hojoon Sohn, MPH, McGill University, Montreal  
Dr CN Paramasivan, FIND, Geneva  
Dr V Kumaraswami, MD, TRC, Chennai  
Dr Madhukar Pai, MD, PhD, McGill University, Montreal

## **Local Organizing Committee**

Dr Banu Rekha, MD  
Dr Aleyamma Thomas, MD  
Dr MS Jawahar, MD



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## Course description and content

### Context:

High quality diagnostic studies are critical to evaluate new tools, to develop evidence-based policies on TB diagnostics. There is evidence that TB diagnostic trials are poorly conducted and poorly reported. Lack of methodologic rigour in TB trials is a cause for concern as it may prove to be a major hurdle for effective application of diagnostics in TB care and control. Furthermore, there is evidence that a majority of TB diagnostic studies are focused on test accuracy. There are limited data on outcomes such as accuracy of diagnostic algorithms (rather than single tests) and their relative contributions to the health care system, incremental value of new tests, impact of new tests on clinical decision-making and therapeutic choices, cost-effectiveness in routine programmatic settings, and impact on patient-important outcomes. This poses problems because research on test accuracy, while necessary, is not sufficient for policy and guideline development. Test accuracy data are surrogates for patient-important outcomes and cannot provide high quality evidence for policy making. Therefore, accuracy studies must be considered along with impact of the test on patient-important outcomes, and other factors such as quality of the evidence, the uncertainty about values and preferences associated with the tests and presumed patient-important outcomes, and cost and feasibility, especially in resource-limited settings.



### Course content:

This short course will cover the basic principles behind diagnostic research, diagnostic study designs, sources of bias, and analysis and interpretation of diagnostic accuracy data. Also, critical appraisal of diagnostic studies, and conventional and advanced methods for systematic reviews (meta-analyses) of diagnostic tests will be presented. More recently, there is growing appreciation that “test accuracy research” focused on sensitivity and specificity is not necessarily the same as “diagnostic research.” There is also a clearly felt need to go beyond test accuracy and evaluate accuracy of diagnostic algorithms (rather than single tests) and their relative contributions to the health care system, incremental value of new tests, impact of new tests on clinical decision-making and therapeutic choices, cost-effectiveness in routine programmatic settings, and impact on patient-important outcomes. This course will briefly introduce multivariable approaches to diagnostic research, and cover alternative designs which evaluate outcomes other than test accuracy. Throughout the course, the focus will be on TB, and real life examples from TB diagnostic research will be used. Special evening seminars (also open to public) will cover related topics of interest.

### Objectives:

At the end of the course students will understand

- principles and practice of diagnostic research focused on accuracy of tests
- principles of multivariable approaches to diagnostic research
- principles of meta-analyses of diagnostic accuracy studies
- principles of alternative designs to evaluate impact of new tests on clinical decision-making, therapeutic choices, cost-effectiveness, and patient-important outcomes

**Readings:** Course CDs will be provided to all participants; they will contain PDF articles for readings.

### Course contents in brief

- Design of TB diagnostic studies
- Estimation of test accuracy (sensitivity, specificity, predictive values, likelihood ratios, ROC curves)
- Sources of bias and variation in TB diagnostic studies
- Reliability (reproducibility) of diagnostic tests
- Sample size estimation for diagnostic test studies
- Critical appraisal of diagnostic studies
- Accurate reporting of studies of diagnostic accuracy
- Multivariable approach to diagnostic research
- Systematic review and meta-analysis of diagnostic studies
- Implementation and operational research
- Clinical impact studies and cost analysis



**Venue:** Tuberculosis Research Centre, Mayor V. R. Ramanathan Road, Chetpet, Chennai - 600 031, India

**Enrolment:** Maximum of 40 participants. *Only participants with prior TB diagnostic research experience or advanced training will be selected.*

**Registration:** No registration fee, but participants are expected to cover their travel and accommodation costs. To apply, please send a CV (resume) and a cover letter describing your background and prior experience in TB diagnostic research to:

### Dr Banu Rekha, MD

Tuberculosis Research Centre,  
Mayor V. R. Ramanathan Road,  
Chetpet, Chennai - 600 031, India  
Email: [bannu24@yahoo.com](mailto:bannu24@yahoo.com)

## COURSE SCHEDULE

Date	Time	Topic	Faculty
Dec 13, Monday	8.30 AM - 12 noon	Overview of diagnostic research and types of diagnostic studies	M Pai
		Landscape of TB diagnostic research	
	12 noon to 1 PM	Lunch	
	1.00 - 4.30 PM	Lab exercise: Measures of test accuracy	M Pai & K Steingart
Computer exercise (demo): OpenEpi & WinPEPI ROC simulation exercise			
		Reliability and sample size issues	M Pai
4.30 - 5.30 PM: Special evening seminar (public): <i>Making the most of poor diagnostics : increasing access to TB treatment through optimized smear microscopy services</i> , A Ramsay			
Dec 14, Tuesday	8.30 AM - 12 noon	Bias in diagnostic research and sources of variation	K Steingart
		Optimism bias in TB diagnostic research	M Pai
		Critical appraisal of diagnostic studies	K Steingart & M Pai
	12 noon to 1 PM	Lunch	
	1.00 - 5 PM	Alternative designs to evaluate clinical impact	M Pai & A Ramsay
		Multivariable approaches to diagnostic research: computer demo and simulation exercises	M Pai
	Evaluation of TB diagnostics in children: challenges and potential solutions from DEEP guidelines	S Swaminathan	
	Good Lab Practices for TB Diagnostic Research	CN Paramasivan	
4.30 - 5.30 PM: Special evening seminar (public): <i>Global report for research on infectious diseases of poverty: relevance for India</i> , S Swaminathan			
Dec 15, Wednesday	8.30 AM - 12 noon	Meta-analysis of diagnostic research & computer demo (MetaDiSc and STATA)	K Steingart
		Approaches to cost analyses	H Sohn
		Implementation research: translating new TB diagnostics into impact & framework for assessment of impact	A Ramsay
	12 noon to 1 PM	Lunch	
	1.00 - 2 PM	The GRADE approach to diagnostic guidelines and policies: an introduction	K Steingart
		Scientific blueprint for new TB diagnostics development	A Ramsay
2.00 - 4.00 PM	Improving the landscape of TB diagnostics in India Encouraging diagnostic innovations in India	M Pai V Kumaraswami MD Nair	