

Sun Pharma Research Foundation

sponsored

ADVANCED COURSE ON CLINICAL & GENETIC EPIDEMIOLOGY

September 9-14, 2019

National Institute of Biomedical Genomics, Kalyani, West Bengal

Organized jointly by:

National Institute of Biomedical Genomics, Society for Applied Studies, and
Indian Statistical Institute

Purpose of the Course: This course is being organized for young clinical researchers, basic scientists engaged in research on biomedical sciences and teachers who teach epidemiological methods to clinicians. The intent of the course is to empower young researchers in methods of epidemiology, both clinical and genetic.

Who Can Apply: If you are currently engaged in clinical or biomedical research, you can apply. You need to provide evidence of your engagement in such research, through publications, funded projects, etc. You also need to provide a one page write-up of the research that you are currently conducting and the reasons for your intent to participate in this Course.

Topics to be Covered: Study designs, Measures of occurrence, Probability distributions, Sampling, Hypothesis testing, Sample size determination, Measurement in research: qualitative and quantitative, Analyses of qualitative and quantitative data, Genetic epidemiological methods for observational and case-control studies, Methods of interventional studies and clinical trials. *A major feature of this course is that there will be extensive discussion sessions on each topic.*

Other Information: This is a residential course. There is no course fee or other costs. ***The total number of participants to be selected is limited.*** Board and lodging will be provided. All participants will be accommodated in the Guest House of the National Institute of Biomedical Genomics, possibly on a shared basis. Travel support will be provided to a limited number of selected applicants. ***The last date for receiving applications is July 31, 2019. Send your application, without exceeding the suggested page limits, that should include (a) Bio-data, with current designation and affiliation, email address and cellphone number (one page); (b) Evidence of engagement in relevant research (half-page); and (c) Description of current research and reasons for intent to participate (two pages)] to: workshop@nibmq.ac.in***

TENTATIVE SYLLABUS OF THE ADVANCED COURSE

Day 1

1. (10:00-11:30) Identifying Research Priorities and Framing Hypothesis

== TEA BREAK ==

2. (12:00-13:30) Measures of Occurrence

- Incidence, Prevalence
- Discussion on Exposures and outcomes

== LUNCH BREAK ==

3. (14:30-17:30) Study designs

- Principles of different Study designs with Examples

== TEA BREAK ==

- Case control studies and variants

- Cohort studies and variants

(17:30-18:30) *Discussion on Proceedings of Day-1*

Day 2

4. (9:30-11:00) Probability Distributions

- Basics: Types of probability distributions and how do these arise in practice.

== TEA BREAK ==

5. (11:30-15:30) Sampling

- Concept of a population
- Sampling frame and representativeness of a sample

== LUNCH BREAK ==

- Sampling methods: Probabilistic and Non-probabilistic

- Sampling errors

== TEA BREAK ==

6. (15:30-17:30) Testing of Hypothesis, Power and Sample size

- Simple tests of hypothesis
- Multiple testing correction
- Type 1, Type 2 Error, Power
- Sample Size Calculation for Observational Studies

(17:30-18:30) *Discussion on Proceedings of Day-2*

Day 3

5. (09:30-11:30) Measurement in research: Qualitative and Quantitative

- Pros and Cons of Qualitative vs. Quantitative measurement
- Validity and Reliability
- Levels of measurement – Nominal, Ordinal, Interval, Ratio
- Association
- Measures of Risk
- Causality
- Replication
- Generalization

== TEA BREAK ==

6. (12:00 – 13:30) Framing Research Questions in extended PICO format

== LUNCH BREAK ==

7. (14:30-17:30) Analyses of qualitative and quantitative data

- Data summarization – Summary data display, Summary table
- Simple methods of association analysis and measures

== TEA BREAK ==

- Concept of Bias, Confounding and Interaction

- Regression analysis: Simple linear, Multiple regressions

- Adjustment for covariates

(17:30-18:30) *Discussion on Proceedings of Each of Da-3*

Days 4 and 5 (Breakout Sessions)

The student group splits into two separate subsets: one subset will be taught Genetic Epidemiological Methods for Observational and Case-Control Studies and the other subset will be taught Methods of Interventional Studies and Clinical Trials. Laboratory visits and exposure to genomic experimentation will be organized for both groups.

Session 1: Genetic Epidemiological Methods for Observational and Case-Control Studies

- Genetic basis of disease
- Familial clustering – genes vs. environment
- Pedigree method

- Association analyses, including genome-wide and genome-wide association studies (GWAS)
- Relative risk and Odds ratio, with tests of significance
- Multiple testing correction
- Concept of haplotype and haplotype based association

(17:30-18:30) *Discussion on Proceedings of Each of Days 4 and 5*

Session 2: Methods of Interventional Studies and Clinical Trials

Topics	Time
Day 4	
Overview of Trial Phases (Phase 1-4)	9.30 – 11.00
Tea break	11.00-11.30
Ethical Issues and Consent	11.30- 12.30
Defining Interventions and outcomes	12.30- 13.30
Lunch break	13.30-14.30
Assumptions for Sample Size Calculations - Superiority, Inferiority and Equivalence trials	14.30-14.30
Sample Size calculations - Hands on	14.30-15.30
Day 5	
Selection of Study population, Randomization (Simple, Blocked, Stratified) and Blinding	9.30 – 11.00
Tea break	11.00-11.30
Implementation and its Challenges	11.30- 12.30
High loss to follow up in RCTs – what can go wrong and how to minimize it	12.30- 13.30
Lunch break	13.30-14.30
Plan of Analysis	14.30-14.30
Comparison of more than two groups- Factorial design in RCT	14.30-15.30

(17:30-18:30) *Discussion on Proceedings of the Day*

Day 6

All students reassemble

- Discussion on Laboratory Visit and Impact
- Research Ethics
- Group activities
 - Group activity – 4 groups: PICO presentation by participants and discussions
 - Group activity – 4 groups: Critique of published articles – 10 minutes presentation and 5 minutes discussion for each group
- Q & A session

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Possible Evening Discussions (Not compulsory)

- Concept of Bayesian method
- Mediation analysis – Structural equation modelling