## METHODS IN EPIDEMIOLOGICAL DATA COLLECTION

### 1. Credit Distribution, Eligibility and Pre-Requisites of the Course

| Course title and Code | Credits | Credit distribution of the course | | | Eligibility Criteria | Prerequisite of the Course |
|---|---|---|---|---|---|---|
| | | Lecture | Tutorial | Practical | | |
| Methods in Epidemiological Data Collection | 2 | 0 | 0 | 2 | Class XII | Nil |

### 2. Learning Objectives

The Learning Objectives of this course are as follows:

- To understand different types of epidemiological studies and learn how to effectively apply these to analyze real-world public health scenarios.
- To acquire practical skills in extracting epidemiological data from various sources and ability to interpret them.
- To understand the basics of epidemiological study designs addressing key issues like ethical considerations, informed consent and confidentiality ensuring research integrity.
- To understand the ethical and regulatory guidelines as per The Declaration of Helsinki established by the World Medical Association (WMA), National Ethical Guidelines for Biomedical and Health Research involving Human Participants specified by the Indian Council of Medical Research (ICMR) and International guidelines based on The Council for International Organizations of Medical Sciences (CIOMS).
- To learn about the role of National Ethics Committee Registry for Biomedical and Health Research (NECRBHR), Department of Health Research (DHR).
- To learn the principles of questionnaire designing for epidemiological surveys and implementation of these to collect data.
- To develop proficiency in organizing, analyzing and presenting epidemiological data using tools like Excel/ Google Forms/ REDCap, etc.

### 3. Learning Outcomes

Upon successful completion of the course, students will be able to:

- Identify and differentiate among various epidemiological study designs.
- Develop skills to extract and interpret data related to disease frequency, distribution, and health determinants from public health databases.

- Gain knowledge about the Declaration of Helsinki, a foundational document that laid ethical principles to guide physicians and researchers in conducting research involving human subjects established by the World Medical Association (WMA).
- Understand the National and International Ethical Guidelines for the research involving human participants as specified by ICMR and CIOMS, respectively.
- Appreciate the role of NECRBHR, DHR in processing the applications for mandatory requirement of institutional ethics committee to conduct biomedical and health research involving human participants.
- Identify and address ethical challenges in data collection, including issues of informed consent, privacy, and cultural sensitivity in accordance with the National Ethical Guidelines for Biomedical and Health Research involving Human Participants as laid down by the Indian Council of Medical Research (ICMR).
- Design a comprehensive epidemiological study, including selecting the appropriate design, defining the target population, and calculating sample size and power.
- Gain the ability to develop and analyze questionnaires for epidemiological studies using tools like Google Forms or Epicollect.
- Implement questionnaires to collect epidemiological data.
- Develop skills to organize, analyze and present data using tools such as Excel, Google Forms, or REDCap, ensuring effective communication of results.

**4. Main Course Structure**

**Unit I: Introduction to Epidemiological Studies and Data Extraction (5 weeks/ 20 Hours)**

Laboratory 1-2: Review different types of epidemiological studies: Descriptive studies, Analytical studies (cohort, case-control, cross-sectional) and Experimental studies (RCTs) using research papers/ case studies, etc.

Laboratory 3-4: Extraction of epidemiological data from publicly available databases (e.g., WHO/ CDC/ National Health Surveys/ NCRP/ ICMR/ any other public domain) for disease frequency, distribution of disease and determinants of disease.

**Unit II: Epidemiological Study Design and Ethical Considerations (3 weeks/ 12 Hours)**

Laboratory 5: Simulation of scenarios involving the Ethics Committee (as per the guidelines of ICMR, DHR) processes related to forms and guidelines, to address ethical dilemmas in data collection (e.g., informed consent, data privacy, confidentiality, cultural sensitivity, etc.).

Laboratory 6: Design a study plan for a research problem, including selection of appropriate study type, subjects and sampling method, calculation of sample size and power of the study, measures for sampling bias reduction.

**Unit III: Epidemiological Survey Design, Implementation and Data Organization**

**(7 weeks/ 28 Hours)**

Laboratory 7-8: Designing a questionnaire for an epidemiological study (e.g., survey on smoking, diabetes, hypertension, lung cancer risk, etc.) using tools such as manual methods/ Google Forms/ Epicollect, etc.

Laboratory 9-10: Class activity to simulate conducting interviews or administering surveys to a sample group.

Laboratory 11-12: Importing, organizing and presenting epidemiological data (obtained from public database/class activity) in tabulated/ graphical form using Excel/ Google forms/ REDCap/ etc.

**5. Teaching Methodology/Activities in the classroom**

Hands-on sessions, Analysis of Case Studies, Simulations, Online Databases and Tools, Videos, Research Articles, Project based learning, Workshops, etc.

**6. Assessment Pattern for each Unit/practical.**

Overall Assessment will be based on the following:

1. Maintenance of practical records (10 Marks)
2. Viva Voce (10 marks)

Unit I: Introduction to Epidemiological Studies and Data Extraction

1. Analysis and presentation of summary of epidemiological data from published research articles/ case studies. (10 Marks)
2. Mini report submission on the extracted epidemiological data with calculations and interpretation of various parameters. (10 Marks)

Unit II: Epidemiological Study Design and Ethical Considerations

1. Real Time simulations to present comprehension of ethical issues involved during data collection. (7 Marks)
2. Design of study plan for an epidemiological study including the study design incorporating ethical considerations, unbiased sampling and optimum sample size. (8 Marks)

Unit III: Epidemiological Survey Design, Implementation and Data Organization

1. Design of a questionnaire including with relevant, specific and appropriate questions using tools like Google Forms/ Epicollect (10 marks)
2. Class activity simulating the interview to effectively conduct an epidemiological survey. (5 Marks)
3. Effective organization and presentation of the data obtained from public database/class activity with interpretation. (10 marks)

**7. Mapping with the next suggestive course**

Methods in Epidemiological Data Analysis

**8. Prospective Job Roles after a particular course**

Epidemiological Data Collector, Survey Coordinator, Public Health/Disease Surveillance Assistant, Community Health/Social/NGO Worker, Project Assistant in academic and research labs.

**9. Essential readings:**


- Park, K. (2021), 26th Edition. Park's Textbook of Preventive and Social Medicine. Banarsidas Bhanot Publisher, ISBN: 9789382219163.
- A. Stewart (2022), 5th Edition. Basic Statistics and Epidemiology: A Practical Guide. ISBN: 9781003148111.
- Daniel, W.W. and Cross, C.L. (2019), 11th Edition. Biostatistics: A foundation for analysis in the health sciences. New York, USA: John Wiley & Sons. ISBN: 9781119588825.
- Website for NECRBHR, DHR: https://naitik.gov.in/DHR/Homepage
- Website for Epicollect: https://five.epicollect.net/
- Website for REDCap: https://project-redcap.org/


**10. Suggestive readings:**


- Christiansen-Lindquist, L., Christiansen-Lindquist, L., Wall, K. M., Wall, K. M. (2024). Fundamentals of Epidemiology. United States: Springer Publishing Company. ISBN: 978-0826166937.
- Webb, P., Bain, C., Page, A. (2024). Essential Epidemiology: An Introduction for Students and Health Professionals (5th ed.). Cambridge: Cambridge University Press. ISBN: 9781009415361.
- Welham, S. J., Mead, A., Clark, S. J., Gezan, S. A. (2024). Statistical Methods in Biology: Design and Analysis of Experiments and Regression. United States: CRC Press LLC. ISBN: 9780826166944.
- Quinn, G. P., Keough, M. J. (2023). Experimental Design and Data Analysis for Biologists. United Kingdom: Cambridge University Press. ISBN: 9781107036710.
- Triola, M.M., Triola M.F., Roy J. (2019). 2nd Edition. Biostatistics for Biological and Health Sciences. Harlow, UK: Pearson Education Ltd. ISBN: 9789353436537.
- A. Aschengrau and G. R. Seage, (2018), 4th Edition. Essentials Of Epidemiology In Public Health Ann Aschengrau and George R. Seage. ISBN:9781284128352.
- Bertram K.C. Chan (2016), 1st Edition. Biostatistics for Epidemiology and Public Health Using R. ISBN: 9780826110268.

- Katz, D.L., Elmore, J.G., Wild, D. Lucan, S.C. (2013). 4th Edition. Jekel's epidemiology, biostatistics, preventive medicine and public health. Philadelphia, USA: Elsevier Saunders. ISBN: 978-1455706587.
- Bonita, R., Beaglehole, R. and Kjellstrèom, T. (2006). 2nd Edition. Basic epidemiology. Geneva, Switzerland: World Health Organization. ISBN-13: 978-9241547079.
- Dawson, B., Trapp, R.G. (2004). 4th Edition. Basic and clinical biostatistics. New York, USA: Tata McGraw-Hill. ISBN: 978-0071410175.