Semester: I
Core Course
2. Course Code & Title: MPC 51 02 & Basic Epidemiology
Credits: 4

Course objectives:

The objectives of this course are: -

1. To enable MPH students to understand the role of epidemiology in disease prevention and health promotion.
2. To introduce MPH students to the basic epidemiological terminology, concepts, outcome measures and study designs.
3. To enable MPH students, appreciate the application of epidemiological concepts in public health practice and research.
4. To equip the MPH students with the essential skillset to critically analyze the concurrent public health challenges.

Course outcomes:

On successful completion of the course the student will be able to

1. Apply the concepts of epidemiology in understanding diseases and their determinants.
2. Gain transferable skills in applying epidemiological study methods in conducting public health research.
3. Develop the ability to undertake epidemiological research studies.

Skills developed:

On successful completion of the course the students shall be able to develop skills in conducting epidemiological studies, assessment of bias and confounding and calculate and interpret the measures of risk.

Teaching methods:

This course will be delivered using a variety of teaching methods which include (but not limited to) classroom lectures, online classes, webinar's, assignments, field work and group work.

Units and Topics	Teaching Methods								Mandatory Readings
Unit-I: Introduction to epidemiology and public health									
	L	FW	FV	CS	GW	SS	SP	P	
1.1 Definitions, History, scope, and importance of epidemiology	X					X			Gordis, L. (2014). Epidemiology. 5th Ed. Philadelphia: WB Saunders Elsevier, 116-37
1.2 Basic concepts of health and disease prevention	X					X			
1.3 Iceberg theory of Disease, Natural history of diseases	X					X			
1.4 Epidemiological transition	X					X			
1.5 Disease transmission dynamics						X			
Unit-II: Measuring mortality and morbidity									
2.1. Introduction to tools used in measuring disease mortality and morbidity (Rates, Ratios ad Proportion)	X					X			Gianicolo, E., Riccetti, N., Blettner, M., & Karch, A. (2020). Epidemiological Measures in the Context of the COVID-19 Pandemic. Deutsches Ärzteblatt International, 117(19), 336.
2.2. Mortality Measures	X				X			X	Vetter, T. R., & Jesser, C. A. (2017). Fundamental epidemiology terminology and measures: it really is all in the name. *Anesthesia & Analgesia*, *125*(6), 2146-2151.
2.3. Morbidity Measures	X								
2.4 Disease transmission Measures	X								Gordis, L. (2014). Epidemiology. 5th Ed. Philadelphia: WB Saunders Elsevier, 116-37
Unit-III: Causation and association									
3.1. Causation, association and correlation	X			X					Gianicolo, E. A., Eichler, M., Muensterer, O., Strauch, K., & Blettner, M. (2020). Methods for Evaluating Causality in Observational Studies: Part 27 of a Series on Evaluation of Scientific Publications. Deutsches Ärzteblatt International, 117(7), 101. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7081045/
3.2. Criteria for establishing causation	X							X	

3.3. Measures used to determine causation	**X**							**X**	Sauerbrei, W., & Blettner, M. (2009). Interpreting results in 2× 2 tables: part 9 of a series on evaluation of scientific publications. Deutsches Ärzteblatt International, 106(48), 795. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2797398/
Unit-IV: Epidemiological study designs									
4.1 Introduction to epidemiological study designs	**X**							**X**	Röhrig, B., Du Prel, J. B., & Blettner, M. (2009). Study design in medical research: part 2 of a series on the evaluation of scientific publications. *Deutsches Ärzteblatt International*, *106*(11), 184.
4.2 Descriptive study designs – Ecological study, Cross-sectional study	**X**					**X**			Gordis, L. (2014). Epidemiology. 5th Ed. Philadelphia: WB Saunders Elsevier, 116-37
4.3 Descriptive study designs – Longitudinal study	**X**					**X**			Gordis, L. (2014). Epidemiology. 5th Ed. Philadelphia: WB Saunders Elsevier, 116-37
4.4 Analytical study designs – Case-control study ad Cohort study	**X**					**X**			Ressing, M., Blettner, M., & Klug, S. J. (2010). Data analysis of epidemiological studies: part 11 of a series on evaluation of scientific publications. Deutsches Arzteblatt International, 107(11), 187.
4.5 Analytical study designs – Hybrid designs	**X**					**X**			
4.6 Experimental study designs – Randomized controlled trials	**X**					**X**			Begg, C., Cho, M., Eastwood, S., Horton, R., Moher, D., Olkin, I., ... & Stroup, D. F. (1996). Improving the quality of reporting of randomized controlled trials: the CONSORT statement. Jama, 276(8), 637-639. Kabisch, M., Ruckes, C., Seibert-Grafe, M., & Blettner, M. (2011). Randomized controlled trials: part 17 of a series on evaluation of scientific publications. *Deutsches Ärzteblatt International*, *108*(39), 663. Lange, S., Sauerland, S., Lauterberg, J., & Windeler, J. (2017). The range and scientific value of randomized trials: Part 24 of a series on evaluation of scientific publications. *Deutsches Ärzteblatt International*, *114*(38), 635.
Unit-V: Bias and cofounding in epidemiological studies									

5.1 Introduction to bias, cofounding ad effect measure modification.	**X**					**X**			Hammer, G. P., du Prel, J. B., & Blettner, M. (2009). Avoiding bias in observational studies: part 8 in a series of articles on evaluation of scientific publications. *Deutsches Ärzteblatt International*, *106*(41), 664. Smith, G. D., & Phillips, A. N. (1992). Confounding in epidemiological studies: why" independent" effects may not be all they seem. *BMJ: British Medical Journal*, *305*(6856), 757. Gordis, L. (2014). Epidemiology. 5th Ed. Philadelphia: WB Saunders Elsevier, 116-37.
5.2 Bias	**X**					**X**			
5.3 Cofounding	**X**					**X**			
5.4 Effect measure modification	**X**					**X**			
Unit-VI: Screening									
Screening of diseases and risk factors	**X**					**X**			Spix, C., & Blettner, M. (2012). Screening: part 19 of a series on evaluation of scientific publications. Deutsches Ärzteblatt International, 109(21), 385. Parikh, R., Mathai, A., Parikh, S., Sekhar, G. C., & Thomas, R. (2008). Understanding and using sensitivity, specificity and predictive values. *Indian Journal of Ophthalmology*, *56*(1), 45. Gordis, L. (2014). Epidemiology. 5th Ed. Philadelphia: WB Saunders Elsevier, 116-37

L- Lecture; FW- Field work; FV - Field Visit; CS - Case study; GW- Group work; SS- Self-study; SP- Seminar presentation; P-Practical

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Evaluation

As per CBCS guidelines, this course will be evaluated for 100 marks with a Continuous Evaluation (CA) component of 40 marks and End-Semester Evaluation (ESA) component of 60 marks. The continuous assessment will be conducted using examinations, quiz, assignments and presentation.

Additional Readings

1. Du Prel, J. B., Röhrig, B., & Blettner, M. (2009). Critical appraisal of scientific articles: part 1 of a series on evaluation of scientific publications. *Deutsches Arzteblatt International*, *106*(7), 100. Available at https://www.aerzteblatt.de/int/archive/article/63438
2. Pearce, N. (2012). Classification of epidemiological study designs. *International journal of epidemiology*, *41*(2), 393-397. Available at https://academic.oup.com/ije/article/41/2/393/697874

3. Röhrig, B., du Prel, J. B., Wachtlin, D., Kwiecien, R., & Blettner, M. (2010). Sample size calculation in clinical trials: part 13 of a series on evaluation of scientific publications. Deutsches Ärzteblatt International, 107(31-32), 552. available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2933537/
4. Kwiecien, R., Kopp-Schneider, A., & Blettner, M. (2011). Concordance analysis: part 16 of a series on evaluation of scientific publications. Deutsches Ärzteblatt International, 108(30), 515. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3165924/
5. Zwiener, I., Blettner, M., & Hommel, G. (2011). Survival analysis: part 15 of a series on evaluation of scientific publications. *Deutsches Ärzteblatt International*, *108*(10), 163. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3071962/
6. Wellek, S., & Blettner, M. (2012). Establishing equivalence or non-inferiority in clinical trials: part 20 of a series on evaluation of scientific publications. Deutsches Ärzteblatt International, 109(41), 674. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3487152/
7. Wellek, S., & Blettner, M. (2012). On the proper use of the crossover design in clinical trials: part 18 of a series on evaluation of scientific publications. *Deutsches Ärzteblatt International*, *109*(15), 276. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3345345/