Department of Epidemiology
School of Public Health
University of North Carolina

EPID 160, PRINCIPLES OF EPIDEMIOLOGY

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Fall Semester 1971

This manual contains the supportive material for the lecture and laboratory meetings for the first eight weeks of the course.

Two hours credit:

One-hour lecture per week
Two-hour laboratory per week

TABLES OF CONTENTS

General Text MAUSNER, JUDITH S. AND BAHN, ANITA K. Epidemiology, An Introductory Text, Philadelphia, W. B. Saunders Company, 1974

2nd Lilienfeld, Abraham M. Foundations of Epidemiology, New York, Oxford University Press, 1976.

READING LIST

~~GENERAL:~~ MacMahon, Brian and Pugh, Thomas. Epidemiology: Principles and Methods. Boston: Little Brown & Co., 1970.

Morris, J. N. Uses of Epidemiology. 2nd ed. Baltimore, Maryland: The Williams and Wilkins Company, 1964.

This is a very useful reference book providing a wide series of provocative illustrations of the uses to which epidemiological principles and methods can be put. The book is not a "text" in itself but provides insights into a number of problems and a very full set of references as a guide to further reading. It does not deal extensively with epidemiological method and will thus need to be supplemented by selected readings in this area.

MacMahon, Brian and Clark, Duncan. Preventive Medicine. Boston: Little Brown & Co., 1967.

Lerner, Monroe and Anderson, Odin. Health Progress in the United States, 1900-1960. Chicago: The University of Chicago Press, 1965.

Dubos, Rene. "Man Meets His Environment." Health and Nutrition, VI, 1-11.

II EPIDEMIOLOGY AS THE BASIS FOR SCIENTIFIC PUBLIC HEALTH PRACTICE:

Terris, Milton. "The Scope and Methods of Epidemiology." American Journal of Public Health, 52(September 1962), 1371-1376.

Editorial. "The Scope and Methods of Epidemiology." American Journal of Public Health, 52(September 1962), 1502-1504.

Saiger, Geo. L. "Ten Uses of Epidemiology." Canadian Medical Association Journal, 85(October 1961), 992-995.

Mattison, Berwyn F. "Epidemiological Techniques and Data in Planning Public Health Programs." Public Health Reports, 70(1955), 625-632.

III THE EPIDEMIOLOGICAL METHOD AND DATA REQUIRED IN EPIDEMIOLOGICAL STUDY:

Recent Studies in Epidemiology. Edited by Pemberton and Willard. Oxford: Blackwell Scientific Publications, 1958.

Comparability in International Epidemiology. Edited by Roy M. Acheson. Milbank Memorial Fund, 1965.

Epidemiological Approaches to the Study of Cancer and Other Chronic Diseases. Edited by William Haenzel. National Cancer Institute Monograph 19, January 1966.

Lilienfeld, Abraham; Pedersen, Elinar; and Dowd, J. E. Cancer Epidemiology: Methods of Study. Baltimore: The Johns Hopkins Press, 1967.

Paul, J. R. Clinical Epidemiology. Chicago: University of Chicago Press, 1958.

Taylor, Ian and Knowelden, John. Principles of Epidemiology. Boston: Little, Brown & Co., 1957.

Papers of Wade Hampton Frost. Edited by K. F. Maxey. New York: The Commonwealth Fund, 1941.

Witt, L. J. Medical Surveys and Clinical Trials. Oxford University Press, 1959.

Gordon, John. "Ecological Investigation of Disease." Research in Public Health, Milbank Memorial Fund, 1952, 49-76.

Gordon, John. "Epidemiology in Modern Perspective." Proceedings of the Royal Society of Medicine, 47(July 1954), 564-570.

Gordon, John. "Epidemiology: The Diagnostic Discipline of Public Health." Royal Sanitary Institute Journal, 74(July 1954), 445-454.

Gordon, John. "Medical Ecology and the Public Health." American Journal of Medical Science, 235(March 1958), 337-358.

Gilliam, Alexander G. "Epidemiology in Non-Communicable Disease." Public Health Reports, 69(October 1954), 907-913.

Clark, Virginia A. and Hopkins, Carl E. "Time is of the Essence." Editorial in the Journal of Chronic Diseases, 20(1967), 565-569.

Editorial. "Modern Concepts of Epidemiology." Journal of Chronic Disease, 2(November 1955), 593-596.

Mainland, Donald. "Notes on the Planning and Evaluation of Research with Examples from Cardiovascular Research." American Heart Journal, 55(1958), 644-655, 824-837, 838-850.

Mainland, Donald. "The Use and Misuse of Statistics in Medical Publications." Clinical Pharmacology and Therapeutics, 4(1960), 411-422.

Mainland, Donald. "The Significance of Nonsignificance." Clinical Pharmacology and Therapeutics, 4(1963), 580-586.

Cassel, John; Patrick, Ralph; and Jenkins, David. "Epidemiological Analysis of the Health Implications of Culture Change: A Conceptual Model." Annals of the New York Academy of Science, 84(December 1960), 938-949.

Cassel, John. "Social Science Theory as a Source of Hypotheses in Epidemiological Research." American Journal of Public Health, 54(September 1964), 1482-1488.

EPIDEMIOLOGICAL STRATEGY AND METHOD
AREAS TO BE COVERED

1. Differences between observational and experimental sciences.

2. Methods of study.

   Case history (retrospective)
   Cohort (prospective, incidence)
   Cross-sectional (prevalence)

   Ref: Epidemiology; MacMahon, Brian and Pugh, Thomas. Little Brown & Co., 1970, Chapters 2, 11, 12.
   Preventive Medicine; MacMahon, Brian; Duncan Clark, Little Brown & Co., 1967, Chapter 7.
   Medical Surveys and Clinical Trials; Witt, L. J., Oxford University Press, 1959, Chapter 4.

3. Attributable and relative risk.

   Ref: Epidemiology; MacMahon, Brian and Thomas Pugh. Little Brown & Company, 1970, 232-235; 268-275.

4. Interpretations from prevalence (point and period) incidence, mortality, case fatality.

   Ref: Medical Surveys and Clinical Trials; Witt, L. J., Oxford University Press, 1959, Chapter 3.
   Epidemiology; MacMahon, Brian and Thomas Pugh, Little Brown & Co., 1970, Chapter 5.

5. Reliability and validity.

   Ref: Medical Surveys and Clinical Trials; Witt, L. J., Oxford University Press, 1959, pp. 30-40.

6. Association versus cause.

   6.1 Non-causal associations
      6.1.1 chance
      6.1.2 artifact
      6.1.3 secondary

   6.2 Causal associations
      6.2.1 indirect
      6.2.2 direct
      6.2.3 configurational

   Ref: Epidemiology; MacMahon, Brian and Thomas Pugh, Little Brown & Co., 1970, Chapter 2.

7. Bias and selection.

8. Control tables.

9. Calculation of "expected" values.

10. Ecological fallacy.

11. Analytical approaches to continuous and discrete data.

    11.1 Limitation of mean
    11.2 Bimodality
    11.3 Cohort effect

    Ref: Epidemiology; MacMahon, Brian and Thomas Pugh. Little Brown & Co., 1970, Chapter 7.

LECTURE SCHEDULE

Wednesday 12-1, School of Public Health Auditorium

I. Epidemiology as a Foundation Science for Public Health Practice

Lecture #1, September 8,	Current Status of Public Health Practice and Health Care
Lecture #2, September 10,	Role of Epidemiology in Scientifically Based Practice: Epidemiologic Surveillance and Community Diagnosis
Lecture #2, September 14,	Role of Epidemiology in Scientifically Based Practice: Epidemiologic Surveillance and Community Diagnosis
Lecture #3, September 15,	Role of Epidemiology in Scientifically Based Practice: Program Planning and Evaluation

II. Strategy of Epidemiology

Lecture #4, September 22,	Association vs. Cause in Observational Science, Case History, Cohort and Cross Sectional Approaches
Lecture #5, September 29,	Gathering and Recording Data: Reliability and Validity
Lecture #6, October 6,	Data Processing and Reduction
Lecture #7, October 13,	Analysis and Interpretation
Lecture #8 October 20,	Analysis and Interpretation (continued)

October 27 ---------- Mid Term

Lecture #9, November 3,	Biological Characteristics
Lecture #10, November 10,	Social Characteristics
Lecture #11, November 17,	Personality Characteristics
Lecture #12, November 24,	Behavioral Characteristics
Lecture #13, December 1,	The Physical Environment
Lecture #14, December 8,	History of Epidemiology and the Development of New Conceptual Models

* Lecture replaces track laboratory.

OBJECTIVES AND GENERAL COURSE OUTLINE

Epidemiology may be viewed both as a specific body of knowledge concerning various states of health and as a method of study. Thus it is appropriate to talk of "the epidemiology of" typhoid fever or lung cancer, for example (i.e., the specific body of epidemiological knowledge concerning those two diseases) and also to talk of "epidemiological investigation" to determine the factors responsible for any disease or disorder. This course is concerned mainly with the principles underlying epidemiology as a method of study and the scope, potentialities and limitations of this approach.

In the minds of many, the objectives of epidemiological investigation are restricted to discovering the factors responsible for an outbreak or epidemic of some infectious disease. Modern epidemiologists regard this as only one contribution of epidemiology. The scope and uses of epidemiological study have been considerably broadened. This point will be amply documented in this course.

Stated formally the objectives of this course are:

1. To develop a conceptual model of epidemiological enquiry as the basis for scientific public health practice.
2. To illustrate the scope and uses of epidemiological enquiry.
3. To familiarize students with the basic principles of the observational sciences (of which epidemiological enquiry is one).
4. To teach a number of the more important aspects of epidemiological method.

To accomplish these objectives the course will be divided into a lecture and a laboratory/seminar series. The lecture series will be con-

cerned with the philosophy, principles and methods of epidemiology. The laboratory/seminar series will review and illustrate these principles using various areas of application.