

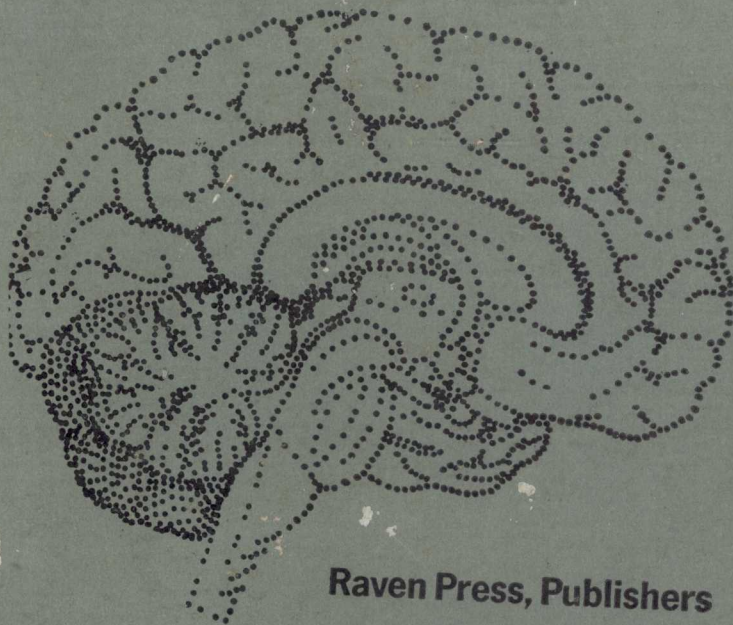
Advances in Neurology

Volume 19:

Neurological Epidemiology:
Principles and Clinical Applications

Edited by

Bruce S. Schoenberg



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Advances in Neurology

Volume 19

Neurological Epidemiology: Principles and Clinical Applications

Edited by

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NOTE: The nomenclature for human histocompatibility antigens has been changed several times within recent years. In the present edition some variation exists among authors.

Although every effort has been made to insure that drug and treatment information in this volume is in accord with current recommendations and practice at the time of publication, the authors, editor, and publisher cannot assume responsibility for this material. In view of the results of ongoing research and experience with treatment modalities, possible errors, etc., the reader is urged to check the package insert for each drug prior to use.

Preface

Of what value is neuroepidemiology to the clinical neurologist or neurosurgeon? It is the purpose of this volume to attempt to answer this question and to demonstrate that neuroepidemiology applies the scientific method to the problems of clinical neurology. On the basis of his experience, the clinician reviews the patient's signs and symptoms, establishes a diagnosis and a prognosis, and institutes appropriate forms of therapy. By examining and cataloging the entire disease spectrum in a population, the neuroepidemiologist is able to enlarge the individual physician's experience and better quantify the frequency of disease occurrence. He is able to provide the clinician with guidelines to the likelihood of a given diagnosis. By following patients over a period of time, it is possible for the neuroepidemiologist to obtain an accurate picture of the natural history of a disease and identify accurate indicators of prognosis early in the course of the disorder. By means of clinical trials, treatment modalities can be evaluated on a firm scientific basis. Neuroepidemiologic research is also useful for detecting unusual disease patterns and trends over a period of time, for providing etiologic clues, for measuring the social and economic impact of neurological disease, and for forecasting the needs for programs and facilities to care for people with such disorders.

Neuroepidemiologic activities do not in themselves generate funds. Thus the support for such studies must come largely from the federal government. The National Institute of Neurological and Communicative Disorders and Stroke (NINCDS) program in neuroepidemiology is attempting to meet this responsibility in three broad areas: research, consultation, and education.

Research studies such as those reported in this volume are carried out by NINCDS staff or by scientists receiving research grant or contract support from the Institute. The staff of the Section on Epidemiology is interested and eager to serve in a consultative capacity to any clinician or research scientist desiring to investigate the epidemiologic aspects of neurological disease.

Neuroepidemiologic research requires thorough knowledge of both clinical neurology and epidemiologic methods. Unfortunately, there are only a few individuals in the United States with training in both disciplines. Educational opportunities supported by the NINCDS include individual post-doctoral research training fellowship awards and institutional training grants in neuroepidemiology. In addition, a videotape series has been developed that reviews the application of epidemiology in the analysis of clinical problems in neurology and neurosurgery. These tapes are available to physicians, medical schools, and residency training programs on a loan basis, and they are provided without charge.

This volume represents a major educational activity supported by the

NINCDS. In the late spring of 1977 a 1-day course and 2-day conference on neuroepidemiology were held in Washington, D.C. Although there have been many books based on conferences, this was perhaps one of the few conferences that was based on a book. Several weeks prior to the meeting, all invited participants were provided with copies of the chapters in this volume for the purpose of thoughtful review. The conference itself was devoted largely to thorough discussion of these manuscripts, which were then revised. Edited versions of these valuable discussions appear after each chapter.

The book is organized in two parts. The first section deals with the principles of neuroepidemiology and provides the reader with a review of terminology, methods, and sources of data. It also explains the interaction between neuroepidemiology and other neurosciences. This should supply the reader with the basic foundation by which to judge the validity and usefulness of the myriad case reports, case series, drug trials, population studies, etc., appearing in the clinical literature. The remainder of the book discusses the clinical applications of neuroepidemiology. Acute neurological diseases, chronic neurological diseases, and neurological complications of other diseases are discussed. These sections of the text highlight the usefulness of this information in the practice of neurology and neurosurgery. The authors not only critically review our present knowledge but also emphasize the questions that remain unanswered.

The clinical neurologist is the key to epidemiologic investigations; he must be constantly alert to unusual disease patterns. If this volume does nothing more than make the clinician aware of his vital role in neuroepidemiologic research and of the practical value of such research in his patient care efforts, it will be a success.

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Neurological Epidemiology: An Introductory Perspective

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Epidemiology is literally study (*logos*) among (*epi*) people (*demos*)—that is, the investigation of diseases (or other characteristics) in populations, with special reference to their distributions and to the factors influencing those distributions (7,9). Characteristically it is a discipline that combines or integrates data from a variety of sources to provide information concerning etiology and the bases for prevention or control of disease. Some of the basic concepts of epidemiology, especially the concepts of environmental influences and of contagion, are found throughout recorded history (9). In ancient Greece, Hippocrates wrote on *Airs, Waters, and Places* (6). In 1546, Fracastoro (2) published work on contagions, but the concept must have been much older, in view of such examples as mention of leprosy in the Bible and the timeless taboo that dictated abandoning any dwelling in which someone died. Other important epidemiological concepts have emerged during the last several centuries: vital and health statistics, as introduced in 1662 by Graunt (5); modes of transmission of disease, as exemplified by Panum's careful description of the measles epidemic in the Faeroe Islands (14) and Snow's study of two cholera epidemics in London (22); prevention of disease, as demonstrated for scurvy by Lind (10) and for puerperal fever by Semmelweis (19).

There is a tendency to equate epidemiology with studies of epidemic diseases (7), and as Lilienfeld noted (9), the discipline began to flourish only after the discovery of bacteria provided a firm theoretical basis. However, epidemiological studies of infectious and noninfectious diseases employ essentially similar methods and derive their inferences in similar manners. Despite the fact that each noninfectious disease has its own, often unknown, pathophysiological basis, epidemiological data have contributed significantly to the understanding and even prevention of a number of noninfectious diseases such as coronary artery disease and lung cancer. Thus, Lilienfeld (9) emphasized that epidemiological studies have been influential in changing our conception of a number of diseases once thought to be degenerative, constitutional, and nonpreventable but now known to be partially or wholly environ-