

EPIDEMIOLOGY FOR THE INFECTION CONTROL NURSE

Edited by

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FOREWORD

In the late 1950s and early 1960s, workers in hospitals in the United States became aware that some patients were acquiring infections during and as a result of their hospitalizations. The reasons for this were not simple. They seemed to result, in part, from the phenomenal advances in medical technology that grew out of World War II, and from the antibiotics, to which pathogens adapted quite rapidly. Concurrently, barrier nursing techniques, the "aseptic conscience," and general knowledge of disease transmission seemed to have all but disappeared from the patient care scene. We found ourselves faced with more versatile microorganisms carried to ever-more susceptible patients. This resulted in more disease to more people at more cost, and sometimes in death.

As we assessed our problem and what to do about it, we also looked at the approaches taken in England and Canada. By 1963, two university hospitals, one in California, the other in Illinois, had established an infection control committee—as had the British—and had designated a nurse to be responsible for implementing the surveillance, prevention, and control functions recommended by the committee. By 1970, the idea of hospital infection control programs was well established and many hospitals had initiated programs. The basic qualifications for the infection control nurse included a sound clinical nursing background, an inquiring mind, a sense of organization, and a charismatic personality. This last quality has to do with being able to tell the good news good and the bad news good, too! It also has to do with effect-

ing behavioral changes and getting people to like and conscientiously implement changes.

Another trait necessary in these early infection control nurses was courage: the courage to take on a nebulously defined job, the courage to help develop the components of the job as identified by needs, and the courage to seek further preparation through continuing education programs in infection control.

Ideally, the infection control person required knowledge of clinical patient care, infectious disease, microbiology, asepsis, epidemiology, statistics, and a working knowledge of channels of communication and administration. Many of the above areas were not, and are not, included in basic nursing education or in the basic education of other health-related disciplines, but must be acquired through continuing or postgraduate education.

The principal continuing educational experience available since 1968 has been Course 1200-G, *Surveillance, Prevention, and Control of Nosocomial Infections*, offered at the Center for Disease Control. Its greatest value has been to provide a common educational experience for nearly 3,000 infection control practitioners, and to provide opportunity for participants from all over the United States (and other countries) to share problems and solutions together, which constitutes a learning experience in itself. The early participants in 1200-G went home and shared their knowledge with the clinical and administrative personnel in their hospitals and with other novices in other hospitals. Short-term local seminars began to appear,

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the Association for Practitioners in Infection Control (APIC) was founded, and a more sophisticated perspective in infection control gradually evolved.

With this greater sophistication came the need for more in-depth knowledge. The leadership at the University of California, San Diego, undertook the development of a program to meet the needs expressed by local ICNs. The program, presented by the Office of Continuing Education in the Health Sciences in the Medical School of San Diego, was the first and is perhaps the only community program of its kind specifically planned to provide additional continuing education for the person with major responsibility in infection control. This book is the result of that curriculum and should provide an outstanding reference for those who are working

in communities without such a resource. The need for continuing education is of paramount importance, and I trust others will take the San Diego experience as a guide for developing local educational programs. We stand barely inside the threshold of an evolving nursing specialty with unparalleled opportunity for an efficient, capable decision maker and implementer to emerge who can make a difference in patient care through effective infection control programs. My wish for each reader's success in this achievement is strong and ever present.

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PREFACE

This book evolved from a request from infection control nurses (ICNs) in the San Diego area for instruction in specific topics germane to their professional activities. The basic outline came from a course that was subsequently created with their assistance and in response to their perceived needs and that focused on topics in clinical infectious diseases, laboratory diagnosis, and epidemiology.

The book is not intended as a text, nor has any attempt been made to provide detailed coverage of infectious diseases, laboratory diagnosis, or epidemiology. Readily available information provided by the Center for Disease Control or other sources has not been duplicated; the reader has been informed about and directed to them. Instead, we present several essays on specific topics, partly selected by the field workers themselves. These essays should provide a rationale for the knowledge, skills, and behavioral patterns that infection control nurses should acquire and utilize to function effectively. The presentation of didactic material for topics in clinical infectious disease, followed by problem solving exercises referring to studies of actual outbreaks, provides some pragmatic lessons that the ICN may follow or adapt when conducting similar investigations. An underlying assumption is that such knowledge will make the ICN's work more productive, less stressful, and thereby more rewarding.

The course and this book are aimed at a very diverse group of individuals with a broad range of educational and professional

backgrounds. Initially, the manuscripts comprised a variegated mixture of presentations, some elementary, some advanced, and some in between. We intervened to modify divergent styles and levels of presentation. On occasion, these interventions resulted in drastic changes in the original manuscripts. Consequently, we express our appreciation for the patience and forbearance of the authors, some of whom found their contributions significantly shortened and their prose rearranged from time to time as we strove for more uniform presentations. Despite such interventions, the text still retains some unevenness, which is probably inevitable in a multiauthored text.

We would like to acknowledge the efforts of the planning committee whose input, persistence, tenacity, and dedicated service made possible both this book and the educational program for ICNs at the University of California, San Diego. The outstanding contributions of the following San Diego ICNs must be recognized: Ann Sue, Mary Ekstrom, Clela Ammundsen, Alita Marks, and Sandra Emerson. By providing continuous encouragement and direction throughout the developmental process, Lois Ann Shearer, Nurse Epidemiologist at the California State Department of Health in Berkeley, made invaluable contributions. Finally, we acknowledge the forbearance of our staffs, families, and colleagues who tolerated impossible deadlines and extended working hours with remarkable grace. We all hope that this book will prove useful to others involved in the never-ending problems of hospital infection

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control. Those engaged in this very complex and difficult task need and deserve all the assistance they can obtain.

Elizabeth Barrett-Connor
Shirley L. Brandt
Harold J. Simon
Douglas C. Dechairo

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I/DEFINITIONS, METHODOLOGY, AND APPROACH

1/NOSOCOMIAL INFECTIONS: DEFINITIONS AND MAGNITUDE

Elizabeth Barrett-Connor

Hospital-acquired or hospital-associated (nosocomial) infections are currently estimated to complicate the course of 2% to 10% of all hospitalized patients in acute care facilities throughout the United States. Nosocomial infections probably account for at least half of all instances of infectious diseases currently seen in hospitals in the technologically advanced countries.

The notion that one individual should be responsible for monitoring the nature and frequency of infections in hospitals originated in England in the mid-1950s. The concept was transplanted to the United States and first applied at Stanford in 1962. By 1976 any hospital desiring accreditation by the Joint Commission on Accreditation of Hospitals was required to utilize the services of an individual whose primary responsibility is to identify and control infections associated with hospitalization. The mandatory assignment of these functions to a specifically identified person, variously called a nurse epidemiologist or infection control nurse, reflects the growing awareness of the importance of the problem of infections acquired by patients after admission into a hospital. To determine the magnitude of this problem at its most elementary level—the frequency of hospital infection without regard to its sequelae—the problem and the population must be clearly defined. *Any good epidemiologic investigation must begin with a defined population and a defined condition for study.*

Defined population

The population being studied by the infection control nurse (ICN) is the popula-

tion in the hospital—patients and employees. Patients frequently exhibit impaired host defenses and undergo procedures that carry risk of infection along with intended benefit. Most of this book is therefore devoted to infections acquired by patients. It should be recalled, however, that employees are also at risk, and that some virulent microorganisms can attack healthy adults such as hospital workers.

Clearly, the defined populations for studies of specific hospital-associated infections may vary. For example, the appropriate study population for a review of postoperative infections is found among patients who have undergone surgery within the study period. The defined population could be further limited to a specific age group and a particular operative procedure, such as a study of infection rates among patients over 65 years of age who received a hip prosthesis.

Defined condition

For our purposes, the defined condition for study is a hospital-acquired or nosocomial infection. *A hospital-acquired infection is defined as one diagnosed during or after hospitalization, which was neither present nor incubating at the time of admission.* Every ICN knows that this simple definition fails to differentiate many community-acquired from hospital-acquired infections because the incubation period is not clearly defined for many infectious diseases. Additionally, the incubation period may differ from that recorded in the literature if the host's defenses have been impaired. Alternatively, clinical manifestations may depart from the classic patterns among immuno-