

Exposure assessment in occupational and environmental epidemiology. Edited by Mark J Nieuwenhuijsen. Oxford: Oxford University Press; 2003. 280 p. ISBN 0–19–852861–2. Price: GBP: 36.50 [This book can be purchased from <http://www.oup.com>.]

While research in the area of exposure assessment in occupational and environmental epidemiology has increased enormously during the last 20 years, there are still very few textbooks about it. I have been waiting for a book that covers the most essential areas in this research field, as, thus far, anyone wanting information was forced to search the scientific literature for original articles or reviews of different topics. My expectations were high when I received the book, and they became even higher as I read the back cover, where it said “The aim of this book is to develop an understanding and knowledge of exposure assessment methods and their application to substantive issues in occupational and environmental epidemiology. The emphasis is on methodological principles and good practice. It is focused on exposure assessment in both occupational and environmental epidemiology since there are many similarities but also some interesting differences.”

The book has been divided into two sections, one on methods and the other on current topics. In the first section, 12 chapters mainly outline the basic principles of exposure assessment, whereas the second section discusses the current status and exposure assessment issues regarding five specific areas. The chapters have been written by 18 different contributors, all of whom have published several often-cited papers in the field in which they have contributed. The contributors are mainly from the United Kingdom, but also from other western European countries and the United States.

In section 1 the first chapter discusses questionnaires. The pros and cons of different types of questionnaires and issues regarding the design of questionnaires are presented, along with some examples of questionnaires. This chapter provides the reader with hands-on information on how to design questionnaires and also offers useful tips regarding, for example, translation, open-ended and close-ended questions, and coding. There are also questionnaires used for face-to-face interviews, telephone interviews, and observation studies, as well as for obtaining information from records.

The following two chapters discuss environmental measurements and modeling. In the first of the two, data needs and availability are described, along the connection between exposure assessments and geography and the related limitations. The theory of two source

dispersion models is described and followed by examples from the scientific literature. The second of the two chapters is dedicated to geographic information systems (GIS). It does a good job of describing what GIS are and how exposure assessment can be performed from monitoring data, from source-based modeling or from a combination of these methods with the aid of GIS. These two chapters offer an understanding of what can be modeled, the limitations of the modeling, and how modeling can be used in environmental epidemiology. When reading these two chapters, the reader also realizes that environmental exposure assessment is something that is preferably carried out by a multidisciplinary research team.

In the next chapter “Personal Exposure Monitoring” again hands-on information is given. The chapter discusses the design of sampling strategies and how the chosen strategy affects, for example, the duration of sampling, the type of monitor or sampler, the number of subjects, and the measurements that should be performed. It also focuses on how stationary monitoring is used as an exposure index in environmental exposure assessment in contrast to occupational epidemiology and how these ambient measures correlate with personal measurements. The importance of repeated individual measurements for estimations of variance is also emphasized in this chapter, whereas, in the next chapter, the analysis and modeling of personal exposure are discussed. Different variance components are described, and the reader is introduced to the analysis of variance and linear regression in the estimation of determinants of exposure. The different techniques and modeling presented in this chapter are followed by examples from the scientific literature.

In chapter 7, an overview of retrospective exposure assessment methods is presented, and, in chapter 8, the use of exposure surrogates commonly used in epidemiology (ie, job-exposure matrices, self-reports, and expert evaluations) are discussed more in depth.

In the next three chapters, dermal exposure assessment, physiologically based pharmacokinetic modeling, and biological monitoring are discussed. These exposure assessment methods are seldom used in epidemiologic studies mainly because of lack of data or available methods. However they are important, as they, theoretically, provide a more accurate estimation of the real dose. Among these three exposure assessment methods, biological monitoring is the most used in epidemiologic studies. These chapters also discuss different types of biological samples, and also the importance of biological half-times, the autocorrelation of samples, and the

use of biological samples in multiple regression models in combination with questionnaires to find determinants of exposure. In the chapter on dermal exposure, the reader is introduced to the parameters that are important with respect to dermal exposure, to the means of measuring and modeling dermal exposure, and to the difficulties involved with dermal exposure measurement and modeling.

The first section of the book ended with a chapter on exposure measurement errors and their consequences and the effect on the design of studies.

The last five chapters describe the exposure assessment methods in use today and what can be used tomorrow in the following five areas: allergen exposure and occupational respiratory allergy and asthma; particulate matter; chlorination disinfection by-products and birth outcome; pesticides and cancer; and radiofrequency exposure and cancer. In these chapters, examples are given of how exposure assessment strategies are dependent on the exposure-response relation being studied and also how, for example, instrumental issues affect the strategy applied.

This is a really good book! It is well written, and it is easy to find what you are looking for in the index. Each chapter starts with short introductions that clearly say what you are supposed to find in that chapter and often also refers to other chapters where relevant information is located. Each chapter also contains several cross-references to other chapters, and these cross-references make it easy to find what you are looking for. Each chapter ends with references for more in-depth reading. The reference lists include key publications within the specific field covered in the chapter in question, and they are very up to date.

However, even good books can have some small disadvantages. If I were performing exposure assessment

in epidemiologic studies on the effects of ergonomic or psychosocial exposure, I would be very disappointed, as these issues are not mentioned in the book at all. This fact is evident from the information given on the back cover of the book, but can not be surmised from reading the title only. In the more theoretical chapters, short examples are included to make the theory easier for the reader to understand. I think this approach increases the value of the book, but there could be more examples, and also the examples could be a little more extensive to make them easier to follow. However, there are references to the original publications for the readers who want more information.

It is said that this book will be a valuable source for undergraduate and postgraduate courses. I fully agree. It would be an even better source if it were extended to include more exercises and solutions. An even better solution would have been to have exercises and solutions available on the Internet. I think such an approach would really benefit the area of exposure assessment in occupational and environmental epidemiology.

My expectations of the book were high, and I was not disappointed. I will probably use this book as my first reference when I am searching for specific information. If I do not find it there, I will find a good reference. I also think that all concerned with exposure assessment and epidemiology will find uses for this book. Furthermore, I am sure that it is a good source for courses in exposure assessment and related topics.

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