

**Michael J. Daniels, Joseph W. Hogan: *Missing data in longitudinal studies***

**CRC Chapman & Hall, 2008, 328 pp, \$ 79.95, € 60.99, £ 47.49, ISBN 978-1584886099**

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In many situations where a statistician deals with missing data prior information is needed in order to overcome the missingness. For this reason it is intuitive to apply Bayesian methods. This is the scope of the book by Daniels and Hogan. The authors combine their expertise in longitudinal data and Bayesian inference to missing data problems to give an overview of methods that can be used in various longitudinal studies. The emphasis is on applications in clinical and public health research but the methods are beneficial in other domains as well.

The targeted readers are statisticians and data analysts dealing with longitudinal data. They should be familiar with basic methods for handling missing data, statistical inference at the level of [Casella and Berger \(2002\)](#) and with regression at the level of [Kutner et al. \(2003\)](#). Knowledge of Bayesian statistics is helpful although the book gives a short review and numerous references to books and important papers on the topic.

The book has 10 chapters. After a short motivation for using the Bayesian approach in longitudinal studies with missing data the authors introduce motivating examples and datasets that are used throughout the book in Chap. 1. Chapter 2 gives a short review of regression models extending linear regression to generalized linear models, random effects models and semiparametric regression. Bayesian inference is reviewed in Chap. 3. Chapter 4 gives some examples using complete datasets to illustrate the models of Chaps. 2 and 3. Chapter 5 discusses the problem of missing data mechanisms, such as missing at random (MAR) and missing not at random (MNAR), and their impact on longitudinal data. In Chap. 6 the ignorable case of missingness is discussed and Chap. 7 illustrates some case studies for this missing data mechanism. Chapter 8 then continues with the case of nonignorable missing data and gives an

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overview of models that can cope with this challenging situation. Sensitivity analysis is the topic of Chap.9 which is very important in situations where missing values are not ignorable. Finally the 10th and last chapter presents some case studies for nonignorable missingness.

The focus of this book is on longitudinal studies with missing data and sensitivity analysis. The text is a mixture of theory and applications, and there are real examples and data sets used throughout the book. These data sets are also available from the book's web site as well as the code used for analyses. Each chapter ends with suggestions for further reading on the topic of that chapter comprising up-to-date references on the domain. Although the examples are mainly from health science they are very helpful to illustrate the potential of the theory.

## References

- Casella G, Berger RL (2002) *Statistical inference*. Duxbury Press, New York  
Kutner MH, Nachtsheim CJ, Wassermann W, Neter J (2003) *Applied linear regression models*. McGraw-Hill, Irwin