

## IN BRIEF

- An overview of the ten-part series to be published in the *BDJ*.

# Further statistics in dentistry: Introduction

by David Moles<sup>1</sup>



## FURTHER STATISTICS IN DENTISTRY:

1. Research designs 1
2. Research designs 2
3. Clinical trials 1
4. Clinical trials 2
5. Diagnostic tests for oral conditions
6. Multiple linear regression
7. Repeated measures
8. Systematic reviews and meta-analyses
9. Bayesian statistics
10. Sherlock Holmes, evidence and evidence-based dentistry

Statistics are a pervasive force in the practice of dentistry. They are involved in the entire spectrum of clinical decision making. Manufacturers may provide details of the effectiveness of their products in an attempt to persuade practitioners to purchase them. Individual practitioners may choose to alter the way in which they practise as a result of published research findings. Government departments and professional bodies may produce guidelines or regulations on the basis of a body of evidence concerning a particular area of practise – an example of the latter being the recommendations made by the National Institute for Clinical Excellence (NICE).<sup>1</sup> In each case it is likely that statistics will have been used in the process of evaluating the strength of evidence in favour of (or against) taking a particular course of action. Without a basic understanding of statistics it is difficult for the individual practitioner to assess the value of a particular piece of published research, or to make their own mind up as to whether new guidelines are reasonable.

In 1989 the *BDJ* published a series of papers which explained basic statistical concepts. These were collated and published as a *BDJ* book later the same year.<sup>2</sup> The book has proven to be an invaluable resource to the profession, has been reprinted twice and will now be published as the first volume of a two-volume set with *Further Statistics in Dentistry*. Since 1989, there has been a substantial increase in the quantity and complexity of statistics seen in dental journals. Many techniques that are now commonplace were hardly seen at the time of the original series of articles. Unfortunately, statistical texts are often unhelpful as they tend to be filled with technical details that are not required by dentists and they do not focus on dental practitioners' specific requirements. The publication of a new series of articles by Petrie *et al.*, in the *BDJ* is timely. There is a real need for material which will enable dentists to inter-

pret published results, to keep pace with ever-accelerating change and to successfully negotiate a pathway through the minefield of statistical jargon.

There are ten articles in the new series. The first two explain the concepts of research design. The different study types are described along with a discussion of their relative strengths and weaknesses. The third and fourth articles concentrate specifically on clinical trials and explain how to calculate an appropriate sample size for any investigation. The fifth article in the series addresses the use of screening and diagnostic tests in dentistry. It discusses the philosophy behind screening and explains how the performance of screening tests can be measured. The sixth article considers multiple regression techniques that form the cornerstone of the analysis of much modern dental research. It explains how these statistical models are used and how to check their validity. The seventh article examines the commonly encountered problem of how to appropriately analyse repeated measurements in dental research (eg how we deal with data that are recorded at several different sites in the same mouth). The eighth article explains the background behind the increasingly popular use of systematic reviews. It describes how meta-analysis can sometimes be used to pool data from several similar studies. The penultimate article indicates some exciting developments that are altering the way in which research is approached. The final article considers the growth in the practice of evidence-based dentistry. It explains that evidence-based practice is not a new concept and draws interesting parallels with the approaches used by Sir Arthur Conan Doyle's fictitious detective Sherlock Holmes over a century ago.

1. <http://www.nice.org.uk/>
2. Bulman J S, Osborn J.F. *Statistics in Dentistry*. British Dental Association, 1989.

<sup>1</sup>British Dental Journal Adviser on Statistics