Statistics in medicine

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For most of its history, the practice of medicine has been a profoundly empirical enterprise. While this empiricism continues by necessity to exist in the clinical environment, the advent of scientifically rigorous epidemiology has tremendously changed medical research in the 20th century.

The driving force behind the maturation of an epidemiological approach to medicine has been the incorporation of statistics in modern medical research, a practice that has become mandatory in past decades [1, 2]. Sound statistical methods are essential to medical science, as they transform uninterpretable raw data into meaningful results [3]. However, trends toward evidence-based medicine can only flourish in a culture of statistical literacy. Such a culture requires physicians who are equipped with the knowledge and skills to critically and accurately interpret statistics [2, 4–6].

Unfortunately, there is ample evidence that many physicians are poorly prepared for accurately interpreting statistical computations in medical literature [2, 7, 8]. The vast majority of medical schools and residency programs in Switzerland do not provide appropriate training in the understanding and application of statistics in medicine. Moreover, it has been reported that the little statistical knowledge acquired during medical school is rapidly lost in the years thereafter [7]. Given the ever-increasing importance of evidence-based practices, such a lack has potentially grave implications for the medical community.

Dr Sprent's manuscript "Statistics in Medical Research" is an excellent start to compensate at least partially for the unfortunate lack of statistical training during medical school or residency. It represents a concise and very helpful summary of the most relevant basic concepts of statistical computations in medical research. Simple, yet frequently misunderstood notions such as p-values, 95% confidence intervals, error of first and second kind, and power computations are explained in easily understandable language. Important caveats such as the difference between standard deviation and standard error of the mean, over-analysis of data by doing multiple comparisons, and putative discrepancies between statistical significance and clinical importance are emphasised. A simple and intuitive hypothetical example of a randomised controlled trial comparing post-operative complications after two surgical procedures highlights the tremendous importance of the appropriate assumption of whether or not the data are normally distributed.

Dr. Sprent's manuscript represents an expansion on his statistical lectures during the first "Science Writing Course" organised by the Research Section of the Swiss Surgical Society (RS-SSS) in May 2003. The primary objective of this course was to teach young physicians with a potential interest in research and an academic career how to write a scientific manuscript as well as to provide some basic statistical knowledge. The first course enjoyed an overwhelmingly positive feed-back from the participants, which has stimulated the RS-SSS to organise further courses. From 2004, we plan to organise two courses per year, one focusing on basic knowledge of statistics and epidemiology, mainly intended for junior physicians interested in clinical or basic research, and a second one for more advanced investigators covering other more sophisticated aspects of statistics and grant writing.

Basic knowledge about statistical computations in medical literature is invaluable for the critical assessment of scientific findings and their implementation in clinical practice. The learning curve for the appropriate interpretation of statistics is, however, steep and the process highly iterative. Dr. Sprent's manuscript only scratches the surface of statistics in medicine. Nonetheless, it is certain that this publication will facilitate the critical appraisal of medical literature and hopefully represents a stimulus for physicians to further deepen their ability in the interpretation of statistical computations.

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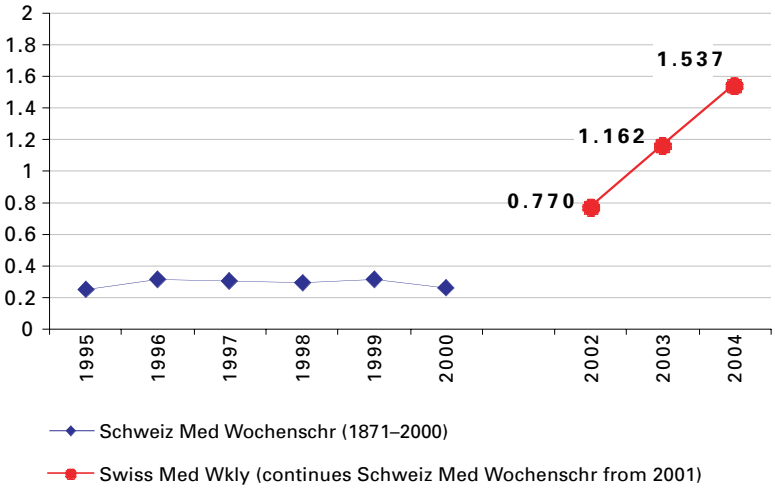

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