Special Issue Paper

Statistics in Medicine

Received 28 November 2010, Accepted 29 June 2011 Published online 21 September 2011 in Wiley Online Library

(wileyonlinelibrary.com) DOI: 10.1002/sim.4345

Considerations on what constitutes a 'qualified statistician' in regulatory guidelines

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International regulatory guidelines require that a 'qualified statistician' takes responsibility for the statistical aspects of a clinical trial used for drug licensing. No consensus on what constitutes a 'qualified statistician' appears to have been developed so far.

The International Society for Clinical Biostatistics is issuing this reflection paper in order to stimulate a discussion on the concept. Copyright © 2011 John Wiley & Sons, Ltd.

Keywords: qualified statistician; regulatory affairs; ICH; guideline

1. Introduction

To our knowledge, no consensus on what constitutes a professional biostatistician exists. Nor has a consensus on what constitutes a 'qualified statistician' for regulatory submissions been developed so far [1]. The International Society for Clinical Biostatistics (ISCB) [2] has drafted this reflection paper in order to stimulate a discussion on what constitutes a 'qualified statistician' for regulatory submissions because we believe that such a consensus is needed.

International regulatory guidelines require that a 'qualified statistician' takes responsibility for the statistical aspects of a clinical trial used for drug licensing. According to the International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH) E6 Guideline for Good Clinical Practice [3], 'Each individual involved in conducting a trial should be qualified by education, training, and experience to perform his or her respective task(s).' The ICH E9 Guideline on Statistical Principles for Clinical Trials [4] states that the 'responsibility for all statistical work associated with clinical trials will lie with an appropriately qualified and experienced statistician'. This means that what follows does not only apply to statisticians who are directly involved in the planning, conduct and analysis of clinical trials but also to, for example, statisticians working in regulatory

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agencies or for ethic committees or statistical reviewers for medical journals or of funding applications for clinical trials.

2. Career paths

There are potentially many different academic and professional career paths which could be considered to lead to becoming a qualified statistician for clinical trials. These include but are not limited to specialized university degree programmes such as, for example, Master of Science in Medical Biometry/Biostatistics offered by many universities and certificates from learned societies such as, for example, Chartered Statistician by the Royal Statistical Society [5] or the Certificate 'Biometrie in der Medizin' of the German Region of the International Biometric Society (IBS) and the Deutsche Gesellschaft für Medizinische Informatik, Biometrie und Epidemiologie [6].

3. Academic education

Qualified statisticians should not only be able to apply statistical methods correctly but also to fully understand their applicability in order to judge the suitability and the limitations of the statistical methods employed for a particular medical problem. Qualified statisticians should also be able to assess the merits of newly published methods and to apply them, if appropriate, to practical problems they may be faced with.

We believe that the education needed to become a qualified statistician should be equivalent to at least a master's degree in statistics. This could be achieved directly by studying (bio-)statistics or by studying a closely related science such as mathematics with a specialization in statistics.

4. Practical training

Qualified statisticians should be able to understand the basic medical issues of the medical area they are working in. This includes not only an understanding of the evaluation of efficacy but also that of general safety (e.g. adverse events, blood chemistry, vital signs) and specific safety (e.g. menstrual bleeding pattern in women's health) issues relevant to the therapeutic/diagnostic area. Knowledge about patient reported outcome measurements may also be relevant.

Qualified statisticians should know the regulatory context in which drug development takes place. This includes the ethical principles of biomedical research, relevant laws and regulatory guidances, the framework of good clinical practice as well as the standard operating procedures of the statistician's institution.

Extensive practical knowledge and experience of the planning, analysis and reporting of clinical trials is needed in order to take responsibility for the results. This means that a statistician should have planned, analysed and reported multiple studies under the supervision of a qualified statistician for 1 to 2 years in a specific medical field before taking over responsibilities as a qualified statistician for a clinical trial. Several years of practical experience are needed to take over the responsibility as project statistician for a whole regulatory dossier. Since clinical trials usually take several years to complete, different studies may be needed to learn to plan, analyse and report. The practical knowledge should include sound understanding of methods of computational statistics and of the software used to analyse the data. Software used for statistical analysis usually allows users to write their own sub-routines in order to implement methods not yet supported by the ready-to-use procedures of the package used. Qualified statisticians should be able to program in at least one package or programming language since all packages have their pros and cons in terms of capabilities. Basic knowledge of data bases and aspects of data security and data protection is also recommended.

5. Continued education and training

It is essential that qualified statisticians maintain their expertise by continued professional development in all domains addressed above. Recommendations for continued training include attending related conferences (e.g. ISCB, IBS conferences) and workshops and keeping abreast of the statistical literature.

Where a statistician experienced in one area of application changes to another (for example from one therapeutic area to another or from phase I to later phase), further training is also likely to be needed.

6. Discussion

The ISCB is issuing this reflection paper in order to stimulate a discussion on the concept of a qualified statistician as described in regulatory guidelines for clinical trials. We have not tried to develop a syllabus on how to become a qualified statistician since any syllabus would likely be incomplete and certainly be outdated soon. Instead, we have aimed to develop the guiding principles to be considered when appointing an individual to the role of a statistician responsible for a clinical trial that is intended for regulatory submission. In principle, our recommendations are equally relevant to statisticians working in pre-clinical trials.

We cannot stress enough our belief that to be a qualified statistician requires not only having a relevant education, appropriate training and adequate experience but also that sufficient time is set aside in the often busy work environment for further training. This applies not only to those professional statisticians working in industry but also to our colleagues in the regulatory agencies [7].

Acknowledgements

The authors would like to thank the ISCB's subcommittee on Statistics in Regulatory Affairs (SiRA) that drafted an earlier version of this paper.

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