

Regulatory science

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Published online: 13 March 2012
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Curiosity is the main driver for academic research and consequently a major reason for designing and performing qualitative and quantitative analysis, that is, measurements. However, there is also an increasing demand for sound analytical data for regulatory decisions. Actually, the timely provision of such data with demonstrated reliability, fit for the purpose of making qualified decisions, is often crucial and not seldom even a bottleneck in the implementation of legislation.

Therefore, ACQUAL's stakeholders include besides academic researchers, quality-minded university teachers and staff of metrology institutions also regulators, managers of official control laboratory and their assessors, coming in particular from accreditation bodies and their associations. That means the customer-reader-author community of this journal differs somewhat from those of common analytical journals.

Scientific challenges from the design, implementation and monitoring of legislation have initiated major research programs and the creation or transformation of various public or publicly supported research institutes. For constituting the scientific foundation of regulatory, legislative and judicial decisions, the term 'regulatory science' has been coined. Even an "Institute for Regulatory Science" was established in the USA in 1985. Much like many scientific (sub)disciplines that have evolved within the last several decades, regulatory science is both interdisciplinary and multidisciplinary and relies upon a large number of basic and applied scientific disciplines. One of them is certainly metrology, even if it is still often neglected or insufficiently appreciated how critical information from

problem-tailored measurements can be. But such information is needed to evaluate legal options, to develop regulations for their implementation or to take qualified decisions in numerous court cases. Often both risk assessment and risk management are relying at a certain stage of decision-making on measurement results.

Therefore, a journal devoted to quality assurance of measurements has also to reflect the needs of regulatory science. In this respect, the practical realisation of a very fundamental concept of metrology, namely metrological traceability, is crucial. Sometimes risk assessments compare measurement data which resulted from the intention to measure the same quantity ('measurand' as defined in the International Vocabulary of Metrology, VIM3) but they actually originate from different chemical compounds. Remember the melamine scandal in food control! Moreover, all issues concerning the proper estimation and use of measurement uncertainty are of particular importance. This uncertainty may have a significant influence on fixing a legal limit. Measurement data used for this decision carry inevitably measurement uncertainties besides uncertainties related to, for example, the knowledge on dose–effect relations, etc. Also the precision with which one can measure around a legal limit is increasingly considered in the regulatory process of its fixation.

Without any doubt, the identification of decision-relevant measurands and the delivery of traceable results via adequate, transparent measurement procedures require sound measurement science. There is a tendency in modern legislation to replace, where feasible, the prescription of specific measurement methods for legislative controls by minimum performance characteristics of acceptable control methods. For realising this more innovation-friendly approach, it is necessary to proof that the applied methods are measuring the same target quantity or that the

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mathematical relation is unambiguously known to transform the value of a quantity measured by one method into a value of another quantity which is the subject of measurement by the other method. Moreover, quality tools such as reference materials and interlaboratory comparisons have to be available for establishing and monitoring the performance characteristics of the methods under routine regulatory control conditions.

ACQUAL has published papers on such topics and is looking for further submissions outlining related challenges

and solutions for measurement sciences. Indeed, this journal is a publication instrument for the developing 'regulatory science', that is, a facilitator of science-based (metrology) developments for evidence-based policy making. Authors are encouraged to submit related manuscripts to ACQUAL, and the journal's readership is encouraged to bring such publications to the attention of regulators.

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