Leading Articles

Quality Assurance of Medical Research?

While quality assurance in health care is still looking for the ideal method—medical audit, patient satisfaction, recording of quality indicators, the use of diagnosis-related groups or others—that in medical research has long had its method. Pre-publication peer review of articles is not a bad way to get an expert opinion, and the scientific community is performing a possibly unparalleled degree of professional and unpaid self-help and service. This system is necessary, but one might ask whether it is still enough. It is derived from a time when both health care and medical research were much smaller sectors of society and economy than today. At that time quality assurance of health care was also left largely to the profession and to informal peer control. Now, however, scientific research has become a very large sector of the society. The Swedish disbursement for research and development is about 7 billion US$ or 2.7% of the GNP; in the US and Japan it is 3% [1].

Peer review

As for all systems, some questions can be asked about peer review. The most important is that about the fate of unconventional papers with unexpected results. Both Jenner’s paper on smallpox vaccination and Rosalyn Yallow’s Nobel prize winning one on radioimmunoassays were rejected, for example. Another not unexpected problem is the fact that 85% of papers rejected by the most prestigious journals are found to be acceptable by other peer-reviewed journals [2]. Every journal editor knows that, given the three choices to accept a paper for publication, to return it for revision or to reject it, a large majority of reviewers select the middle alternative. For the minority of papers where either acceptance without revision or rejection is recommended, agreement between the reviewers is frequent. However, when the nature of the critical remarks is examined, agreement between the two reviewers about the same article is much less common.

Partial scientists

Are reviewers impartial? That scientists are no more immune to partiality than anybody else is illustrated by the recent written protest of 59% of the grantees of the Swedish Medical Research Council (MRC). The MRC suggested five research areas, and gave "examples" of teams worthy of support, all more or less closely associated with the research interests of the MRC councillors. The MRC proposal was sensitive since it concerned a single appropriation of about 2 billion US$, corresponding to many years of regular MRC budgets [1]. Similarly, one study suggested that bias exists as regards the status of the authors and the institution of origin of a paper [2]. This explains why some journal editors do not let reviewers know the names of authors or institutions. Nevertheless, obviously partial comments like requests for referral to papers authored by the reviewer are rare.

Do scientists cheat?

Ever since Mendel’s sweet peas and Arthur Koestler’s “The case of the midwife toad”, spectacular cases of scientific fraud have been widely publicized, recently perhaps more frequently than before. However, since the first scientific journal in 1665, there has been exponential proliferation of the numbers of scientific journals and articles, with a doubling of the number every 10 years. There were about 9000 scientific journals globally in the year 1900, and there are about 65,000 now, of which about 15,000–25,000 are biomedical [2,3]. It is not surprising that half the articles are not quoted and half the journals in the library not read [2]. If each journal publishes an estimated average of only 50 articles per year, approximately 3 million scientific articles are published annually, and there are no more than a dozen or two of known cases of scientific fraud during the last decades. The incidence of cheating in this area seems to be lower than in most other fields of human enterprise.
Does medical research produce clinically relevant results?

Here, the situation is considerably more problematic. A number of major industrial research laboratories are at present being restructured or sold or even dismantled because results have not been considered sufficiently relevant for the owners. This is true even when theoretically very interesting results have been achieved, such as the super conductors studied by Bellcore, the liquid crystal screens studied by the Radio Corporation of America and the two Nobel prizes earned by IBM. This restructuring take place even for very large research departments, such as that of Xerox with a budget of 120 million US$ per year, or that of IBM with a US$ 500 million budget. The reason is stated to be that scientists often have motives which are personal rather than relevant and beneficial for their employer. One of the questions they should ask themselves is “Who benefits if you succeed?”.

Medical researchers should definitely ask themselves the same question. In medicine, it is mainly the relevance of cancer research for cancer treatment which has been debated. There are indications that both the mortality and the time between diagnosis and death have in fact decreased [4,5]. However, it is uncertain whether this is due to cancer research and better treatment or only to an expanding health care and earlier diagnosis. Since cancer research has for many years been a priority research field, this raises the question as to whether there is really a satisfactory percentage of medical research which benefits the employer, i.e. the patients. While the academic standards, the credibility and the reliability of scientific papers are probably quite well assured by peer review, there is very little documentation regarding the relevance for and benefit to the patients. To document this is really the task of quality assurance.

An even more provocative question than whether research activities really benefit patients is whether they can harm them. There is a risk; for instance, for the patients given sometimes quite aggressive chemotherapy in the 82% of the 230 published prospective randomized tumor chemotherapy clinical trials where no statistically significant difference was found between any of the treatment arms [6], or among the 1138 non-Hodgkin’s lymphoma patients in a clinical trial, where also no difference was found [7], or among the post-menopausal patients with breast cancer given adjuvant chemotherapy during the 1980s without any survival benefit, but with many thousands of myelodysplastic syndromes as a result of the chemotherapy. Again, it is the task of quality assurance to follow the incidence of inadvertent occurrences, including complications.

The clinical relevance of medical research

It is suggested here that the tax payers who pay, directly or indirectly, for medical research may well require quality assurance not only of medical care but also of medical research. There are not yet any methods to assess research quality from the point of view of relevance, but hopefully a debate could be started. It is not enough that a reasonable percentage of medical research improves the quality of life for at least some patients, it must also be made evident to the tax payer that this is the case!

Peter Reizenstein
Stockholm

REFERENCES