Seven measures of research quality – application to surgical oncology

Siete medidas de calidad de la investigación - Aplicación a la oncología quirúrgica

Dr. Grant Lewison[1], Dr. Philip Roe[2] and Dr. Richard Sullivan[3]

[1] *grantlewison@aol.co.uk*
University College London, England. Director of Evaluametrics, Ltd

[2] Evaluametrics, Ltd. St Alband, England

[3] King's College London, London SE, England

Abstract

Research evaluation has mostly been carried out with counts of citations in the scientific literature as the main, sometimes the only, measure of impact or quality. But different types of research require a range of indicators, and normalisation is essential in order to make comparisons fair. Here we describe seven distinct measures of quality, and apply them to the outputs of 21 leading countries in surgical oncology research. **Methods:** Two sub-field filters, for surgery research and for oncology, were developed and applied to the Web of Science; they were based on lists of specialist journals and title words. The intersection of these two filters identified papers in surgical oncology, and their bibliographic details were downloaded to an Excel file for analysis. This included the matching of five-year citation counts to the papers, the impact factor of their journals, their geographical analysis by country on both integer and fractional counts, transnational collaboration, involvement in clinical trials and citation on clinical guidelines, and the percentage of reviews, a new measure of esteem. **Results and Discussion:** Surgical oncology represents about 9% of all cancer research – rather low in comparison with surgery's contribution to cancer treatment – or about 4000 papers (articles and reviews) per year. As in many biomedical subject areas, the USA published the most, followed by Japan which had a high relative commitment to surgery within cancer research, and the large West European countries. Although Sweden's papers were relatively basic (within a spectrum from clinical to basic), it participated the most in clinical trials. Its papers were also the most cited on cancer clinical guidelines, but contained relatively few reviews, where the UK, Greece and Belgium scored best. Surgical oncology papers are generally not well cited compared with cancer research overall, but on this measure the Netherlands, the USA and Sweden scored best. International collaboration was measured relative to what might have been expected, since smaller countries tend to need foreign partners more than big ones; on this indicator Canada, Switzerland and the USA were the best performers. **Conclusion:** The seven indicators reveal different aspects of the research of leading countries. They should not be averaged to give a single composite value but can be conveniently displayed in the form of a kite diagram for a country, with each indicator calculated relative to the world value, or to the expected value, as a number above or below unity. This allows the performance of a country (or of an institution within it) to be seen from several different viewpoints.

Keywords: oncology; surgery, quality indicators, citations, reviews, collaboration, clinical trials.