Using Bibliometrics to Measure the Impact of Cancer Research on Health Service and Patient Care: Selecting and Testing Four Indicators

Frédérique Thonon[1,2], M. Saghatchian[1], R. Boulkedid[2] and C. Alberti[2]
[1]Gustave Roussy, European and International Affairs, Villejuif (France)
[2]Hôpital Robert Debré, unité d'épidémiologie clinique, Paris (France)

Introduction

Traditionally, biomedical research is measured by bibliometric indicators of scientific production and impact (such as number of publications and h-index) and indicators linked to clinical trial activities (Pozen & Kline, 2011). However, there has been an increasing demand in the last few years to measure the impact of medical research in terms of how it improves patients' well-being and public health (Wells & Whitworth, 2007; Ovseiko, Oancea, & Buchan, 2012). Measuring the final impact of research on patients' outcomes is difficult because of attribution problems and time lag between research and outcomes (Ovseiko, Oancea & Buchan, 2012). The aim of our research project is to select and test indicators measuring the impact of cancer research on health service and patient care

First step: indicators selection

See Figure 1 below for details of this process.

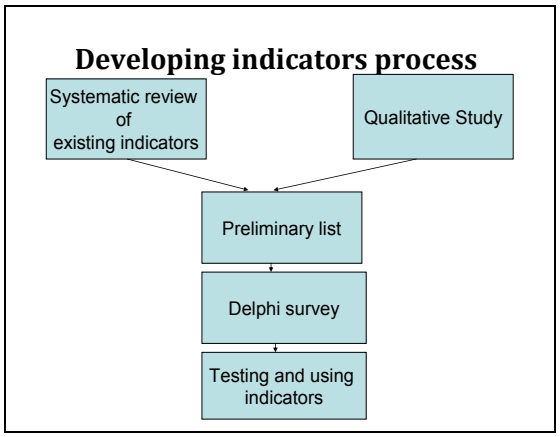

Figure 1: Indicators development process.

Systematic review of indicators

We firstly undertook a systematic review of existing indicators measuring the output and outcome of medical research in order to (1) enlist all the indicators that could potentially be used and (2) to describe their methodology, use, advantages and disadvantages. We took care of designing a study as comprehensive as possible, in order to include indicators ranging from those measuring research activity to those measuring the long-term impact of research. As a result we drew a detailed list of 57 indicators (Thonon et al., 2015).

Qualitative study of researchers

We wanted to develop indicators that would be accepted by those concerned by this evaluation system. Therefore, we undertook a qualitative study to explore the views of actors in translational research on the definitions, issues and evaluation modes of translational research. This study was done to complete the results of the systematic review with an input from the stakeholders directly involved. We interviewed 23 researchers, engineers, administrators and clinicians from diverse backgrounds and engaged in diverse fields of oncological translational research.

Delphi survey

Those two exploratory studies led us to the drawing of an initial list of 61 indicators. We submitted this list to all members of the platform for a modified Delphi survey (N=267). Participants were presented indicators, as well as their methodologies, advantages and disadvantages, and were asked to rate their feasibility and validity on a scale from 1 to 9, and to comment on them. Comments from participants were particularly useful to adjust the methodology of the indicators. In addition, a physical meeting was held where 26 participants discussed the inclusion and methodology of some indicators.

Results

As a result we were able to draw a list of 12 indicators, including 4 indicators that focused on measuring the impact of research on health service and patient care but not used in evaluation systems very often:

- Citation of research in clinical guidelines;
- Citation of research in public health guidelines;
- Number of clinical guidelines authored; and
- Number of validated biomarkers identified in publications.

Second step: indicators testing

We constructed the following methodology to measure those indicators: 17 European cancer centres have been selected in this study. We used

the Scopus database to extract all original articles published between 2000 and 2014 and analysed the data.

Citation of research in clinical guidelines

We selected clinical oncology guidelines published by the European Society of Medical Oncology (ESMO), the American Society for Clinical Oncology (ASCO), and the National Comprehensive Cancer Network. Those guidelines are published in, respectively, *Annals of Oncology, Journal of Clinical Oncology* and the *Journal of the National Comprehensive Cancer Network.* We analysed the number of publications cited in the 'clinical practice guidelines' issues of those journals. We searched the literature for data on the AGREE score of those guidelines to measure the validity of this indicator.

Authorship of clinical guidelines

We extracted and analysed data relative to the clinical oncology guidelines mentioned above.

Citation of research in public health guidelines

From the database of European publications (https://bookshop.europa.eu/en/home/) we searched for public health guidelines related to cancer. Then we extracted the references of the selected guidelines in Scopus and carried out a citation analysis.

Number of validated biomarkers identified in publications

We firstly performed a literature review to identify and list all validated biomarkers used in clinical practice for oncology patients. We then performed a search for all publications related to those biomarkers in the corpus of original articles.

Discussion

This study is still ongoing and the results will be available shortly. We believe those four indicators can provide an additional tool to measure the impact of cancer research on health service and patient care. Citation of research in clinical guidelines is the most investigated indicator (Lewison, 2003; Mostert et al., 2010). There is little literature on indicators linked to the citation of research in public health guidelines (Lewison, 2003) but none linked to indicators measuring the identification of biomarkers, despite the importance of their use for cancer patients' outcomes.

References

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