

Background

Alternative metrics have recently gained much attention in the biomedical community, due to increase of related publications. Formally, any new metric needs external validation against an accepted “gold-standard”; however, there is not a universally accepted validation method. We aimed at investigating whether the statistical methods applied to validate the new metrics were applied correctly, with a particular focus on the biomedical community.

Aims

We aimed at investigating whether the statistical methods applied to validate the new metrics were correctly applied, with a focus on the biomedical community

Methods

We performed a systematic review on Pubmed, ArXiv e-prints archive and DPLB database. Eligibility criteria for full-text retrieval focused on alternative metrics in abstract/title and on a quantitative approach. From selected papers, we extracted: publication type, citation, publication year, aims formally declared scientific aim, main results presented in the abstracts, types of statistical methods, overall judgement on the appropriateness of above mentioned statistical methods.

Results

We retrieved 200 records from ArXiv, 38 from Pubmed, and 13 from DPLB, for an overall total of 251; 185 were excluded from screening abstract (161 focused on social media rather than on alternative metrics, while 24 were about narrative reviews articles or viewpoints). We retrieved 42 full texts: publication year of the first report was 2005, the second publication 2011, 2 in 2012, 6 in 2013 and 16 each in 2014 and 2015.

Of the 42 full-texts, 4 were abstracts and 3 were unpublished and with no quantitative approach, 1 was a duplicate publication and 15 were not relevant (see Fig. 1)

The statistical methods applied were:

- purely descriptive 2,
- correlation methods 9,
- regression methods 3,
- dimensional methods 4,
- network analysis 2,
- meta-analysis of correlation 1.

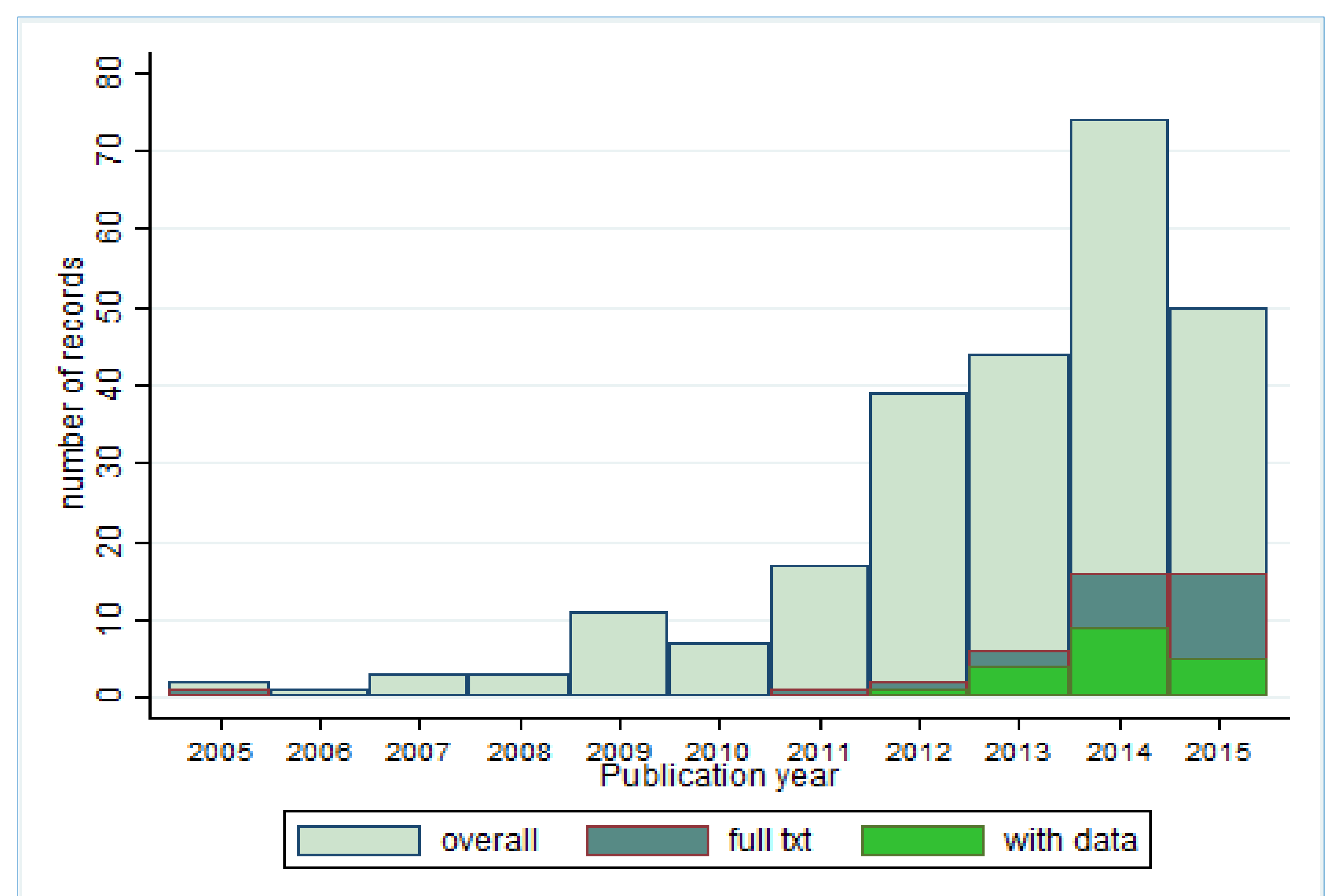


Fig. 1 : Correlation between publication year and number of records

Conclusions

Original research on altmetrics represented only a minority of all publications, and it was conducted by a small number of research groups, with a specific interest in Altmetrics. The statistical methods were generally appropriate, though in 20% of the papers only descriptive statistics was used. The overall quality of the statistical methods was fair.

In conclusion, in order to support the uptake of altmetrics indicators in the biomedical community, for research evaluation or other purposes, formal validation of alternative metrics needs to be expanded in the future. The inclusion of a statistician in any research groups is strongly suggested.