Even advocates of impact factors admit that they are a flawed measure of quality. **Gareth Williams** believes we should get rid of them whereas **Richard Hobbs** thinks refinement is the answer

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NO From 2008, state funding for academic research in the UK will be calculated differently. The research assessment exercise, which is based substantially on (high intensity, high cost) peer review, will transfer to bibliometric scoring.[1] Such metrics include journal impact factors, published annually in *Journal Citation Reports*. The impact factor is based on the average number of citations of individual "source" articles (original papers, research reports, and reviews) published in that journal during the preceding two years.

Of course, as with most routinely collected data, there are problems. Some of them are basic—only 2.5% of journals are tracked[2] and not all disciplines routinely cite others' work. Numerous other non-quality factors drive article citations and therefore the impact: reviews cite other articles the most[3]; basic sciences routinely cite many more references than clinical sciences; short turnover science (principally basic) is widely

referenced for a short time (enhancing scores in the limited two year window); journals that publish weekly get more citations than monthly (probably because they are more widely read); specialist clinical journals are cited less than non-specialist; selective citation occurs, through within country bias (most notably in the US),[2] within discipline bias,[2] and general gaming.

Despite these problems we need a measure of quality. We want journals to publish material that has been filtered to ensure it is reliable, interesting, relevant, or important and that reading it results in some wider benefit. And surely, if we are sufficiently influenced by the work, we would want to acknowledge the source through citation? Citation scores are therefore capable of recognising some value, some quality, of those articles that persuade us through argument or data.

So rather than just discarding impact factors we should consider solutions to the problems. For example, extend the citation surveillance period beyond two years or adjust for citation bulge in rapid turnover disciplines. Weightings could be applied to adjust for the average number of references across journals (which will be discipline dependent) or for national versus international citation; or we could consider scoring journals on only their most important papers, since the most cited 15% of articles account for 50% of citations and the most cited 50% of articles account for 90% of the citations.[4] Why not measure only those that really influence rather than include the tail? After all, development of more complex citation scoring was advocated (to avoid citing unreliable studies and deepen historical meaning) by Eugene Garfield, the father of impact factors, in his original 1955 paper.[5]

Fewer, better papers

An even more compelling reason to measure and publicise the quality of journals is that there are simply too many of them. An estimated 126 000 journals[6] in a world that is struggling to cope with waste is ridiculous. Who reads them all? How many journals exist merely to meet the inexorable drive to "publish at all costs," regardless of quality? Too much pressure on academics to produce too many papers creates a market for journals, but at an intellectual, material, and environmental cost.

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We should be attempting to encourage more complete work, of a higher quality, in a reduced number of journals that are more widely read and cited. It would be nice to think that a handful of practice changing research papers or thought provoking reviews were a worthwhile career objective rather than 200 papers of average to low quality. Electronic publication of preliminary work could stimulate further iterative study and critical response without influencing citation scores. The journals with higher impact factors currently produce expanded electronic versions of papers that, if freely available, widen readership and influence. This system is also potentially more carbon friendly—we print off fewer articles, probably only those 15% that account for most citations.

All of this is not to say that the articles representing the citation tail in journals with some impact factor should be disregarded. However, quality measures that focus on a reduced number of papers in fewer journals should be encouraged.

So, yes, it's easy to criticise bibliometrics, but we should attempt to refine them and debate in parallel how we can track academic careers and encourage fewer, but better studies that affect the wider community. After all, as Oscar Wilde said, "**The only** thing to do with good advice is pass it on. It is never any use to oneself," although he failed to reference Publilius Syrus's maxim: "Many receive advice, few profit by it." So cite freely when citation is merited and let adjusted metrics profit those, fewer, journals that meet a quality threshold. They might also help save the planet.

Competing interests: RH is a career academic dedicated to evidence based care and regularly attempts to publish quality papers in quality journals and to get a high research assessment exercise score.

References are in the full version on bmj.com