

## Journal Impact Factor: baby and bathwater discarded?

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**Abstract** The San Francisco Declaration on Research Assessment (DORA) criticises Journal Impact Factor (JIF) without offering an alternative. It is true that JIF is flawed and can be misused but it also helps match manuscript to publication venue and identifies references likely to be authoritative. Above all, JIF helps librarians make difficult purchase decisions. JIF is a way to assess a journal, not an individual paper. If the DORA authors wish to abandon JIF, an appropriate alternative should be proposed.

**Keywords** Research assessment; research impact; journal metrics; science communication.

The San Francisco Declaration on Research Assessment (DORA) was cobbled together by a consortium of editors and publishers at the annual meeting of the American Society for Cell Biology in 2012.<sup>1</sup> DORA is a sprawling document that attempts to serve a variety of needs, but may serve none of them well.

Its main goal is “to improve the ways in which the output of scientific research is evaluated by funding agencies, academic institutions, and other parties.”<sup>2</sup> This is a noble goal, though broad, in that the “other parties” named include publishers, researchers, and organisations that supply journal metrics.

The problem with the Declaration is that “the scientific content of a paper is much more important than publication metrics or the identity of the journal in which it was published.” This is true, but unhelpful. No hint is given as to how that importance should be measured, if not by use of the Journal Impact Factor (JIF).

JIF is a measure of how often, on average, articles in a journal are cited over time, and it was conceived as a way to help librarians select amongst a range of journals when allocating subscription money.<sup>1</sup> Clearly, JIF is flawed, it can be misused, and it has become fashionable to dislike it.<sup>2</sup> From my perspective, any journal ranking system in which *CA: A Cancer Journal for Clinicians* has a JIF of 153.5 (2012 Journal Citation Reports®, Thomson Reuters 2013) and *The New England Journal of Medicine* has a JIF of 51.7 is imperfect. Yet, this is a trivial reservation and more substantial issues have been noted.<sup>3</sup> For example, it has been claimed, without evidence or citation, that JIF is used to decide whether or not authors are hired, promoted, tenured, or given grant funding.<sup>4</sup> If this happens, it is evidence of a superficial understanding of what JIF can do.

Problems with JIF have been detailed: it is substantially affected by publication of a few widely-cited reviews or methods papers;<sup>4</sup> fewer citable articles per issue leads to higher JIF; JIF can be manipulated or “gamed” by excluding ostensibly citable articles from consideration, or by encouraging authors to cite other articles in the same journal, or by reducing the number of non-review articles published;<sup>4</sup> the for-profit company that calculates JIF has no obligation to be accountable to the true stakeholders, whose work is being evaluated;<sup>4</sup> and calculation of JIF is based on final print publications.<sup>4</sup> Because most journals make electronic copies

available long before print versions, online-to-print delays artificially inflate JIF for an individual article, with greater inflation for longer delays.<sup>5</sup>

The notion that JIF can be led astray or even “gamed” is a bit shocking. Yet, a single blockbuster paper can skew JIF badly. The first human genome paper in *Nature* has been cited more than 10,000 times (as of 7 June 2013), and this disproportionate impact increased the apparent JIF of every other paper published in *Nature*.<sup>6</sup> More disturbingly, *Current Biology* had a JIF of 7.0 in 2002, which jumped to 11.9 in 2003.<sup>6</sup> At the same time, the number of citable articles in *Current Biology* dropped from 1,032 in 2002 to 634 in 2003, though the total number of articles increased.<sup>6</sup> The company that calculates JIF has not refuted serious charges that relate to such miscalculations.<sup>7</sup>

There is also clear evidence that JIF can be systematically misleading. For example, the rate of citation varies from field to field. Papers in the life sciences are cited on average more than six times each; papers in mathematics and computer sciences are cited on average less than once.<sup>8</sup> Therefore, JIF is a poor predictor of the impact of specialist papers in a generalist journal.<sup>9</sup> An article in English is likely to be cited more than an article in another language,<sup>10</sup> and JIF is more likely to be used as a metric of research quality in Asia and Africa than in Europe or the United States.<sup>10</sup>

There is also clear evidence that JIF can be used to assess the quality of research. There was a strong correlation between expert opinion and journal of publication amongst 669 papers assessed by the Wellcome Trust.<sup>11</sup> This happens because a small minority of journals publish the vast majority of key papers and consequently receive the majority of citations.<sup>12</sup> Despite an enormous choice of publication venues, authors publish the most influential papers in a small number of journals. More than half of the 2,100 most influential papers over a decade were published in just six journals.<sup>12</sup> While there is uncertainty in the point estimate of JIF, and substantial overlap in estimated JIF amongst similar journals,<sup>13</sup> JIF spans a large and meaningful range. In broad terms, JIF is a measure of editorial quality.<sup>14</sup>

The key insight is that JIF is a way to assess a journal, not an individual paper. Any use of JIF to assess an individual paper or the output of a particular scientist is naïve. We also cannot condone use of JIF to assess a grant application or tenure request. But JIF is an excellent way to measure a journal’s reputation, and JIF can also be useful for research.<sup>15</sup>

Research has changed in the digital age. There are many publication venues, and it is hard to find the right place to publish a particular manuscript. There is a vast number of references to sort through, and JIF can help identify those likely to be authoritative. There are new journals emerging, and JIF can help librarians make difficult purchase decisions. There are alternatives to JIF,<sup>16-20</sup> but it is unclear if the alternatives are as useful as the original. If DORA is going to call for abandoning JIF, their burden is to determine what should replace it.

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## Grey literature: a growing need for good practice

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**Abstract** Before the internet, grey literature addressed specific audiences and had limited circulation; it was produced mainly in-house with varying editorial standards. Today grey literature is increasingly available online and new responsibilities arise for its authors and issuing organizations. The challenges of a wider dissemination of grey literature are outlined; in particular, grey literature authors and issuing organizations should become aware of basic editorial standards and guidelines, including both technical and ethical issues.

**Keywords** Grey literature, guidelines, standards, scientific writing, technical reports.

Research scientists do not always adhere strictly to a journal's instructions to authors. When it comes to informal documents, such as those falling under the umbrella term of grey literature, scientists are even less inclined to follow editorial standards and guidelines. The broad category of grey literature includes technical reports, reports to funding agencies, teaching material, operational protocols, guidelines for laboratory techniques, translations and or information leaflets addressed to specific targets or produced for very practical aims.<sup>1</sup>

Before the advent of the internet, grey literature had a limited circulation. It was produced mainly in-house, for practical rather than prestige purposes, and often had a rather shabby look—defined as “grey” to differentiate it from white or open publications appearing in commercial journals and books. It was therefore the Cinderella of literature.<sup>2</sup>

During the 6th International Conference on Grey Literature held in New York in 2004,<sup>3</sup> the following definition for grey literature was adopted:

“information produced on all levels of government, academia, business and industry in electronic and print formats not controlled by commercial publishing, ie where publishing is not the primary activity.”

The limited circulation is no longer applicable because grey literature can now be freely and widely available via the Internet.

The most recent international conference on grey literature, held in Rome in November 2012, focused on tracking innovation. Disseminating research results in all forms is now widely recognised as best practice by many national and international institutions, not only for research but also for society. For example, the European Commission supports and encourages sharing all types of information and data, including grey literature.<sup>5</sup> This implies a paradigm shift in information dissemination that goes beyond classical scholarly publications and confers a different status on grey literature as an accepted and important source of information circulated online.