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Impact Factor, Impact, and Smoke and Mirrors

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To the Editor:

I believe that the editorial by Martin Tobin, "Thirty years of impact factor and the *Journal*," which appeared in the August 15, 2004 issue of the *AJRCCM*, merits comment (1). I was particularly struck by the figure showing a dramatic upward trajectory in the impact factor in recent years. This, to me, bore an ominous resemblance to the increase in the NASDAQ stock index in the late 1990s, before its collapse in 2000. We, as physician-scientists, are trained to notice the unusual and to investigate further.

As the author noted, the impact factor for a journal in year X is a ratio of the number of citations (in any journal) in year X to the number of articles (in the journal of interest) in years X-1 and X-2. Thus, the impact factor can be influenced by either decreasing the number of articles published or increasing the number of citations. There is evidence for both of these in the case of *AJRCCM* (using *Thorax* and *Chest* as reference points).

Any journal can directly influence the number of articles published annually. From 1999 to 2003 the number of articles in *Thorax* remained stable (196 to 198) as did the number of articles in *Chest* (701 to 704). Over the same period of time, the number of articles published in *AJRCCM* decreased from 600 to 380. The trajectory for publications was increasing through 2000 when *AJRCCM* published 757 articles, making the 2003 number about a 50% decrease. Given the explosion of research in respiratory disease in recent years, it seems ironic that publications have been cut in half. Viewed another way, ATS members are now paying twice as much per article, which, in my mind, decreases the "impact" of the *Journal*.

The other way to influence impact factor is to increase the number of citations to published articles. Although one would think this would primarily result from the publication of additional respected manuscripts or reviews, it is also possible with a process known as "self-citing," which is occurring in *AJRCCM* at a much higher rate than in other journals. For example, of the 3,948 citations to 2002 *AJRCCM* articles, 1,122 (30.2%) were "self-cites." Corresponding values from *Thorax* and *Chest* were 12.1% and 11.3%, respectively. This appears to be occurring for several reasons. First, the series "Year in Review in the Blue Journal," which exclusively cites *AJRCCM* articles, artificially increases the impact factor. As an example, the 6 articles in the 2004 edition of this series cited the 380 *AJRCCM* articles for 2003 a total of 576 times, and will influence the 2004 impact factor (2-7). Second, authors invited to resubmit articles to *AJRCCM* receive the following statement: "In revising your manuscript, please update your references to ensure that you discuss your work in the context of the most recent research in this area. In particular, you need to compare your references against the articles in Year in Review 2002 and 2003 accessible through the File-Cabinet icon on the Homepage of *AJRCCM*." This is apparently intended to ensure increasing citation of *AJRCCM* work. The net result of this can be seen in Figure 1; for *AJRCCM* in 2003, 44% of the 2002 articles referenced were "self-citations," compared with 19% of 2003 *Thorax* article references. Other strange phenomena also occur. For example, the fourth leading citer of *AJRCCM* articles in 2003 was the French journal *Revue des Maladies Respiratoires* (with the *European Respiratory Journal* at number three and *Thorax* at number five). In 2003, 32% of the *Revue des Maladies Respiratoires* 2002 citations were of *AJRCCM* articles (341/1055), with the next highest percentages being *Chest* and *European Respiratory Journal*, both at 5%.

Figure 1. Distribution pattern of citations for articles published in 2003 in (A) *AJRCCM* and (B) *Thorax*. The solid part of the bar represents "self citations," which comprised, in 2002, for *AJRCCM* 44% (1,122/2523) of the citations and for *Thorax* 19% (91/491) of the citations (9).

Ethical behavior is critical in the scientific publication world (8). In my opinion, using creative techniques to inflate the apparent "importance" of a journal represents a form of duplicate publication and is no different than "ignoring" data from experiments that do not support one's preconceived hypotheses. The use of "smoke and mirrors" to boost the impact factor of any journal damages the integrity of the entire system. This practice must be stopped. It is my sincere hope that the new editorial staff at *AJRCCM* focuses more on science, integrity, and value to the ATS membership, and less on the impact factor of the *Journal*.

Conflict of Interest Statement: D.M.M. does not have a financial relationship with a commercial entity that has an interest in the subject of this letter.

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From the Editorialist:

I thank Dr. Mannino for his interest in my editorial (1). He is not alone in his criticism of impact factor (2–5). That was the reason I wrote another editorial discussing ten other measures of journal performance (6). Impact factor, however, remains a major determinant of research funding worldwide; only American investigators can afford to dismiss it (3, 4, 7).

Dr. Mannino claims that any journal can directly influence impact factor. All editors wish the impact factor of their journal were higher (8–12), but find it difficult to achieve. One mechanism is to increase rejection rate, but this needs to be applied evenly. Throughout the 1990s, rejection rates differed by as much as 30% among *AJRCCM* associate editors handling a given field (6). To be fair to authors, the associate editors decided to achieve a uniform standard, and rejection rates now differ by less than 3% within and across fields of equal scientific quality (6). In striving for that goal, associate editors decided to raise rather than lower scientific standards. In 2000, *AJRCCM* published 757 articles, whereas *Gastroenterology* published 296 articles and *Circulation Research* published 339 articles. The increase in rejection rate from 50% in 1999 to 75–80% in 2003–2004 brings *AJRCCM* closer to that of leading journals of other subspecialties, such as *Circulation* (85% rejection rate). *Thorax* lists a rejection rate of 87.6% (13) and the *European Respiratory Journal* is targeting a rejection rate of 75% (11).

In considering influences on impact factor, Dr. Mannino omits publication lag—a major determinant because impact factor operates with a 2-year window (5). In 1999, *AJRCCM*'s publication lag was on a trajectory for 10 months (6). It is now 2.5 months. The reason we published 757 articles in 2000 (an increase of 26% over 1999) was to decrease this lag—not a desire for a larger journal, as Dr. Mannino believes. (Indeed, the steady increase in printed pages throughout the 1990s was placing an unsustainable financial burden on the newly constituted ATS [6].) Clearing the backlog, however, prevented the otherwise anticipated increases in impact factor for 2001 and 2002 (5). It is the disappearance of these 757 articles from the denominator for 2003 that caused the abrupt increase in impact factor in 2003 (1). Another issue not mentioned by Dr. Mannino is the discontinuation of industry-sponsored supplements, which constituted more than 12% of articles published in 2000 (and more than 33% of articles on asthma) (6).

Dr. Mannino asserts that publishing fewer articles in *AJRCCM* shortchanges readers. More than 5,000 articles are published every year in the major pulmonary and critical care journals (14). To read these would require more than 25 hours each and every week of the year. A major task of editors is to select those manuscripts most worthy of a reader's time—a focus on quality, not quantity.

Dr. Mannino overestimates the contribution of *Year-in-Review*. The series cites articles from 1 year, whereas the denominator for impact factor is based on number of articles published in 2 years. Accordingly, *Year-in-Review* caused a one-time increase in impact factor of 0.50 between 2000 and 2001, whereas impact factor increased by 3.433 between 2000 and 2004.

Comparing new findings to other recent research is fundamental to scholarship (15). In 2000, however, many papers published in *AJRCCM* failed to include even one reference from the preceding 10 years. We changed our Instructions for Contributors, requesting authors to use available search engines to bring their references up to date. *Year-in-Review* is the only search site in pulmonary and critical care that categorizes articles by taxonomic criteria (16), making it more user-friendly.

Dr. Mannino implies that *AJRCCM* is suppressing data on impact factor. On the contrary, all of the numbers that go into the calculation of *AJRCCM*'s impact factor were provided in my editorials (1, 5). There is no smoke. There are no mirrors. All is transparent.

Conflict of Interest Statement: M.J.T. served as editor of *AJRCCM* from 1999 to 2004, and received a fixed stipend from the American Thoracic Society and was not affected financially by the impact factor of the journal. He does not receive financial support for research from pharmaceutical, biotechnology, or medical device companies and does not serve as a consultant to or on the advisory board of any company. He receives royalties for two books on critical care published by McGraw Hill, Inc.

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