CORRESPONDENCE

Variations in Databases Used to Assess Academic Output and Citation Impact

TO THE EDITOR: Online scientific databases are increasingly accessed to evaluate academic productivity.[1] However, major discrepancies among databases[2] can affect the recognition and professional advancement of academicians. To highlight inaccurate and inconsistent bibliometric reports across databases, we performed a large-scale analysis of data on the entire faculty cohort at New York University Medical Center.

We searched listings of 1469 clinical and research faculty according to their full names in the PubMed, Web of Science, Scopus, and Google Scholar databases; to be included in the analysis, the faculty members had to have a middle initial and an h-index greater than zero in at least one database (the h-index, the maximum number of publications that have each been cited h times, is a measure of productivity and citation impact that has been used to delineate physicians and scientists between academic ranks).[3,4] No specifiers such as field of study or institutional affiliation were incorporated. Average absolute differences among databases in the number of publications, the number of citations, and the h-index shown in each database, per author, were calculated and compared with the use of an unpaired Mann–Whitney test.

Google Scholar showed the highest number of publications per author, followed by Web of Science, Scopus, and PubMed. Scopus showed more citations per author than Web of Science (average absolute difference in the number of citations, 836) and higher h-indexes (average absolute difference in the h-index value, 6.4). Inherent differences in database design, curatorial policies, and journal indexing may explain these discrepancies (additional details are provided in the Supplementary Appendix, available with the full text of this letter at NEJM.org). For example, databases use unique, proprietary algorithms to determine which citations are attributed to each author; these algorithms result in variations in citation output among databases. There were significantly more discrepancies in h-indexes for faculty with Ph.D.s than for those with M.D.s, D.O.s, D.D.S.s, and dual degrees. These discrepancies increased significantly with increased academic standing (i.e., professorship) and were inconsistent across academic departments (Fig. 1A, 1B, and 1C). Univariate regression showed that differences in h-index values correlated more with differences in citation counts than with differences in numbers of publications (Fig. 1D and 1E). Differences in citation assignments among databases were central to the discrepant h-indexes; this underscores the need for transparent and homogeneous citation algorithms.

Misidentification of authors contributed to some of the observed inconsistencies; common name combinations, in particular, led to errors in databases. Our results show that databases that rely on author input to create and maintain

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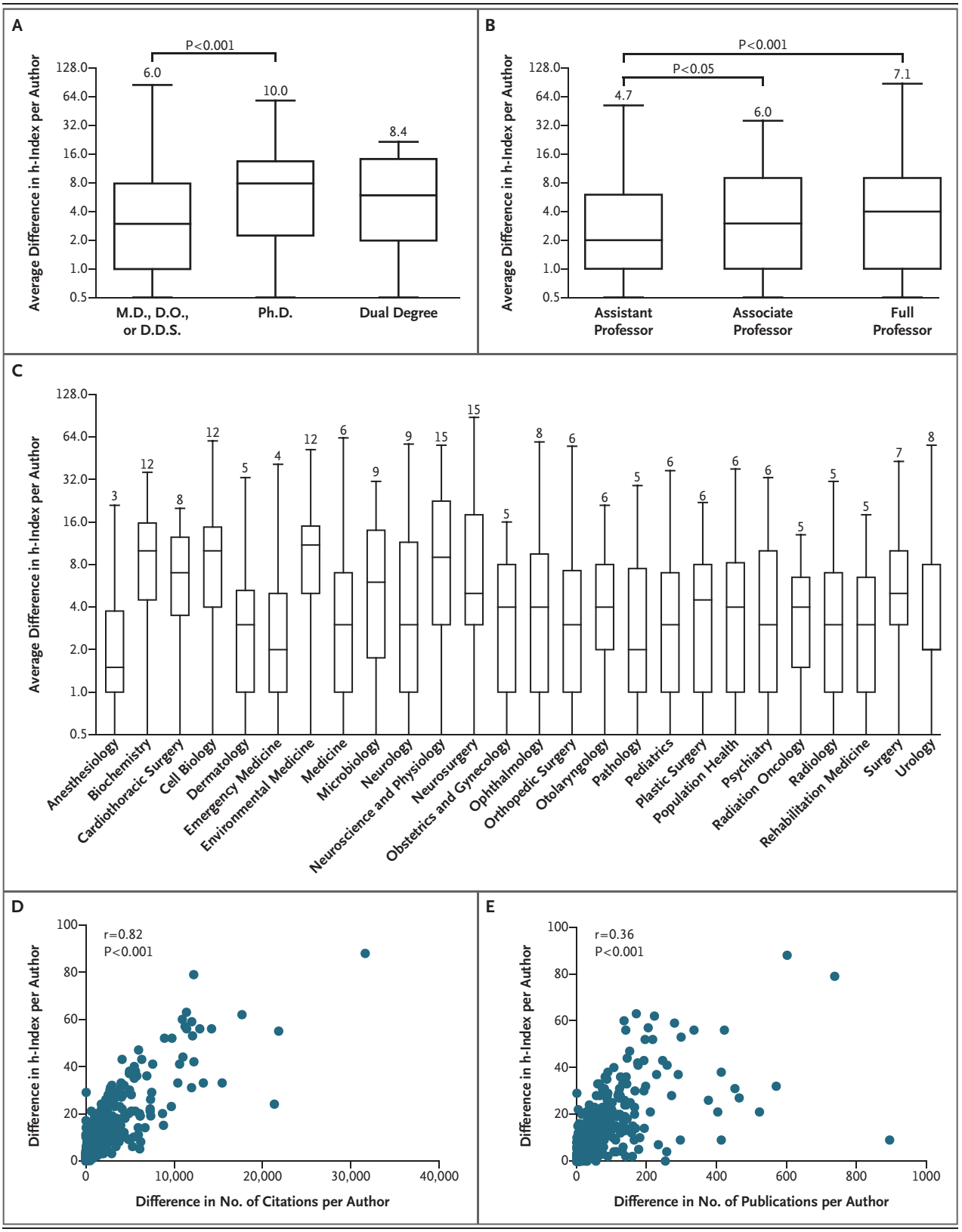

Figure 1 (facing page). Differences in the h-Index, the Number of Publications, and the Number of Citations per Author across Two Databases.

Box-and-whisker plots show the absolute average difference in h-indexes per author between the Web of Science and Scopus databases, according to clinical degree (Panel A), academic status (Panel B), and department (Panel C). In Panels A through C, the numbers above the individual box-and-whisker plots represent means. In each box-and-whisker plot, the horizontal line represents the median, the top and bottom of the boxes the interquartile range, and the I bars the minimum and maximum values. Scatter plots show the correlation between the observed absolute average difference in the h-index per author and the absolute average difference in the numbers of citations (Panel D) and publications (Panel E) per author between the Web of Science and Scopus databases. In Panel D, each circle represents one citation, and in Panel E, each circle represents one publication.

individual profiles are ineffective: 2% of the faculty members included in our analysis had a public Google Scholar profile, and on average, 3 Scopus profiles (range, 0 to 202) were observed per author.

The "exaggerated" accuracy[5] of database-specific author identifiers highlights the need for a database-independent, universal identification of authors. The highest potential lies with Open Researcher and Contributor ID (ORCID), which can be integrated into all databases for consistency. The most accurate resource to calculate an academician's bibliometric profile remains unclear. Meanwhile, to ensure proper credit for their contributions, we recommend that authors create and maintain a Google Scholar profile, merge cross-institutional Scopus profiles, and create an ORCID identifier to include in manuscript submissions whenever possible.

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Extended Treatment of Venous Thromboembolism

TO THE EDITOR: Weitz et al. (March 30 issue)[1] report on the results of the Reduced-dosed Rivaroxaban in the Long-term Prevention of Recurrent Symptomatic Venous Thromboembolism (EINSTEIN CHOICE) study. These results are highly relevant, since there is accumulating evidence of a significant risk of recurrence of venous thromboembolism after an initial period of anticoagulation following the index event.[2]

Two issues, if clarified, would increase the applicability of the study findings to the daily clinical setting. First, this study was unique among extension studies because it predominantly included patients with provoked venous thromboembolism that was due to either minor transient risk factors or persistent risk factors. Since this strategy is broader than that recommended by current guidelines,[3,4] it would be very useful to know which risk factors for venous thromboembolism were present in the patients with provoked venous thromboembolism who did not have cancer or known thrombophilia and did not receive hormonal therapy.

Second, risk factors for recurrent venous thromboembolism are associated with different rates of outcome events.[3] An analysis of the interaction between the various risk factors for venous thromboembolism and the dose of rivaroxaban on the rate of thrombotic events would be of interest, since it is conceivable that patients with