Internationalization of General Surgical Journals

Origin and Content of Articles Published in North America and Great Britain From 1983 to 1998

Ronald K. Tompkins, MD; Clifford Y. Ko, MD; Arthur J. Donovan, MD

Hypothesis: The origin and characteristics of articles published in the 6 highest rated (Institute for Scientific Information classification) English-language general surgical journals have changed significantly during the past 15 years.

Design: All articles published in 1983, 1988, 1993, and 1998 in 5 US surgical journals and 1 British surgical journal were reviewed and characterized.

Main Outcome Measures: Absolute numbers and proportions of national and international articles published in each journal.

Results: Articles reviewed included 4868 in US journals and 1380 in the British journal. The total number of US journal articles decreased by 15.1%. The total number of British journal articles increased by 58.9%. The percentage of national articles decreased from 87.5% to 68.8% in US journals (P<.001) and constituted the minority of freely submitted articles in 1998 in 3 of 5 US journals. The percentage of national articles also decreased from 74.8% to 47.1% in the British journal (P<.001). Articles by European and Asian authors showed the most striking increases in all journals. The percentage of basic research articles declined in US journals from 23.3% to 17.9% (P=.001) owing to a 14.9% decline in national basic research articles. The percentage of clinical randomized studies increased from 2.2% to 4.1% (P<.008), but the increase was attributable to international articles. Government funding alone decreased from 13.6% to 11.2%, and government plus another source of funding decreased from 19.2% to 16.7% for national articles in US journals.

Conclusions: Internationalization of the highly rated British and the 5 highest rated US general surgical journals has occurred. The decrease in the number of national articles in the US journals has been accompanied by significant decreases in government funding and basic research articles and a static output of clinical randomized studies from North America.

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A n increase in international articles concerning basic and clinical research in highly rated US general surgical journals has been reported.1 Whether there has been an increase in the total numbers of international articles is not known. If an increase in the number of published international articles were observed, it could reflect either an absolute increase in the number of articles published or a relative decrease in the number of national articles being published. This study was undertaken to determine the origin and characteristics of all articles published in the highest rated US and British general surgical journals from 1983 to 1998.

The agreements in coding between authors were as follows: country of origin, 99.3%; type of article, 99.0%; and primary subject matter, 98.5%. A total of 4868 articles published in the 5 US journals and 1380 articles published in the British journal were analyzed.

See Invited Critiques at end of article

The US journals showed a 15.1% decrease in total number of articles from 1983 to 1998, ranging from 0.7% to 30% (median decrease, 8.0%) (Table 1). In contrast, there was a 58.9% increase in the number of articles published in the British journal during this same period.

Of the 4868 articles in US journals, 1746 (35.9%) were society articles. There was a 24.7% decrease in the number of society articles from 1983 to 1998, ranging by journal from −41.5% to +16.7% (median decrease, 22.5%). The number of freely submitted articles in US journals (64.1%) decreased by 9.4% from 1983 to 1998, ranging from −26.2% to +21.0% (median decrease, 11.8%).

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MATERIALS AND METHODS

The 5 highest rated US general surgical journals and the highest rated British general surgical journal (according to the Institute for Scientific Information impact factor rankings for 1998) were selected for the study. All of these journals had editorial content of a general, rather than a specialty, surgical nature.

The journals were American Journal of Surgery; Annals of Surgery; Archives of Surgery; British Journal of Surgery; Surgery; and Surgery, Gynecology and Obstetrics and its successor The Journal of the American College of Surgeons.

All articles published in these journals for the calendar years 1983, 1988, 1993, and 1998 were analyzed. Half of the journals were reviewed by 1 of 2 authors (R.K.T. or A.J.D.) in 6-month segments (eg, January through June and July through December) for each year. Variations in coding between the reviewers were assessed by randomly assigning three 6-month segments that had been reviewed by one author to the other author to re-review, and the results were compared. Each article published in the journals for the study years was analyzed for the following variables.

COUNTRY OF ORIGIN

We defined national articles as those from the United States and Canada for the US journals and those from Great Britain and Ireland for the British journal. Articles from areas other than these were designated as international articles.

TYPE OF ARTICLE (SOCIETY ARTICLE OR FREELY SUBMITTED ARTICLE)

A society article was defined as an article presented at a meeting of a society and published in a surgical journal as an article derived from that meeting. The societies for the US and British journals are given here.

Societies for US Journals
- American Association of Endocrine Surgeons
- American Surgical Association
- Association of Veterans Administration Surgeons (1988)
- Association for Surgical Education
- Central Surgical Association
- European Surgical Association (1998)
- Midwestern Vascular Surgical Society (1983)
- New England Surgical Society
- North Pacific Surgical Association
- Pacific Coast Surgical Association
- Society for Clinical Vascular Surgery
- Society of Head and Neck Surgeons
- Society of Surgical Oncology (1988)
- Society of University Surgeons
- Southern Association for Vascular Surgery (1983)

Societies for British Journal
- Association of Surgeons of Great Britain and Ireland
- British Association of Endocrine Surgery
- British Association of Pediatric Surgery
- British Association of Surgical Oncology
- British Society of Gastroenterology
- British Transplantation Society
- European Association of Gastroenterology and Endoscopy
- European Society of Surgical Oncology
- European Society for Surgical Research
- Eurosurgery 92 and 96
- Pancreatic Society of Great Britain and Ireland
- Surgical Research Society
- Vascular Surgery Society of Great Britain and Ireland

A freely submitted article represented a manuscript that had been sent directly to the editorial offices of the journals and selected for publication after editorial peer review. Articles published in the journals in 1988 and 1998 were selected for more detailed study. The articles published in these years were analyzed for content in the following areas.

PRIMARY SUBJECT MATTER CATEGORIES

The primary subject matter categories were as follows: abdomen (liver, pancreas, biliary tract, spleen, peritoneum, hernia); alimentary tract; breast and soft tissue, including skin; endocrine; head and neck; history and socioeconomic status; infection and metabolism; musculoskeletal; pediatric surgery; plastic surgery; transplantation; thoracic and cardiovascular; trauma and critical care; vascular; and other unclassified. Certain articles were suitable for inclusion in more than one category. Examples were articles concerning transplantation of specific organs and pediatric surgical articles, all of which dealt with another primary area. Articles concerning malignant disease in a primary subject area were counted separately.

Basic research was defined as studies that involved animals or humans in which the research was not directly related, retrospectively or prospectively, to their care. Randomized studies were blinded or nonblinded clinical studies that randomly assigned patients to 2 or more alternative therapies. Funding sources were identified as government, private, or industry as sole sources or in some combination.

All data were entered into a computer spreadsheet (Microsoft Excel, Microsoft Corp, Redmond, Wash). Statistical analyses were performed using a statistical computer program (STATA Version 6; STATA Corp, College Park, Tex). Statistical significance was assumed at P<.05. For purposes of anonymously reporting results, the journals were coded by randomly assigning an identifying consonant to each journal.

Of 1380 articles in the British journal, 197 (14.3%) were society articles; this number increased by 80% during the study period. The number of freely submitted articles (85.7%) also increased in the British journal by 56.1% from 1983 to 1998 (Table 1).

COUNTRY OF ORIGIN

All Articles

The percentage of national articles in US journals decreased from 87.5% of total articles in 1983 to 66.8% in...
The reciprocal increase in the percentage of international articles is given in Table 2. The increase was especially notable for Asian articles. The change in the percentage of published international articles for each journal from 1983 to 1998 ranged from +8.3% to +26.2% (median increase, 22.9%).

The number of national articles in the British journal decreased from 74.8% of total articles in 1983 to 47.1% in 1998. The reciprocal increase in the number of international articles is given in Table 3. Both European and Asian articles almost tripled during the study period.

### Society Articles

The number of national society articles in US journals decreased from 99.2% of all society articles in 1983 to 92.2% in 1998. The number of European society articles increased from 0.8% (4 articles) in 1983 to 6.2% (23 articles) in 1998; 10 of the latter-year articles were from the newly formed European Surgical Society. Asian society articles constituted less than 0.5% from year to year.

The number of national society articles in the British journal was 92.0% of all society articles in 1983 and had decreased to 84.4% in 1998. International society articles were chiefly from Europe (11.1%) and other areas (4.5%) in 1998; none were from Asia.

### Freely Submitted Articles

National articles constituted 80.5% (662 articles) of all freely submitted articles in US journals in 1983 but in 1998 constituted only 54.1% (403 articles). Conversely, the number of international freely submitted articles increased markedly from 160 (19.5%) in 1983 to 342 (45.9%) in 1998. The number of Asian articles rose from 29 (3.5% of all freely submitted articles) in 1983 to 139 (18.7%) in 1998. The number of European articles increased from 110 (13.4% of freely submitted articles) in 1983 to 167 (22.4%) in 1998. The number of articles from other areas increased slightly.

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<th>Table 1. Articles Published in General Surgical Journals</th>
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*Ellipses indicate data not applicable.

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<th>Table 2. Geographic Source of All US Journal Articles</th>
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*The percentages of the total articles that were international were 12.5% in 1983, 21.2% in 1988, 21.5% in 1993, and 33.2% in 1998. Ellipses indicate data not applicable.

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<th>Table 3. Geographic Source of All British Journal Articles</th>
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<td>Other</td>
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<td>Total</td>
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*The percentages of the total articles that were international were 25.2% in 1983, 39.7% in 1988, 39.5% in 1993, and 52.9% in 1998. Ellipses indicate data not applicable.
from 21 (2.6% of all freely submitted articles) in 1983 to 36 (4.8%) in 1998 (Figure).

In the British journal, from 1983 to 1998, the percentage of national freely submitted articles decreased from 72.5% to 41.4%. The percentage of international freely submitted articles increased by 31.1%. The percentage of articles from other areas increased from 4.2% to 12.2%. The percentage of articles from Europe increased from 11.1% in 1983 to 31.5% in 1998, whereas the percentage from Asia increased from 12.2% in 1983 and 14.9% in 1998.

Notably, by 1998, more than half of the freely submitted articles published in 4 of the 6 journals were international (Table 4).

**PRIMARY SUBJECT MATTER**

Just more than half of the articles published in US journals in 1988 and 1998 concerned the abdomen, alimentary tract, or vascular disease. There was a relative increase in articles concerning the abdomen (21.3% of all articles in 1988 and 28.0% in 1998) but a decrease in articles concerning the alimentary tract (18.9% in 1988 to 16.1% in 1998) and vascular disease (16.5% in 1988 to 11.5% in 1998).

One hundred thirty articles in 1988 and 107 in 1998 were tabulated in more than one category. For example, articles on transplantation were noted both as transplantation articles and as the related organ (e.g., transplantation and liver). Similarly, pediatric surgery articles all have more than one listing (e.g., pediatric surgery and alimentary tract). The relative number of articles in various categories in the journals between 1988 and 1998 did not differ by more than 5% except for those concerning the abdomen (+6.7%) and infection and metabolism (−6.4%) (Table 5).

Roughly three quarters of the articles published in the British journal in 1988 and 1998 concerned the abdomen, alimentary tract, and vascular areas, and the proportion of each did not differ appreciably between those years. The relative number of articles in each category differed less than 3% between 1988 and 1998.

**ARTICLES DEALING WITH MALIGNANCY**

The percentage of all articles in US journals dealing with malignancy was 18.0% in 1988 and increased to 27.2% in 1998. This increase was from 18.1% to 25.3% for all society articles and from 17.9% to 28.2% for all freely submitted articles.

In the British journal, articles dealing with malignancy increased from 18.6% in 1988 to 35.0% in 1998 for all articles. The increase was from 18.5% to 24.4% for all society articles and from 18.7% to 36.6% for all freely submitted articles.

**BASIC RESEARCH**

In 1988, 295 (23.3%) of all articles in US journals involved basic research. By 1998 the number had decreased to 200 (17.9%) (P = .001). Society basic research articles in 1988 numbered 141 (29.6% of society articles) but decreased to 78 (21.0%) in 1998. There was also a decrease in freely submitted articles that reported basic research from 154 (19.5%) in 1988 to 122 (16.4%) in 1998. The number of national basic research articles declined by 14.9% of all basic research articles between 1988 and 1998 (84.4% to 69.5%). The reciprocal increases in international basic research articles were 9.8% from Europe, 3.8% from Asia, and 1.3% from other countries.

Of all articles published in the British journal in 1988, 26 articles (6.9%) concerned basic research, and this number increased to 44 (12.9%) in 1998. The number of national basic research articles declined from 16 in 1988 to 13 in 1998 (61.3% vs 29.5% of basic research articles, respectively). The reciprocal increases in international basic research articles were 0.4% from Europe, 18.2% from Asia, and 13.5% from other countries.

**CLINICAL RANDOMIZED STUDIES**

In 1988, clinical randomized studies in US journals numbered 28 (2.2% of total articles) and by 1998 had in-

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**Table 4. International Freely Submitted Articles Published by Each Journal**

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*The journals were coded by randomly assigning an identifying consonant to each journal.

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increased to 46 (4.1% of total articles) \(P = .008\). This increase was almost entirely attributable to international articles, which increased from 11 (0.9%) to 28 (2.5%). National randomized studies were essentially unchanged from 17 in 1988 to 18 in 1998 (1.3% and 1.8% of total articles, respectively).

There were 20 clinical randomized studies published in the British journal in 1988 (3.3% of all articles), and this number declined slightly to 15 in 1998 (4.4% of all articles). Between 1988 and 1998, national randomized studies in the British journal decreased from 10 (2.7%) to 7 (2.1%). International randomized studies from Europe declined from 8 (2.1%) to 5 (1.5%), whereas those from Asia increased slightly from 1 in 1988 to 3 in 1998 (0.3% and 0.9%, respectively). There was only one randomized study (0.3%) in 1988 from other areas.

**FUNDING**

Funding sources were listed for 334 (26.3%) of all articles published in US journals in 1988, but this number decreased to 285 (25.5%) in 1998 \(P = .62\). For society articles, 140 (29.4%) listed a source of funding in 1988 and 102 (27.4%) in 1998. For freely submitted articles, 194 (24.5%) in 1988 and 183 (24.6%) in 1998 were funded.

Government as a sole funding source decreased from 172 articles (13.6%) in 1988 to 125 (11.2%) in 1998. Private funding (sole) was stable at 69 (5.4%) in 1988 and 67 (6.0%) in 1998. Industry funding (sole) increased from 16 (1.3%) in 1988 to 27 (2.4%) in 1998. Articles with combined funding from these sources decreased from 77 (6.1%) in 1988 to 66 (5.8%) in 1998.

Government funding, either sole or in combination with another source for all articles, decreased from 243 articles in 1988 to 186 articles in 1998 (19.2% to 16.7%). The number of basic research articles that listed government funding alone or in combination decreased from 215 in 1988 (72.8% of all basic research articles) to 131 (65.3%) in 1998.

Government funding alone or in combination decreased for national articles published in US journals from 209 articles in 1988 to 134 articles in 1998 (16.5% to 12.0% of total articles, respectively) (Table 6). In contrast, for international articles from Europe and Asia, government funding alone or in combination increased.

The highest rate of funding by subject matter was for articles dealing with infection and metabolism (52.2% in 1988 and 50.0% in 1998) and trauma and critical care (35.5% in 1988 and 33.3% in 1998). All other subjects received less than 30% funding in 1988 and 1998.

In the British journal, there were 62 funded articles in 1988 and 78 in 1998 (16.5% and 22.9% of total articles, respectively). In 1988, 61.3% of these funded studies were national articles, whereas in 1998 the number had decreased to 51.3%. There was a reciprocal increase in international funded articles from Europe and Asia.

**COMMENT**

In 1995, Nahrwold et al reported a selective study of the 5 US general surgical journals examined in the present study. They examined articles published in 1983 and 1993 and analyzed those dealing with clinical and basic research. Their results demonstrated a decrease in research reported from the United States during that period with a concurrent increase in research reports from other countries. The results of the current study clearly demonstrate that for these US general surgical journals studied, there has been a decrease in the total number of articles published from 1983 to 1998. The reasons for the decrease (most marked for society articles) are not clear, but several factors may play a role in the decline. First, publishers are increasingly placing limits on total pages in their journals for financial reasons. Second, although society presentations have remained fairly stable throughout the years, society articles have undergone more stringent editorial review, resulting in fewer society articles being published. Third, many of the journals we studied have reduced the numbers of societies they serve during the past several years.

There also have been absolute and relative decreases in national articles published during this period. These decreases have been most notable in freely submitted, peer-reviewed manuscripts but have also occurred to a lesser extent in society articles, which con-
stitute approximately one third of all published articles. The reciprocal increase in international articles, derived chiefly from Europe and Asia, has been sizable; the number of articles from other areas of the world has increased only slightly. Again, these changes are most striking in the freely submitted articles. All 5 US journals have increased publication of international freely submitted articles from 19.5% in 1983 to 45.9% in 1998. In fact, by 1998, these articles constituted more than one half of the freely submitted articles published in 3 of the 5 journals. This internationalization of the US general surgical literature is consistent with the observation of Stossel and Stossel regarding decreasing US representation in leading US clinical research journals and that of Estler and Chen demonstrating internationalization of the American Journal of Roentgenology. Peiper and Zornig reported that German surgeons increasingly publish in American journals, probably owing to the greater impact factors of these journals.

Although the British journal increased the overall number of published articles by more than 50% between 1983 and 1998 and had fewer society articles (approximately 14%), the same trends occurred owing to absolute and relative decreases in the total number of national articles published. Similar to the observations in the US journals, the rise in the number of international articles was mostly from European and Asian sources.

The data presented in this study do not establish a quantitative decline in national surgical productivity, although some may imply that conclusion. To make that judgment, more data would be required, such as ratios of national to international articles submitted to US surgical journals for review, numbers of national surgical articles published in journals other than the 5 reported herein (including basic science, specialty, and general medical journals), and the effect of newer specialty journals on national submission patterns.

The influence of editorial boards on the acceptance of international vs national articles could be a factor in the changes observed in this study. We examined the geographic composition of the editorial boards of the 6 journals in this study and calculated the percentage change in international members during the study period. These were compared with the changes in international articles published by these same journals. Five of the 6 journals have shown increases in international editorial board members, but the changes did not correlate with the larger observed increases in the number of published international articles. Indeed, one journal with a 44% decrease in international editorial board members nevertheless had an 8% increase in the number of international articles published.

The subject matter of the articles published was directed to topics that represent the broad scope of general surgery, with more than half in the combined fields of abdominal, alimentary tract, and vascular surgery. The smaller numbers of articles dealing with pediatric surgery, cardiothoracic surgery, and head and neck surgery probably reflect the increasingly independent roles of these specialties. There is a presumption that some articles previously submitted to these general surgery journals have been siphoned off to specialty journals, but the magnitude of this effect is not known. Many of the specialty journals, such as Diseases of Colon and Rectum, Journal of Pediatric Surgery, Journal of Surgical Oncology, Journal of Surgical Research, Journal of Thoracic and Cardiovascular Surgery, Journal of Trauma, and Transplantation, were well established before 1983, the first year of this study, and Journal of Vascular Surgery was started the next year. The Journal of Gastrointestinal Surgery was not published until 1997. Many of the newer journals are in the fields of laparoscopic and endoscopic surgery and were started after the early 1990s.

A decline in national basic surgical research cannot be assumed based on the experience of these journals. In their deliberations, US academic appointment and promotion committees and granting agencies are also beginning to examine the impact factors of journals in which investigators publish their work. Many basic research articles are being published in basic science or other journals, particularly those with greater impact factors. There is no evidence, however, that this trend has led to a decrease in the impact of the journals studied; the opposite seems to be the case. Comparison of the surgical journal impact factor ranking lists for 1988, 1993, and 1998 shows that each of the journals in this study increased its impact factor during that period. In 1988, the mean impact factor for the 6 journals was 1.7225, and this increased to 2.7168 by 1998. Although there were 83 journals listed in 1988 and this number had increased to 128 (54%) by 1998, the journals in this study had improved rankings from the top 22% in 1988 to the top 16.4% in 1998.

However, there have been warning signs that surgical research is decreasing in the United States. Ko et al recently published a study of surgeons and basic research. Their survey showed that 38% of senior surgeon responders had ceased basic research by age 39 years. An additional 40% ceased such research by age 59 years. The respondents cited increasing clinical demands as the primary reason for ceasing research. The pressures of managed care on many academic faculties has unquestionably contributed to this trend.

Although the number of randomized clinical trials increased in these journals during the study period, they remain at a very low level—only 5% of clinical articles in 1998. Most of the increase from 1983 was due to international, not national, articles. This may not be reflective of surgical involvement in randomized trials, such as breast surgery, gastrointestinal cancer, and vascular trials, many of which are published in specialty or other multidisciplinary journals.

Funding of studies reported in these journals remained steady at about one quarter of the articles, but the decrease in government funding in national in contrast to international studies is noted. The evidence derived from this study suggests that an increase in industry funding may be filling this void for national studies. Such a development raises possibilities of conflicts of interest between investigators and industrial sponsors.

In 1996, Wells addressed the subject of funding of surgical research in depth. Although in preceding years support for research from the American Cancer Society decreased, that from the Veterans Administration increased slightly, and that from the National Institutes of Health increased significantly. Since 1995, there has been...
increasing government funding of the National Institutes of Health, but this has not affected the studies in the journals that we reviewed.

CONCLUSION

The theory that internationalization of the major English-language general surgical journals has occurred during the last 15 years is no longer conjecture. The increase in articles from Europe and Asia published in US and British journals has been striking during this period. Although this mirrors in many ways the globalization that has occurred in economic and political arenas, it poses important questions for North American and British surgeons. We have not made a judgment as to the desirability or lack thereof of these developments. In the journals surveyed during the study period, for undetermined reasons, there has been a decrease in reports of basic research, a stable number of funded research studies, and a dearth of reports of randomized trials. We believe that the role of the top-rated general surgical journals has been, and will continue to be, the mirrors in many ways the globalization that has occurred in the journals surveyed during the study period. Presently, reasons have been a decrease in reports of basic research, a stable number of randomized trials. We believe that the role of the top-rated general surgical journals has been, and will continue to be, the publication of excellent but not necessarily ground-breaking studies in clinical and basic surgical science.

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We thank Carol M. Newton, PhD, University of California, Los Angeles, for her advice and counsel.

The hypothesis by Tompkins and colleagues that the internationalization of general surgical journals has occurred is proven, but they fail to provide convincing arguments for why this has occurred and why the trend has been greater with the British Journal of Surgery (BJS) than the other publications.

The loss of the British Empire may have benefited the BJS, which like Britain has had to look increasingly to Europe and beyond and not just to the English-speaking world. This may explain the greater reduction, proportionally, in national articles in the United Kingdom compared with the United States. The increase in European publications reflects a policy change by the BJS to encourage greater cooperation with European surgical societies, providing a wider readership for their members. Thus, during a 30-year period between 1969 and 1999, the number of United Kingdom–based national publications in the BJS decreased from 82% to 47%, whereas the number of European articles increased from 2% to 28% during the same period. There was no discernible trend in publications from the rest of the world. The US journals seem to have attracted a greater contribution from Asia than from Europe.

In his review of 9 general surgical journals (including the BJS and 3 of the 5 US journals cited in the article by Tompkins and coauthors), the editor of The Lancet, in 1996, compared surgical research to a comic opera, with its emphasis on case series rather than randomized trials. Tompkins and colleagues note a decrease in basic research in all publications but a dearth of randomized trials in the BJS between 1988 and 1998. This finding is at odds with data reported in a leading article in the BJS, which note an increase from 3 to 13 randomized trials per year between 1989 and 1999.

The authors rightly identify the impact of external factors on research, such as the pressure of managed care on academic and clinical departments. In the United Kingdom, the research assessment exercise places great emphasis on the impact factor of publications submitted for grant applications. This has led to a shift from clinical to molecular research with subsequent publication in scientific journals with a higher impact factor. This may explain the relative reduction in national research articles.

The implication for all surgical journals is clear: globalization is here to stay. The difference in the internationalization of general surgical journals between the US journals and the BJS is marked and should sound alarm bells among the editorial boards of these journals. Insularity must be challenged.

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REFERENCES