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Metrics of the Gynecologic Oncology Literature Focused on Cited Utilization and Costs

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1 **Metrics of the gynecologic oncology literature focused on cited**
2 **utilization and costs.**

3 **Edward J Pavlik*, John Hoff, Dylan Woolum, Yuqing Liang, Christiaan**
4 **Wijers. Melissa Schwartz, Jason Lefringhouse and Lauren Baldwin**

5 Short title: *Utilization and cost of the gyn oncology literature*

6 Key words: *impact factor, eigenfactor, article influence score, costs*

7
8 ORIGINAL REPORT

9
10 *Precise: Utilization of the gyn oncology literature sources is influenced by access to*
11 *review or summary information, the size of the specialty, and financial considerations.*

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30 **ABSTRACT**

31 **Objective:** The newest findings on literature utilization relevant to gynecologic
32 oncology were published by Thomson Reuters during June 2013 as determinants of
33 journal standing. Our objective was to assess the different metrics reported for relative
34 impact and cost for journals relevant to gynecologic oncology.

35 **Methods:** 55 journals were evaluated for Impact Factor (IF), 5 Year IF, Immediacy
36 Index, Cited Half Life, Eigenfactor score (EF), Article Influence (AI) scores and
37 subscription costs obtained from publisher information.

38 **Results:** *CA-A Cancer Journal for Clinicians* had the highest IF (101.78) & AI (24.502).
39 The top EF cancer-specific journals were *the Journal of Clinical Oncology*, *Cancer*
40 *Research*, *Clinical Cancer Research* and *Oncogene*. Rankings for *Gynecologic*
41 *Oncology* (409 articles, 18,243 citations) were IF= 3.929, 43/55, EF=0.038, 28/55, AI=
42 1.099, 44/55, all higher than the previous year. The IF improved from the 5 year IF in
43 31 journals, including *Gynecologic Oncology*, 29/31. Subscription costs for *Gynecologic*
44 *Oncology* compared favorably to other journals.

45 **Conclusions:** The high utilization of review information in *CA-A Cancer Journal for*
46 *Clinicians* and *Nature Review Cancer* illustrated by the IF coupled with a relatively low
47 number of articles and short cited half life indicates that they serve as a leading source
48 of quoted cancer statistics (*CA-A Cancer Journal for Clinicians*). Rankings for
49 *Gynecologic Oncology* and the *International Journal of Gynecologic Cancer* have
50 improved. Regardless of specialty size, the Impact Factor for *Gynecologic Oncology* is
51 respectably strong. The decreased IF in 44% of the journals may reflect the
52 international economy's effect on cancer research.

53

54 **Introduction**

55 The great commission of gynecologic oncology is to advance the field. To this end, new
56 information enters the literature and reaches individuals in practice and in training. We
57 have examined the extent to which this information is cited using information formulated
58 by Journal Citation Reports on the ISI Web of Knowledge [1]. In particular, this
59 examination compares gynecologic oncology-specific citations to citations in a variety of
60 journals that have published reports relevant to gynecologic oncology. The metrics
61 considered here move considerations of quality and worthiness to readers beyond
62 subjective views of reputation and command the attention of authors, sponsors and
63 advertisers, while suggesting how metric improvement can be achieved.

64

65 **Methods**

66 The 55 journals selected for inclusion in this report all had published findings relevant to
67 gynecologic oncology annually in the period in 2010-2012. Data on citations were
68 obtained from Journal Citation Reports (JCR) on the ISI Web of Knowledge published
69 by Thomson Reuters on subscription to the University of Kentucky libraries. The
70 following definitions are used:

71 ***Impact Factor 2012*** = A/B where

72 A = the number of times that articles published in that journal in 2010 and 2011 were
73 cited by articles in indexed journals during 2012 and

74 B = the total number of "citable items" published by that journal in 2010 and 2011.

75 ("Citable items" are usually articles, reviews, proceedings, or notes; not editorials or
76 letters to the editor) [2].

77 **5 Year Impact Factor:** Average number of times articles from the journal published in
78 the last five years have been cited in 2012. This measure can better gauge the impact
79 of journals in fields where the influence of published research evolves over a longer
80 period of time [3].

81 **Immediacy Index 2012** = A/B where

82 A = the number of times articles published by the journal in 2012 were cited in indexed
83 journals during 2012

84 B = the number of articles, reviews, proceedings or notes published by the journal in
85 2012 [4].

86 **Cited Half Life:** the median age of the articles in the journal that were cited by other
87 journals during 2012 [4].

88 **Eigenfactor score:** The Eigenfactor Score is measured using the 2012 citations in
89 relation to citable items from the five previous years. While the Impact Factor weighs
90 each citation to a journal equally, the Eigenfactor Score assigns a greater weight to
91 those citations coming from influential journals, allowing these journals to exert greater
92 influence in the determination of the rank of any journal which they reference. The
93 Eigenfactor Score does not count journal self-citations. The sum of Eigenfactor Scores
94 for all journals is 100; each journal's Eigenfactor Score is a percentage of this total
95 [5,6,7].

96 **Article Influence Score:** The journal's Eigenfactor Score divided by the fraction of
97 articles published by the journal. This determination is normalized so that the sum total
98 of articles from all journals is 1 [8].

99 Thus, the mean Article Influence Score is 1.00 across the universe of journals.
100 Consequently, a score greater than 1.00 indicates that articles in that particular journal
101 have above-average influence, while a score less than 1.00 indicates that articles in that
102 journal have a below-average influence.

103 **Cost Comparisons:** Subscription costs were obtained by visiting the web sites for each
104 publication. Cost of some institutional subscriptions were obtained from the University
105 of Kentucky library.

106 **Results**

107 **Metrics of Citation** 55 journals were evaluated. The *Proceedings of the National*
108 *Academy of Science of the United States* published the most articles (3800) in 2012,
109 followed by the *International Journal of Radiation Oncology Biology Physics* (908), the
110 *International Journal of Cancer* (713), *Cancer* (650), and *Clinical Cancer Research*
111 (642), Table 1. *Gynecologic Oncology* published more articles in 2012 than 41 of the
112 journals (380 articles), while the *International Journal of Gynecologic Cancer* published
113 more articles than only 29 of the journals (236 articles). The articles cited in 2012 for
114 publications in 2010-11 define the Impact Factor and *CA-A Cancer Journal for*
115 *Clinicians*, the *New England Journal of Medicine*, the *Lancet*, *Nature Review of Cancer*
116 and the *Journal of the American Medical Association* ranked with the highest Impact
117 factors. *Gynecologic Oncology* ranked 43rd with an Impact Factor of 3.929, while the
118 *International Journal of Gynecologic Cancer* ranked 52nd with an Impact Factor of 1.941,
119 Table 1. Immediacy defined in terms of same year publication and citation was highest
120 for *CA-A Cancer Journal for Clinicians*, the *New England Journal of Medicine*, the
121 *Lancet*, the *Journal of the American Medical Association* and *Lancet Oncology* with

122 *Gynecologic Oncology* ranking 42nd and the *International Journal of Gynecologic*
123 *Cancer* ranking 54th. The staying power of articles as defined by the median age
124 published in other journals in 2012 (Cited Half Life, in years) was highest for the
125 *American Journal of Obstetrics & Gynecology*, *Cancer*, the *Journal of the National*
126 *Cancer Institute*, *Advances in Cancer Research* and the *Journal of the American*
127 *Medical Association* with *Gynecologic Oncology* ranked 18th and the *International*
128 *Journal of Gynecologic Cancer* ranked 33rd, Table 1. Journal citations over a five year
129 period weighted for influential journals (2008-2012: Eigenfactor score) were highest for
130 the *Proceedings of the National Academy of Science of the United States*, the *New*
131 *England Journal of Medicine*, the *Journal of Clinical Oncology*, *Lancet*, and *Cancer*
132 *Research*, while *Gynecologic Oncology* ranked 28th and the *International Journal of*
133 *Gynecologic Cancer* ranked 40th. The Article Influence Score can be taken as a
134 measure of average influence of a journal's articles five years after publication and by
135 this measure *CA-A Cancer Journal for Clinicians*, the *New England Journal of Medicine*,
136 *Nature Review Cancer*, *Lancet*, *Cancer Cell* and the *Journal of the American Medical*
137 *Association* scored highest (>10), while *Gynecologic Oncology* demonstrated above
138 average influence and the *International Journal of Gynecologic Cancer* showed
139 influence well below average.

140 Our survey of the 2011-2012 period revealed that ~15% of papers cited in *Gynecologic*
141 *Oncology* had been published in *Gynecologic Oncology*. In addition, surveying the
142 *Gynecologic Oncology* sections of the *Journal of Clinical Oncology* and of *Cancer*,
143 showed that ~17% and ~5% of the references were to papers published in *Gynecologic*
144 *Oncology*.

145 **Examination of Cost** The most relevant subscription costs to gynecologic oncologists
146 are likely to be *Gynecologic Oncology & the International Journal of Gynecologic*
147 *Cancer* (Table 2 line A), *Cancer* and the *Journal of Oncology* (Table 2 line B) and
148 *Obstetrics & Gynecology* and the *American Journal of Obstetrics and Gynecology*
149 (Table 2 line C) totaling \$2465 for members, \$3003 for non-members and \$8983 for
150 libraries (Table 2 line 3). The total subscription cost to libraries and institutions for all 55
151 journals considered here is \$109,512 and is ~5 times the cost to individual members
152 (Table 2 line E). The mean cost to members of the 55 journals considered (Table 2 line
153 F: \$554±129 (SEM)) compares well with the subscription cost of *Gynecologic Oncology*
154 (\$563 journal alone, \$625 annual membership with complementary journal
155 subscription). However, subscription costs to the 6 journals most relevant to
156 gynecologic oncology (Table 2 line D) are much less than the mean cost of subscription
157 to 6 journals in the group of 55 journals under consideration (Table 2 line G).

158 **Discussion**

159 Ranking of the top 10 *Impact Factor* journals correlated well with the *5 year Impact*
160 *Factor, Immediacy Index and Article Influence Score* in that the same journals ranked in
161 the top 10 for each of these categories (Table 3). Only one of the top 10 *Impact Factor*
162 journals was in the top 10 of the *Number of Articles* published in 2012, while 4 were in
163 the top 10 of *Total Citations* in 2012 and 4 were in the top ten rank for *Cited Half-life*.
164 Half of the top ten *Impact Factor* journals were among the journals with a top ten *Eigen*
165 *Factor* score (Table 3). Thus, annual citation performance is least correlated with the
166 number of articles published and connected about half the time with citations received,

167 their median half life and *Eigen Factor* score. Consequently the metrics of citation are
168 not driven by the volume of articles published.

169 *Gynecologic Oncology* was above the median ranking in terms of articles published,
170 cited half-life and total citations for 2012 (Table 3), but it was below the median ranking
171 in all other measures. The *International Journal of Gynecologic Cancer* was above the
172 median ranking in articles published, but below the median ranking in all other
173 measures (Table 3).

174 Journals that publish reviews (*CA-A Cancer Journal for Clinicians*, *Nature Review of*
175 *Cancer*, *Nature Reviews Clinical Oncology*) are often cited with high immediacy and
176 short half-life because they are subject to annual updating (and do not necessarily occur
177 as citations in the most influential journals as indicated by the *Eigen Factor* metric).

178 Improvement in the current *Impact Factor* relative to the previous five years was
179 observed with 31 journals (56%), while the citation rate fell in 44% of the journals
180 considered. Thus, a narrow 6% margin separates the journals that demonstrate
181 improving citation from those that do not. Two tactics that could serve *Gynecologic*
182 *Oncology* to stay on track with improving annual *Impact Factor* scores could be to
183 include more reviews on gynecologic malignancies and to implement the inclusion of
184 annual statistics on gynecologic malignancies. Such statistics should include and
185 expand the gynecologic malignancies reported on beyond those covered in *CA-A*
186 *Cancer Journal for Clinicians* so that statistics uniquely available in *Gynecologic*
187 *Oncology* would push its *Impact Factor* higher. Importantly, gynecologic cancer reviews
188 and gynecologic cancer statistics should be made available on an Open Access basis to

189 maximize their utilization and contribution to the *Impact Factor of Gynecologic*
190 *Oncology*.

191 Considered in the spectrum of medical specialty journals, *Gynecologic Oncology* is well-
192 positioned. Of twenty seven selected medical specialties that were examined (Table 4),
193 gynecologic oncology which ranked 22nd in physician number (n=1007 [9,10]) had it's
194 lead journal's Impact Factor ranked 13th. The Impact Factor for *Gynecologic Oncology*
195 (3.929) was better than the median Impact Factor for journals in small specialties (49-
196 1854 physicians, median = 2.649) and better than the median Impact Factor for the lead
197 journals of all specialties considered here (median = 3.569). Mid sized specialties
198 (4493-19131 physicians) had lead journals with a greater median Impact Factor (5.644).
199 Large specialties (27651-90269 physicians) had a median Impact Factor (3.877) slightly
200 lower than *Gynecologic Oncology*. Considered in these terms, the current Impact
201 Factor for *Gynecologic Oncology* is quite strong and respectable among journals for
202 medical specialties. Impact Factors >10 considered here (Table 1) were either for multi-
203 specialty journals or multi-discipline journals. We believe that *Gynecologic Oncology*
204 currently serves both private practice and academic gynecologic oncologists extremely
205 well because of it's targeted content. We also believe that as a group, gynecologic
206 oncologists are proud and very competitive. In this regard, we feel that an expectation
207 exists for journal metrics that continuously improve. We believe that there is no down-
208 side to improving these metrics for those in private practice as well as in academic
209 medicine and that the better the journal metrics, the better the Society of Gynecologic
210 Oncologists will fair in the eyes of advertisers and sponsors.

211 In summary, *Gynecologic Oncology* performs well in terms of citation metrics and cost.
212 It should be possible to further improve these metrics by introducing reviews and
213 statistics on gynecologic malignancies.

214 The role of the medical journal must loom in the perspective of practitioners as a
215 trustworthy source of information that carries both influence and advice. In this role it
216 unifies the past with the present and must be counted on to have an ongoing outreach
217 to future discovery and innovation. Authors want to publish in a quality place that draws
218 attention to their work, a place that will be good enough to contribute to their career
219 advancement. Readers want a source of significant information that is worthy of their
220 time and subscription cost. The measure of quality and time worthiness has moved
221 beyond subjective evaluation and now takes on the metrics of utilization, which while
222 not totally perfect, provide comparative numeric standards that, like it or not, do
223 command attention, especially of sponsors and advertisers. Not to be overlooked are
224 new models embracing digital communication that have an influence on authors,
225 readers, patients, sponsors and advertisers through information that reaches them
226 through the Internet, Open Access, social media, blogs, Twitter, search engines, etc. In
227 the end, the metrics of citation utilization will both influence and be influenced by an
228 evolution of awareness brought forward by technology. As this occurs, journals must
229 not lose sight of the significance of peer review [2]. This is the single most important
230 process that can re-craft the submission by utilizing expert reviewers that raise
231 questions, the answers to which can be incorporated in the final publication to enhance
232 it's quality [11]. In the end, with the literature practically "bursting at the seams" with the
233 diverse opportunities made possible by the digital revolution [12], it will be quality that

234 determines readership and citations. The future holds but one thing and that is to
235 continue to evolve so that specialty information is useful to those in the field of
236 gynecologic oncology [13].

237

238

239 **Conflict of Interest Statement**

240 The authors declare that there are no conflicts of interest.

241

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