

Defining the publication source of high-quality evidence in urology: an analysis of EvidenceUpdates

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Objectives

To determine the publication sources of urology articles within EvidenceUpdates, a second-order peer review system of the medical literature designed to identify high-quality articles to support up-to-date and evidence-based clinical decisions.

Materials and Methods

Using administrator-level access, all EvidenceUpdates citations from 2005 to 2014 were downloaded from the topics 'Surgery-Urology' and 'Oncology-Genitourinary'. Data fields accessed included PubMed unique reference identifier, study title, abstract, journal and date of publication, as well as clinical relevance and newsworthiness ratings as determined by discipline-specific physician raters. The citations were then coded by clinical topic (oncology, voiding dysfunction, erectile dysfunction/infertility, infection/inflammation, stones/endourology/laparoscopy, trauma/reconstruction, transplant, or other), journal category (general medical journal, oncology journal, urology journal, non-urology specialty journal, Cochrane review, or other), and study design (randomised controlled trial [RCT], systematic review, observational study, or other). Articles that were perceived to be misclassified and/or of no direct interest to urologists were excluded.

Descriptive statistics using proportions and 95% confidence intervals, as well as means and standard deviations (SDs) were used to characterise the overall data cohort and to analyse trends over time.

Results

We identified 731 unique citations classified under either 'Surgery-Urology' or 'Oncology-Genitourinary' for analysis

Introduction

One of the central challenges to evidence-based clinical practice is to stay abreast with the current best evidence [1]. The vast number of published articles on any given clinical

after exclusions. Between 2005 and 2014, the most common topics were oncology (48.6%, 355 articles) and voiding dysfunction (21.8%, 159). Within the topic of oncology, prostate cancer contributed over half the studies (54.6%, $n = 194$). The most common study types were RCTs (42.3%, 309 articles) and systematic reviews (39.6%, 290). Systematic reviews had a nearly fourfold relative increase within less than a decade. The largest proportion of studies relevant to urology were published in general oncology journals (20.0%, $n = 146$), followed by the Cochrane Library (19.3%, $n = 141$) and general medical journals (17.2%, $n = 126$). Urology-specific journals contributed to only approximately one-tenth of EvidenceUpdates alerts (9.4%, $n = 69$), with the highest contribution occurring during the 2013/2014 period. For clinical relevance and newsworthiness scores (each graded on scales of 1–7), urology journals scored the highest in clinical relevance with a mean (SD) of 5.9 (0.75) and general medical journals scored highest for newsworthiness at 5.3 (0.94). On average, RCTs scored highest both for clinical relevance and newsworthiness with mean (SD) scores of 5.71 (0.81) and 5.22 (0.91), respectively.

Conclusion

A large number of high-quality, clinically relevant, and newsworthy peer-reviewed urology publications are published outside of traditional urology journals. This requires urologists to implement well-defined strategies to stay abreast of current best evidence.

Keywords

evidence-based urology, evidence-based medicine, peer-reviewed resources, EvidenceUpdates, decision-making tools

topic each month greatly exceeds a singular individual's capacity to screen the medical literature, and therefore requires a systematic approach. One important strategy in the armamentarium of the urologist is the use of evidence-based resources that provide a selection and critical pre-appraisal of

studies that are valid, clinically relevant, and applicable to patient care.

In the present study, we assessed the potential value of an evidence-based and no-cost information system called 'EvidenceUpdates', which is primarily aimed at generalists but is also of increasing relevance to the urologist. Produced by McMaster University, and sponsored by the BMJ Publishing Group, the EvidenceUpdates system acts as a second-order peer review of the medical literature that involves screening of published articles from 110 clinical journals (number varies slightly from year to year). Articles are selected based on pre-defined criteria [2] that are designed to maximise inclusion of high-quality studies [3]. Once selected and included in the database, physician raters who are of the same clinical discipline as the article in consideration are asked to review the publication in question. Raters are self-nominated, and ratings from at least three physicians per discipline are collated and averaged. Articles are assessed at the time of publication and rater scores have been shown to correlate with subsequent article citation counts [4]. Users of the EvidenceUpdates system can then register to receive e-mail alerts about articles that may be of clinical relevance to them; they can select a specialty of interest and define cut-off levels of relevance and newsworthiness. A searchable database of past articles is also maintained.

In the present study, we sought to assess the publication sources of urology articles within the EvidenceUpdates/McMaster Premium Literature Service (PLUS) second-order peer review system. We also sought to determine which topics of study were more likely to be included, which sources were most likely to contain articles deemed high in relevance and newsworthiness by physician raters, and how publication source trends have changed over time.

Materials and Methods

Using administrator level access, we downloaded all EvidenceUpdates citations from 2005 to 2014. This included the following data fields: PubMed unique reference identifier, study title, study abstract, journal and date of publication, topic category ('Surgery-Urology' and 'Oncology-Genitourinary'), as well as clinical relevance and newsworthiness ratings (each on a scale of 1–7), with higher values representing higher relevance and newsworthiness. Relevance is defined as the extent to which the article is pertinent to practice in the rater's clinical discipline. Newsworthiness is defined as the extent to which the article's content represents news or something that the clinicians in the rater's discipline were unlikely to know.

A member of the research team subsequently coded the included citations by clinical topic (oncology, voiding dysfunction, erectile dysfunction/infertility, infection/inflammation, stones/endourology/laparoscopy, trauma/

reconstruction, transplant, or other), journal category (as general medical, oncology, urology, non-urology specialty, Cochrane review, or other), study design (as randomised controlled trial [RCT], systematic review, observational study, or other). The 'other' category encompassed clinical practice guidelines, experimental studies, and health technology assessments. A second member of the investigative team confirmed the correct coding for each of these categories; any discrepancies were discussed and resolved through consensus or arbitration by a third researcher. We reviewed all abstracts for relevance to urology; articles that were of only peripheral relevance and comprising of a study population of primarily non-urology patients were excluded from analysis.

The analytical approach was decided *a priori*. We performed descriptive statistics using proportions and 95% CIs, as well as means and standard deviations (SDs) to characterise the overall sample as well as trends over time. For the description of temporal trends, we subdivided the data into 2-year intervals (as 2005/2006, 2007/2008, 2009/2010, 2011/2012, 2013/2014). We performed descriptive statistics only using SPSS Version 23.0 (IBM Corp., Armonk, NY, USA).

Results

We identified 757 unique citations in EvidenceUpdates from 2005 and 2014 that were classified either under 'Surgery-Urology' or 'Oncology-Genitourinary'. We excluded 26 studies that we perceived to be misclassified and/or of no direct interest to urologists, leaving 731 studies.

Table 1 summarises the baseline characteristics of urology studies included in the database. Between 2005 and 2014, the most common topics were oncology (48.6%, 355 articles) and voiding dysfunction (21.8%, 159). Within the topic of

Table 1 Study characteristics.

Publication	Frequency, n (%)
Topic	
Oncology	355 (48.6)
Prostate cancer	194 (54.6)
Urothelial cell carcinoma (bladder and upper tract)	40 (11.3)
Renal cancer	34 (9.6)
Testis cancer	22 (6.2)
General/other	65 (18.3)
Voiding dysfunction	159 (21.8)
Infection/inflammation	47 (6.4)
Transplant	42 (5.7)
Erectile dysfunction/infertility	34 (4.7)
Stones/endourology/laparoscopy	23 (3.1)
Trauma/reconstruction	9 (1.2)
Other	62 (8.5)
Type	
RCT	309 (42.3)
Systematic review	290 (39.6)
Observational study	127 (17.4)
Other	5 (0.7)

oncology, prostate cancer contributed over half the studies (54.6%, $n = 194$). The most common study types were RCTs (42.3%, 309 articles) and systematic reviews (39.6%, 290); only about one in eight papers encompassed an observational study (17.5%, 128 articles). Figure 1 shows temporal trends in the contribution of different study designs. While the number of study alerts rose approximately threefold overall from 74 (2005/2006) to 204 (2013/2014) studies, systematic reviews showed an even larger, nearly fourfold relative increase from 24 (2005/2006) to 92 (2013/2014) studies within less than a decade.

Figure 2 summarises the relative contribution of articles by journal category in 2-year intervals. During this time-period, the number of studies steadily rose from 74 (2005/2006) to 204 (2013/2014). Oncology journals (20.0%, $n = 146$) published the largest proportion of studies followed by the Cochrane Library (19.3%, $n = 141$) and general medical journals (17.2%, $n = 126$). Urology-specific journals overall contributed only approximately one-tenth of these alerts (9.4%, $n = 69$). The number of urology journal contributions was highest in 2013/2014, during which time frame *European Urology* contributed 60 (29.4%) of urology-relevant EvidenceUpdates alerts. Of the studies published in *European Urology* in 2013/2014, 37.3% ($n = 22$) were RCTs, 35.6% were systematic reviews ($n = 21$) and 25.4% ($n = 15$) were observational studies.

Table 2 summarises the 'top 10' journals that contributed the most studies to EvidenceUpdates within the study cohort. Overall, the largest contribution came from the Cochrane Library ($n = 141$), the *Journal of Clinical Oncology* ($n = 107$) and *European Urology* ($n = 59$). Meanwhile, in 2013/2014, *European Urology* was the single greatest contributor

Fig. 1 Temporal trends in the contribution of different study designs.

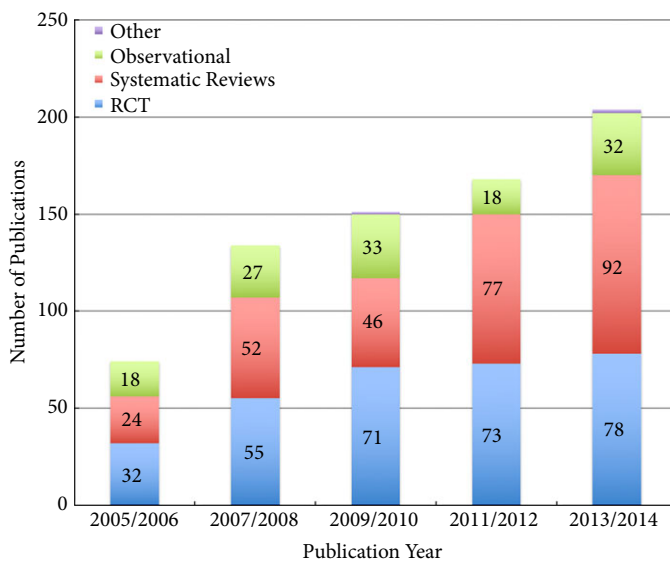
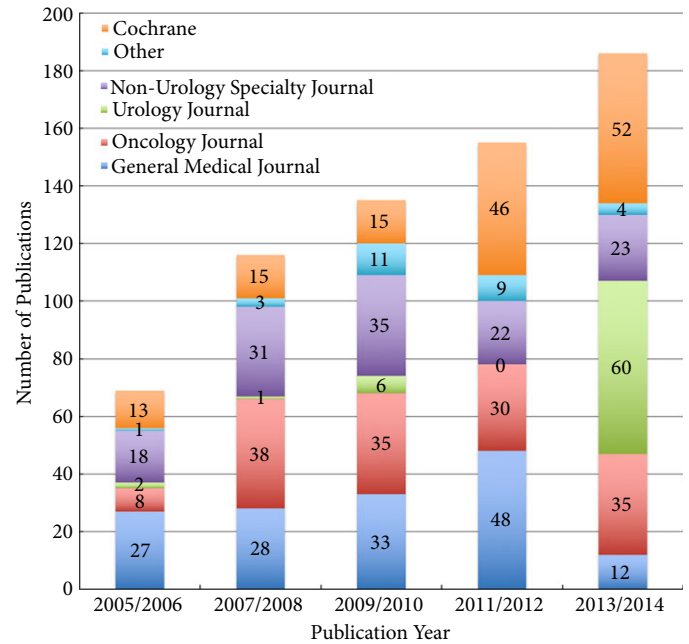


Fig. 2 Summary of the relative contribution of articles by journal category in 2-year intervals.



($n = 59$), followed by the Cochrane Library ($n = 52$) and *Lancet Oncology* ($n = 18$).

We further assessed the clinical relevance and newsworthiness scores by journal category and study type (Fig. 3). The mean (SD) clinical relevance and newsworthiness scores (each graded on scales of 1–7) for all EvidenceUpdates studies within the study cohort was 5.68 (0.82) and 5.00 (0.95), respectively; urology journals scored the highest in clinical relevance at 5.9 (0.75) and general medical journals scored highest for newsworthiness at 5.3 (0.94). On average, RCTs scored highest both for clinical relevance and newsworthiness with mean (SD) scores of 5.71 (0.81) and 5.22 (0.91), respectively (Fig. 4).

Discussion

The key finding of the present study was that a large number of high-quality, clinically relevant, and newsworthy peer-reviewed urology publications were published outside of traditional urology journals. As a result, urologists seeking to stay abreast with the medical literature to guide their practice are at risk of missing these studies altogether, discovering them in a delayed manner or learning about them from unreliable, non-evidence-based resources, which may distort their findings [5]. This emphasises the importance of multi-pronged strategies for clinicians to stay up-to-date with the current best evidence, suggesting that 'push services' like EvidenceUpdates may provide a valuable contribution.

Table 2 'Top 10' contributors by Journal of urological publications in EvidenceUpdates.

Journal	2005/2006, n	2007/2008, n	2009/2010, n	2011/2012, n	2013/2014, n	Total, n
<i>Lancet</i>	3	2	3	7	1	16
<i>Ann Intern Med</i>	2	4	5	6	1	18
<i>Int J Clin Pract</i>	1	4	2	6	5	18
<i>Obstet Gynecol</i>	1	8	3	2	9	23
<i>JAMA</i>	8	7	7	7	4	33
<i>N Engl J Med</i>	6	2	8	12	8	36
<i>Lancet Oncol</i>	0	5	5	11	18	39
<i>Eur Urol</i>	0	0	0	0	59	59
<i>J Clin Oncol</i>	8	33	30	19	17	107
<i>Cochrane Database Syst Rev</i>	13	15	15	46	52	141

Fig. 3 Clinical relevance and newsworthiness scores by journal category.

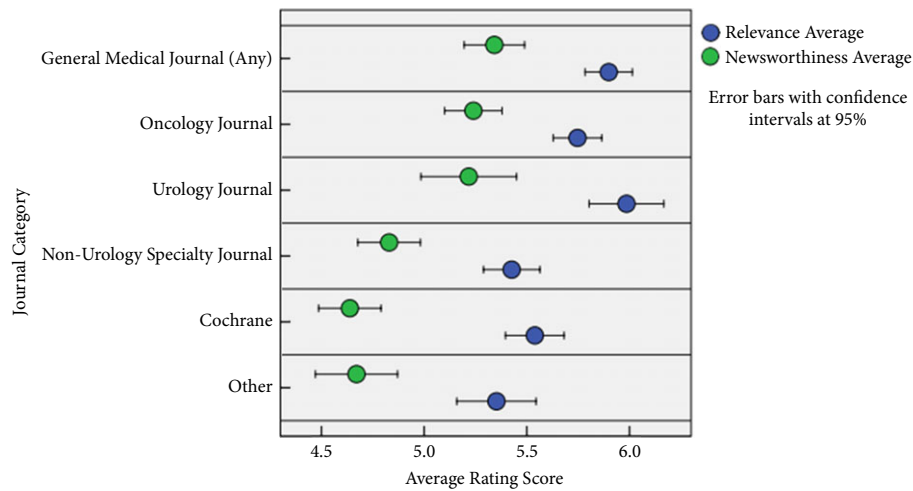
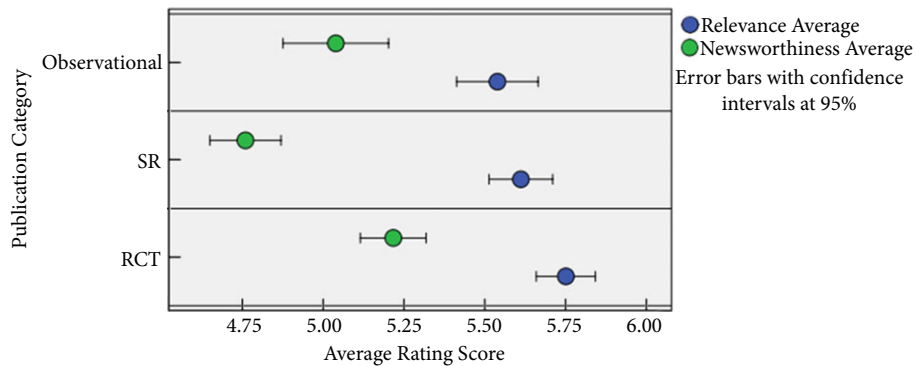


Fig. 4 Clinical relevance and newsworthiness scores by study type. RCT, Randomised controlled trials; SR, Systematic reviews.



The rapid pace of medical innovation poses several challenges to urologists seeking to stay abreast with the current best evidence while balancing clinical, administrative, and research responsibilities. Choudhry et al. [6] found that older, more experienced physicians were paradoxically less likely to possess factual medical knowledge, and as a result, were more likely to have poorer outcomes adhere to established standards of care. In fact, Evans et al. [7] observed that in the

management of hypertension, physicians frequently directed therapy based on the protocols that were prevailing at the time of their training, even if such protocols had become outdated. It was this study, among others, that led early leaders of the evidence-based medicine (EBM) movement to underscore the importance of critical appraisal of the medical literature by clinicians. Similarly, studies suggest that urologists have self-perceived inadequacies in their knowledge

of and their training in searching and critically appraising the medical literature. Nearly a third of AUA members responding to a survey about EBM practices cited lack of understanding of EBM skills/techniques and personal factors (such as lack of time) as barriers to practicing EBM [8]. Despite this, there was strong agreement among urologists that EBM was an important avenue for improving quality of care and that all urologists should possess critical appraisal skills.

An important development in the world of evidence-based clinical practice has been the increased availability of evidence-based resources as categorised by the '5S hierarchy' of information services [9]. This distinguishes (in ascending order) between original research studies, syntheses of studies (e.g. Cochrane Library), synopses (e.g. the American College of Physicians [ACP] Journal Club), summaries (e.g. evidence-based guidelines, *DynaMed*TM, EBSCO Information Services, Ipswich, MA, USA) and systems (computerised decision-support systems). The higher a resource is on the pyramid, the greater the effort that has gone into the pre-appraisal, synthesis and synopsis of the underlying evidence, and the more confidence clinicians may place into underlying validity, clinical relevance and applicability of the resource in question. While the EvidenceUpdates service includes only studies and systematic reviews from this pyramid, it can make an important contribution by alerting urologists to those studies that meet methodological criteria that we associate with trustworthy information. It may be interesting to note that within the same time-period we analysed for the present study (2005–2014), the four major urology journals alone published 31 782 articles, an impossible number of studies for any one individual to meaningfully screen.

Unique to the EvidenceUpdates system is the 'second-order peer-review process', whereby practicing clinicians from both primary care and specialty settings are recruited to review and rate articles by relevance and newsworthiness. In this manner, the EvidenceUpdates system attempts to crowd-source the critical appraisal process and improve the accessibility of high-quality literature to busy physicians.

A second important finding of the present study was the large and increasing contribution of systematic reviews to EvidenceUpdates. This development appears to be driven by two factors. First, there is likely an increased general awareness by clinicians of the preeminent role of systematic reviews as providing methodologically rigorous and transparent summaries of the 'totality of evidence' for a given clinical question. Second, the high citation rates that systematic reviews garner make them an attractive publication type for journal editors seeking to increase their journal's impact factor. A recent study found that the number of systematic reviews published by four major urology journals rose exponentially from 1998 to 2012, with the number of systematic reviews

published in 2012 alone matching the number of all systematic reviews published from 1998 to 2008 [10].

Evidence-based resources, such as EvidenceUpdates, may also provide a valuable alternative to non-peer reviewed so-called 'throwaway journals' that are in wide circulation [11] and likely contribute to a large percentage of urologist's informal continuing medical education process. These publications are typically free of charge, have a high advertising-to-text ratio, generally have non-physician editors, feature narrative review articles and opinion, are scant on original research, and are seldom, if ever, cited [12]. Despite studies that have shown their inferiority with respect to methodological and reporting quality when compared with traditional journals [11], articles in throwaway journals have several characteristics that make them appealing to physicians. In a study by Rochon et al. [5], a group of recently graduated physicians who were in full-time clinical practice were asked to rate the clinical relevance of a pre-selected group of review articles. When 'blinded' to the source, titles from throwaway journals were rated as being more clinically relevant and more likely to be read.

Several limitations of the present study are important to recognise. First, the McMaster database that underlies EvidenceUpdates was primarily designed to meet the evidence needs of generalists, and has only secondarily evolved to provide information services to specialists including the urologist. The service screens a large and increasing number of medical journals, which are selected based on various factors including impact factor and yield of high-quality articles that meet pre-specified criteria. Major urology journals were therefore not consistently screened during the study period, thereby contributing to their under representation. At the same time, the inclusion of *European Urology* since 2013 indicates a responsiveness of the service to changes in the landscape of published journals and their perceived relevance as measured by impact factor. From the perspective of a urological audience, the inclusion of other urological journals in the screening process would be desirable.

Second, one might question whether the criteria used to identify higher quality studies, while standardised and transparent, represent an adequately rigorous standard for clinicians to rely on [13]. For example, required search strategies for the inclusion of systematic reviews focus on the description of inclusion and exclusion criteria and searching of more than one major database. It thereby falls short of the type of assessment that might be provided by the AMSTAR instrument (A Measurement Tool to Assess Systematic Reviews), which has been validated to assess the methodological quality of systematic reviews and includes additional dimensions, such as the search for unpublished studies or conflict of interest reporting [14]. A recent study by Corbyons et al. [10] has documented that there has been

an exponential increase in the number of systematic reviews published in the urological literature from 1988 to 2012. However, the methodological quality of these reviews was modest, did not appear to improve over time, and did not differ greatly by journal.

Third, the second-order peer-review rating of clinical relevance and newsworthiness is based on a minimum of only three self-nominated individuals for a given specialty, which may not necessarily provide representative opinions. These ratings nevertheless appear to be of great value to a broader audience, are highly correlated with citation counts [4] and have also withstood the test of time throughout EvidenceUpdates' existence.

Conclusion

The present study suggests that a large number of high-quality, clinically relevant, and newsworthy peer-reviewed urology publications are published outside of traditional urology journals. This requires urologists to implement well-defined strategies to stay abreast of current best evidence. 'Push services', such as EvidenceUpdates, can play a significant role in keeping urologists informed about potentially practice-changing primary clinical research, as well as high-quality systematic reviews. Additional, specialty focused evidence-based resources would be helpful to improve the uptake of recent high-quality research evidence in the urological community.

Conflict of Interest

Vikram M. Narayan, Kristin Chrouser, Philipp Dahm: the authors have no conflicts of interest to disclose. Brian Haynes: Founding editor of EvidenceUpdates. Rick Parrish: Programmer/analyst for EvidenceUpdates.

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Abbreviation: EBM, evidence-based medicine; RCT, randomised controlled trial.