

# Online research article discussion board to increase knowledge translation during emergency medicine residency

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**Background:** Many clinicians have difficulties reading current best practice journal articles on a regular basis. Discussion boards are one method of online asynchronous learning that facilitates active learning and participation. We hypothesized that an online repository of best practice articles with a discussion board would increase journal article reading by emergency medicine residents.

**Methods:** Participants answered three questions weekly on a discussion board: What question does this study address? What does this study add to our knowledge? How might this change clinical practice? A survey regarding perceived barriers to participating was then distributed.

**Results:** Most participants completed an article summary once or twice in total (23/32, 71.9%). Only three were involved most weeks (3/32, 9.4%) whereas 5/32 (15.6%) participated monthly. The most common barriers were lack of time (20/32, 62.5%), difficulty logging on (7/32, 21.9%), and forgetting (6/32, 18.8%).

**Conclusion:** Although subjects were provided weekly with an article link, email, and feedback, journal article reading frequency did not increase.

**Keywords:** online research, discussion board, knowledge translation, emergency medicine residency

## Introduction

Since 1991, medical knowledge has doubled every 19 years, and now doubles at the staggering rate of every 8–10 years.<sup>1</sup> In 2005, there were 682,121 new articles published in PubMed alone. If clinicians were to read two articles per day, in 1 year they would be over 900 years behind in their reading.<sup>2</sup> Medical professionals often look to medical specialty journals to keep up with the current literature and evidence-based medicine. Many are unable to devote the time needed to filter through this volume of literature and find key elements that affect their clinical practice. Adding to this problem, less than 15% of all articles published on a particular topic are found to be clinically relevant.<sup>3</sup>

Further exemplifying this knowledge-to-application gap, the time from validation to implementation of a new clinical practice is typically 17 years.<sup>4</sup> Knowledge translation is the science of accelerating the transfer of knowledge to practice by understanding and creatively addressing the barriers that prevent adoption of new professional standards.<sup>5–7</sup> The effective translation of clinical evidence into practice is one of the greatest challenges to evidence-based medicine.<sup>5</sup> The combination of rapidly increasing knowledge and the many barriers to changing provider practices has resulted in a widening gap between what is known and what is done.<sup>8</sup>

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Current approaches to effective translation of clinical evidence into practice include journal article repositories, discussion boards, and other online asynchronous learning methods. Online learning has become a popular adjunct to other learning modalities due in part to its asynchronous nature, where depth and timing of participation is determined by the learner.<sup>9</sup> Discussion boards have become one method of online asynchronous learning that facilitate active learning and participation. In contrast with traditional journal clubs, where those who worked overnight may be physically present but too fatigued to have meaningful participation at a specific date and time,<sup>10</sup> online learners may determine what, when, and where to learn.<sup>11</sup> This gives all participants a chance to maximize their efficient participation.

Graduates of medical education programs need to have good lifelong learning habits in order to keep up with this ever-changing environment and provide optimal patient care. We sought to answer the question: can an online discussion board containing an “article of the week” chosen from The American College of Emergency Physicians’ “Top Articles of 2010”<sup>12</sup> facilitate journal reading and knowledge transfer in emergency medicine residents? We hypothesized that an online repository of best practice articles in conjunction with a discussion board would aid in the frequency of journal article reading by emergency medicine residents.

## Materials and methods

Institutional review board exemption was obtained for this curriculum, and all staff received human subjects training. All residents in the Department of Emergency Medicine at the University of Arizona were eligible to participate. There were 70 potential participants and no specific exclusion criteria. It was explained that this was a voluntary curriculum, with no negative consequences for not participating. The residents who participated were recruited with an announcement in weekly didactic conference and followed up with a short email explaining the purpose and methods of the study. Forty residents returned a signed consent form.

An article repository (<http://reserves.ahsl.arizona.edu/eres/coursepage.aspx?cid=545>) was created from the “Top Articles of 2010,”<sup>12</sup> a lecture given by Professor Corey Slovis at the scientific assembly of the American College of Emergency Physicians.<sup>12</sup> This included a total of 35 original research articles after exclusion of policy statements and editorials. The coinvestigators each read one quarter of the chosen articles and answered three questions agreed upon

by the investigators a priori: What question does this study address? What does this study add to our knowledge? How might this change clinical practice? These questions stemmed from the *Annals of Emergency Medicine* editors capsule. To ensure internal reliability, we exchanged responses to the above three questions, and any edits were agreed upon and incorporated.

A discussion board was created on the Arizona Health Science Library website. An article from the American College of Emergency Physicians’ “Top Articles of 2010” list was posted weekly each Monday for 16 weeks with the above three questions (Table 1). After posting, an email was sent to the resident participants notifying them that the article of the week had been uploaded. Resident participants who logged into the site were provided with an easy link to an electronic full-length version of the article. After reading, they answered the above questions via a thread on the discussion board, and had the option to comment on other residents’ answers. The coinvestigator in charge of posting the article of the week monitored the discussion board to ensure that unprofessional comments were not entered onto the university discussion board. Each Friday, one of the coinvestigators posted our answers to the above questions for participant review.

A survey was developed by one of the coinvestigators with postgraduate training in education and survey development before initiation of this curriculum. It was reviewed and agreed upon by all investigators involved. At the conclusion of the project, the survey was distributed to all 40 residents who originally signed consent. It addressed facilitation of knowledge translation via an online discussion board with linked journal article repository and perceived obstacles and barriers of incorporating journal reading into resident life. A qualitative analysis of free response questions was undertaken, using line-by-line analysis<sup>13</sup> until thematic saturation was obtained. Statistical analysis was done using Stata version 12 software (Statacorp, College Station, TX, USA). Means were evaluated and comments were tabulated.

## Results

The study was conducted between August 2011 and January 2012. The study was concluded at 16 weeks due to low participation rates. During this time period, 40 emergency medicine residents consented and participated. Eighty percent (32/40) of the consented participants completed a post-study survey, which also contained questions about precurriculum study habits. The training levels of these residents were

**Table 1** Weekly list of articles from "Top Articles of 2010"<sup>12</sup> lecture

Week of project	Article
1	Friedman BW, Solorzano C, Esses D, et al. Treating headache recurrence after emergency department discharge: a randomized controlled trial of naproxen versus sumatriptan. <i>Ann Emerg Med.</i> 2010;56(1):7–17.
2	McCormack RF, Hutson A. Can computed tomography angiography of the brain replace lumbar puncture in the evaluation of acute-onset headache after a negative noncontrast cranial computed tomography scan? <i>Acad Emerg Med.</i> 2010;17(4):444–451.
3	Stiell I, Clement CM, Perry JJ, et al. Association of the Ottawa Aggressive Protocol with rapid discharge of emergency department patients with recent-onset atrial fibrillation or flutter. <i>CJEM.</i> 2010;12(3):181–191.
4	Cavus E, Kieckhafer J, Doerges V, Moeller T, Thee C, Wagner K. The C-MAC videolaryngoscope: first experiences with a new device for videolaryngoscopy-guided intubation. <i>Anesth Analg.</i> 2010;110(2):473–477.
5	Hakim SM. Cosyntropin for prophylaxis against postdural puncture headache after accidental dural puncture. <i>Anesthesiology.</i> 2010;113(2):413–420.
6	Lessler AL, Isserman JA, Agarwal R, Palevsky HI, Pines JM. Testing low-risk patients for suspected pulmonary embolism: a decision analysis. <i>Ann Emerg Med.</i> 2010;55(4):316–326. e1.
7	Maassen R, Lee R, Hermans B, Marcus M, van Zundert A. A comparison of three videolaryngoscopes: the Macintosh laryngoscope blade reduces, but does not replace, routine stylet use for intubation in morbidly obese patients. <i>Anesth Analg.</i> 2009;109(5):1560–1565.
8	Rao PM, Rhea JT, Novelline RA, Mostafavi AA, McCabe CJ. Effect of computed tomography of the appendix on treatment of patients and use of hospital resources. <i>N Engl J Med.</i> 1998;338(3):141–146.
9	Bobrow BJ, Ewy GA, Clark L, et al. Passive oxygenation insufflation is superior to bag-valve-mask ventilation for witnessed ventricular fibrillation out-of-hospital cardiac arrest. <i>Ann Emerg Med.</i> 2009;54(5):656–662. e1.
10	Decousus H, Quééré I, Presles E, et al; POST (Prospective Observational Superficial Thrombophlebitis) Study Group. Superficial venous thrombosis and venous thromboembolism: a large, prospective epidemiologic study. <i>Ann Intern Med.</i> 2010;152(4):218–224.
11	Goyal N, Miller JB, Sankey SS, Mossallam U. Utility of initial bolus insulin in the treatment of diabetic ketoacidosis. <i>J Emerg Med.</i> 2010;38(4):422–427.
12	Lambert L, Brown K, Segal E, Brophy J, Rodes-Cabau J, Bogaty P. Association between timeliness of reperfusion therapy and clinical outcomes in ST-elevation myocardial infarction. <i>JAMA.</i> 2010;303(21):2148–2155.
13	Simpson PM, Goodger MS, Bendall JC. Delayed versus immediate defibrillation for out-of-hospital cardiac arrest due to ventricular fibrillation: a systematic review and meta-analysis of randomized controlled trials. <i>Resuscitation.</i> 2010;81(8):925–931.
14	Wang HE, Simeone SJ, Weaver MD, Callaway CW. Interruptions in cardiopulmonary resuscitation from paramedic endotracheal intubation. <i>Ann Emerg Med.</i> 2009;54(5):645–652.
15	Weisfeldt ML. In CPR, less may be better. <i>N Engl J Med.</i> 2010;363(5):481–483.
16	Liu L, Tanigawa K, Kusunoki S, et al. Tracheal intubation of a difficult airway using Airway Scope, Airtraq, and Macintosh laryngoscope: a comparative manikin study of inexperienced personnel. <i>Anesth Analg.</i> 2010;110(4):1049–1055.

15.6% (5/32) postgraduate year (PGY)-3, 40.6% (13/32) PGY-2, and 40.6% (13/32) PGY-1. One emergency medicine fellow was also involved in the study (1/32, 3.13%).

Prior to this project, most participants reported reading unassigned medical material once a week (26/32, 81.25%). Only 6.25% read daily (2/32), whereas 12.5% (4/32) reported never reading unassigned material.

During the study time frame, most participants reported that they read and completed an article summary on the discussion board once or twice (23/32, 71.9%). Only three participants were involved almost every week (3/32, 9.4%) whereas 15.6% (5/32) reported participating at least once a month. This is consistent with our observed resident participation on the discussion board.

Concerning the amount of time spent on the study articles, the majority of residents (56.3%) reported spending less than 10 minutes reading the articles and posting on the

discussion board (18/32). Of the remaining participants, 37.5% (12/32) spent 10–30 minutes per week, 6.25% (2/32) spent 30–60 minutes per week, and none spent more than 60 minutes per week reading the article and discussing them.

**Table 2** Barriers to weekly journal article reading and discussion board participation

	Frequency (%)
Lack of time	20/32 (62.5)
Logging on is a problem	7/32 (21.88)
Forget to participate	6/32 (18.75)
Not enough time per article	3/32 (9.38)
Busy studying for boards/in-service	2/32 (6.25)
Poor discussion board	2/32 (6.25)
Bad articles	1/32 (3.13)

**Note:** Eighty percent (32/40) of the consented participants completed the post-study survey.

Participants cited a number of reasons for difficulty participating in the study and reading the articles (Table 2). The most frequent of these included lack of time (20/32, 62.5%), problems with logging onto the discussion board (7/32, 21.9%), and forgetting to participate (6/32, 18.8%).

When specifically evaluating the ease of use of the discussion board, 25% (8/32) of participants noted either issues with logging on, or that the discussion board itself was poor.

The comments about what the participants liked about the program are summarized in Table 3. The most frequent of these were that the articles were clinically relevant (16/32, 50%), that the participants liked the structure of the program (8/32, 25%), and that the articles were all high-impact (7/32, 21.9%). Many participants (22/32, 68.8%) noted the quality of the articles to be good.

## Discussion

We conducted this study to facilitate knowledge translation about the American College of Emergency Physicians' "Top Articles of 2010" and instill lifelong learning qualities in our residents. We were largely unsuccessful at increasing incorporation of weekly journal article reading into the busy schedule of emergency medicine residents. According to our post-study survey, this is likely due to perceived lack of time, difficulty with our Arizona Health Science Library discussion board, and forgetting to participate. This may or may not be generalizable to other discussion boards.

This online article repository was in addition to a monthly mandatory emergency medicine journal club where residents are required to read two journal articles. This mandatory journal club focuses on analyzing and critiquing core emergency medicine medical literature, not current best practice articles. Only two emergency medicine residents and one faculty member prepare for and facilitate each

**Table 3** Advantages to weekly journal article reading and discussion board participation

	Frequency (%)
Clinically relevant articles	16/32 (50.0)
Liked the structure	8/32 (25.0)
High impact articles	7/32 (21.9)
Liked the reading	3/32 (9.4)
Would be better later in career	1/32 (3.1)
Liked the ease	1/32 (3.1)
Exposure	1/32 (3.1)
Web-based	1/32 (3.1)

**Note:** Eighty percent (32/40) of the consented participants completed the post-study survey.

session, although other faculty members often attend the didactic session. We do not currently have a mechanism to track actual resident preparatory journal article reading, but now plan future monitoring. Participation in this mandatory journal club could be similar to the rate of participation in our voluntary online discussion board.

Our barriers to participation were similar to those found in a study of electronic journal club for surgery residents.<sup>10</sup> However, we had a much lower participation rate. This is surprising because most surgical programs have a much more arduous schedule compared with emergency medicine. This surgical study, although reporting essentially voluntary participation, had threats of remedial action for nonparticipation, although they were never acted upon. A learning contract may have increased our participation rate, and was planned in our original study model, but was not approved by our institution's institutional review board.

Despite most participants finding the articles useful, we still only had a minimal participation rate. The low acceptance rate by residents of this educational endeavor may indicate that they are not adult learners, still need a set of requirements, and must be taught the value of lifelong learning strategies. A subsequent study could look further into the cited barriers and obstacles that the residents identified during this study and minimize their effect on weekly journal article reading. Along with this, we plan to query the residents about learning style preferences.

## Limitations

Overall, we had a lower participation rate than we expected or wanted. Our small sample size limits the generalizability of our results, and is a significant limitation of this study. However, we had a high percentage of post-curriculum survey participation.

Our hope was that providing a web-based, asynchronous platform with links to high-impact, full-length emergency medicine articles would encourage residents to read. However, the discussion board was not perceived to be user-friendly, and logging into the discussion board was a major limitation. We would like to incorporate a more user-friendly discussion board on our residency website which is currently under development. This may eliminate some of the technical problems that we encountered.

Although we surveyed residents at the conclusion of this curriculum about baseline study habits, this may have introduced recall bias. Our next journal club repository will incorporate a before and after survey about study patterns

to assess better whether this new educational tool aids in reading frequency.

Journal articles were posted weekly on the Arizona Health Science Library discussion board. This did not take into account residents' call schedules, number of clinical shifts, family events, or vacations. This may have also contributed to decreased participation.

We included one fellow in our study. The impact of including the fellow in our data analysis was not considered prior to curriculum initiation. However, this may have introduced error in our results because fellows may have different educational motivations.

## Conclusion

Residents have busy schedules, and finding time to read journal articles is difficult. Barriers to frequent journal reading cited by the residents included lack of time, problems with the discussion board, and forgetting to participate. Even when provided with a directly accessible link to a high-impact weekly article, reminder email, and feedback on their conclusions, residents did not participate in voluntary weekly reading activities.

## Disclosure

The authors report no conflicts of interest in this work.

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