Dissemination of Quality-of-Care Research Findings to Breast Oncology Surgeons

By Stacey Shiovitz, MD, Ashley Gay, BA, Arden Morris, MD, MPH, John J. Graff, MS, PhD, Steven J. Katz, MD, MPH, and Sarah T. Hawley, MPH, PhD

Department of Internal Medicine, Division of General Medicine; Department of Surgery, University of Michigan, Ann Arbor; Ann Arbor Veteran's Health Care System, Ann Arbor, MI; Cancer Institute of New Jersey and Robert Wood Johnson Medical School, New Brunswick, NJ

Abstract

Purpose: In this era of rapidly evolving clinical knowledge, clinicians need to be aware of current research and how it might affect their practice. The Internet is a widely available, underassessed tool for providing this information. In this two-phase pilot study, a novel Web site (www.cansortsurgeons.org) was developed to specifically disseminate relevant clinical information to community breast oncology surgeons.

Methods: The first phase targeted a sample of community surgeons identified from Surveillance, Epidemiology, and End Results catchment areas in Los Angeles, CA and Detroit, MI. The second phase broadened availability by linking the site through the American College of Surgeons (ACoS) Commission on Cancer (CoC) homepage. An eight-question, Web-based survey was used to obtain feedback regarding the Web site's utility and potential application to clinical practice. Journal continuing medical education credit was also offered through ACoS.

Results: For phase 1, of the 315 community surgeons invited to view the site, 114 (36%) participated in the study and 98 (86%) responded to the survey. Overall, there was a strongly supportive response, with 79 (81%) recommending the site to other clinicians. For phase 2, of the 516 site hits, 411 came from the ACoS site. Only 10 individuals completed the survey during this phase, but all positively endorsed the utility of the site.

Conclusion: The implication for clinical practice is that the Internet is a useful tool for providing relevant clinical research to providers. In the future, this could be tailored to an individual's needs, aiding synthesis and, hopefully, improving the quality of clinical care.

Introduction

With approximately 30,000 biomedical journal articles published every year, a physician would need to read 19 original articles daily to keep up to date in their specialty.[1] Dissemination science offers a way to bridge the gap between published research and clinical practice.[2] According to the National Cancer Institute, dissemination science can be defined as "the targeted distribution of information and intervention materials to a specific public health or clinical practice audience."[3(p2)] Although most research in this area has focused on disseminating evidence-based interventions into clinical practice,[4] there is a clear and unmet need to disseminate research findings effectively to their intended clinical audience.

The Internet has emerged as a new modality for dissemination of health-related information to both patients and providers.[5] Provider-targeted Web sites contain important information about a variety of clinical issues but often do not include comprehensive published research results that providers may wish to understand or apply to their own practice. As a method for disseminating research findings to clinicians, Web sites have the advantage of being easily updatable and offering wider access than printed materials, including specific links or tailored data for those seeking more information. Despite these advantages, few studies have focused on developing and evaluating Web sites specifically designed for structured dissemination of research findings.

Breast cancer treatment represents an area in which dissemination of current research findings could have a positive impact on clinical practice. Breast oncology is clinically complex and subject to frequent refinement. Without a structured method for disseminating relevant research, community surgeons and even high-volume or academic breast surgeons might be challenged to keep pace with the evolving field. We aimed, therefore, to develop and evaluate a Web site that could be used to disseminate research findings related to the quality of breast cancer care directly to community breast oncology surgeons. Phase 1 of the study had two objectives: (1) to analyze the usefulness of an informative Web site for dissemination of current literature on breast cancer to community surgeons, and (2) to evaluate their perspectives on the value of this information in affecting practice patterns. In phase 2 of the study, we partnered with the American College of Surgeons Commission on Cancer (ACoS CoC) to make our Web site available to users of the ACoS CoC Web site, specifically to evaluate the effect of a broader dissemination strategy on use of our Web site by surgeons.

Methods

Web Site Development

The Cancer Surveillance and Outcomes Research Team (CanSORT), based at the University of Michigan, developed a Web site (www.cansortsurgeons.org) with the purpose of disseminating breast cancer quality-of-care research to community surgeons who might not otherwise have direct and comprehensive access to such information. This site was developed by working with the Center for Health Communications Research at the University of Michigan, a National Cancer Institute–funded Center of Excellence in Cancer Communication Research, from May to December 2008, and with the support of ACoS CoC. The Web site was created to disseminate research findings across six categories related to the quality of breast cancer treatment: policy, patient experiences, treatments, surgeon perspectives, quality of life, and disparities. The content included published CanSORT articles related to each category, as well as 2008, 2009, and 2010 CanSORT abstracts presented at the ASCO annual meeting. The Web site was limited to CanSORT manuscripts, as obtaining author and journal permissions for other manuscripts was deemed beyond a reasonable scope for this pilot project.

The Web site was specifically designed to be engaging for community surgeons. For each selected article, the lead authors highlighted the noteworthy conclusions. The Web site then presented this information to surgeons in an interactive question-and-answer format. By means of text bubbles that appeared when contacted by the cursor, the viewer was able to interact with specific areas of interest. For example, under the topic Treatment, pointing the cursor to the question "What factors are associated with patients' choice of mastectomy for treatment of early stage breast cancer?" caused a text bubble with bullet-point answer statements to open. Those who were interested could then view key figures and/or tables recreated from the original article, again with pop-up highlighted details, or download the full-text journal article. Copyright permissions were obtained from all journals in which articles were published. Screenshots of the Web site are presented in Appendix Figures A1 and A2 (online only).

To encourage surgeons to log in to the Web site, continuing medical education (CME) credit was offered through ACoS for reading and answering questions about two different articles (one journal CME per article) during phase 1. Each page of the Web site included a survey button encouraging providers to complete an eight-question survey of the Web site. For phase 2, a link to the designed Web site was placed on the ACoS CoC Web site without a log-in requirement. The content of the Web site remained identical, except that two additional CME credits were made available. This two-phase approach allowed us to compare two approaches for disseminating cancer quality of care information.

Measures

There were two primary outcomes of interest for phase 1: (1) the number of surgeons who logged in among those invited to the site and (2) the responses to the Web site survey. The measures used in the survey were developed by CanSORT breast oncology clinicians, social scientists, and health services researchers. The survey was kept extremely short to encourage participation. The first seven questions were designed to reflect the degree to which the Web site could potentially affect practice patterns, and took the following form: I am likely to 1) . . . use the information from the journal articles related to patients' treatment utilization in my practice, 2) . . . use the information from the figures related to patients' treatment utilization in my practice; It is important for surgeons like myself to have access to data about 3) . . . breast cancer patients' treatment utilization patterns, 4) . . . patient experiences, 5) . . . perspectives of other surgeons; 6) It is important to disseminate breast cancer research to surgeons; and 7) Overall, the look and feel of the Web site is appealing. These questions were answered on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree" but were evaluated as both continuous (five-category) measures and recategorized dichotomous measures ("strongly/somewhat agree" *v* other). An eighth question asked surgeons to indicate how strongly they would recommend the Web site to another surgeon caring for patients with breast cancer on a 5-point scale ranging from "not at all" to "very much." The responses were categorized into "very much" versus "other." Surgeons were also able to write in open-ended comments.

The primary outcomes for phase 2 were the number of visits to the Web site that came via the ACoS CoC parent site, as well as the responses to the survey items for those who completed the survey. A secondary goal for each phase was to evaluate which parts of the site were visited most often.

Study Design: Phase 1

Surgeon recruitment. We identified 315 surgeons caring for patients with breast cancer in catchment areas of the Detroit, MI and Los Angeles, CA Surveillance, Epidemiology, and End Results (SEER) registries. Surgeons were identified from their participation in prior CanSORT research (7/2005-2/2007), from which we had information about their demographic and practice characteristics.[6,7] Starting in January 2009, the Detroit surgeons (n = 128) were mailed an introductory letter from the SEER and CanSORT team with information about the Web site, an anonymous log-in ID card, and a stipend of $10. Surgeons who did not log in to the Web site were sent a reminder by fax at 2 and 4 weeks after the initial mailing. In April, the same procedures were followed for Los Angeles surgeons (n = 190). In November, the SEER study leaders called surgeons who had not logged in as a final attempt to encourage participation before study closure in December 2009.

Data management and analysis. A data file comparing participants to nonparticipants was created by using the surgeons' survey data from the previous study. The two groups were compared on selected characteristics, including volume of breast cancer in their overall practice, sex, and number of years in practice. χ^2 tests were used for categorical variables and *t* tests for continuous variables.

The remainder of the analysis was done only for those who participated in the study and responded to the eight-question survey (98 of those who participated). Those who participated but did not fill out the survey were not included in the analysis. We described the means and standard deviations of each of the survey questions and generated frequencies of the dichotomous versions of the variables. We used χ^2 tests to compare responses to each of the eight questions according to volume of patients with breast cancer, sex, and number of years in practice. Finally, we tabulated the page hits for each component of the Web site and ranked their frequency from highest to lowest.

Study Design: Phase 2

The Web site was made available through the ACoS CoC home page on April 1, 2010. Since then, we have collected the total number of unique hits filtered through their homepage as well as the survey answers from those who visited the site. As in phase 1, we generated descriptive statistics from the survey and tabulated the frequency of hits to the different components of the site. We cannot ensure that all the unique hits to the publicly available version of the site were from surgeons. By tabulating data only from those who entered our site via the ACoS CoC homepage, however, we increased the likelihood that this was the case.

Results

Phase 1

Objective 1. Of the 315 community surgeons solicited by mail, 114 (36%) participated in the study and 98 (86%) responded to the survey. Six people submitted the survey without answering any questions and were grouped into the nonresponder category. Table 1 compares those surgeons who logged in with those who did not. Compared with nonparticipants, participants were more likely to have higher volumes of breast cancer (18% *v* 9% $P = .002$), less likely to be male (74% *v* 86%, $P = .001$), and trended toward fewer years in practice (17.3 *v* 19.3 years, $P = .115$). There were no differences by race/ethnicity. Of note, among participants, low- and moderate-volume surgeons visited the Web site more often than higher volume surgeons (34% and 48% *v* 18%, respectively). Participants also reported university affiliation less often than nonparticipants.

Objective 2. Of the 98 survey respondents, 79 (81%) would recommend or strongly recommend this Web site to other clinicians providing care to patients with breast cancer. Seven (7%) of those who completed the survey did not respond to this question. Results of the survey participant answers to the remaining seven questions are summarized in Figure 1. Overall, there was a very positive response to the purpose of the Web site. Ninety-four percent of surgeons agreed (72% strongly) with the importance of dissemination of breast cancer information to surgeon providers. When addressing specific areas of value, 85% of participants agreed or strongly agreed with the importance of access to data about treatment utilization patterns, and 89% to data about patients' experiences. There was slightly less of a perceived need for access to data about the perspectives of other breast cancer surgeons, with 80% agreeing or strongly agreeing to this point. Specifics of the Web site were slightly less clear: 68% found the overall style of the Web site to be appealing, 64% were likely to use the information from the journal articles in practice, and 58% thought they would use the information from the figures.

Open-ended comments. Survey responders were given the opportunity to write in comments and recommendations for surveillance data that were not included in the Web site. Only a minority of responders (15 of 98; 15%) responded to this question. Suggested areas of expansion included age-related decision making, breast cancer in the setting of other comorbidities, and links to published guidelines. One responder commented that "Quality of life, communication issues and so on [were] the best [topic areas]. Most helpful to me is the information that patients will tell you, but are afraid to tell us." Another stated that, "I primarily do breast cancer surgery and find these articles supportive of my experiences but [they] also spur me to look at my cancer center's statistics and add future research in this arena."

CME use. Unexpectedly, only six surgeons elected to pursue CME credit. On the other hand, one participant commented in the survey that they would be more likely to use the site if there was more CME credit offered. A limitation to obtaining CME credit was that the question answers had to be printed and mailed in rather than submitted electronically.

Web site usage data. We tabulated the total number of hits to the different pages of the Web site (Figure 2). The Patient Treatment Experiences page was the first most frequently visited, followed by the Surgeon Perspectives on Breast Cancer Treatment page. The third most visited was the ASCO Abstracts page.

Phase 2

During the time the Web site was made publicly available (launch April 1, 2010 through study end date October 1, 2010) there were 516 hits; 411 of these came via the ACoS CoC homepage. Although the site received a lot of traffic via the ACoS homepage, only 10 users completed the survey. All responders agreed or strongly agreed that it was important to disseminate the type of information on the Web site to surgeons caring for patients with breast cancer patients. The tabulation of page usage data revealed slightly different patterns of page hits than were found during phase 1. The most frequently visited pages were Breast Cancer Treatment Patterns, followed by Patient Treatment Experiences, and then Surgeon Perspectives. Figure 2 compares the most frequently visited pages for the two phases.

Discussion

Our results have important implications for disseminating research findings directly to key providers through a clinician-focused Web site. Our study was designed to assess the ability of such a Web site to potentially affect clinical practice. As such, our study is able to answer the question, "If you build it, will they come?" The results of the first, more active phase of this study suggest that surgeons in the community will indeed come and engage with this type of Web site, with 36% of the study group logging in after receiving our mailed invitation. The fact that low- and moderate-volume surgeons, and those without a university affiliation, logged in more often than their counterparts suggests that our Web site was engaging the very type of provider to whom it was directed. Moreover, although the majority of surgeons did report a university affiliation, our prior

Table 1. Comparison of the Characteristics of Participants Who Logged on to the Web Site With Nonparticipants

	Participants (n = 117)		Nonparticipants (n = 201)		
Characteristic	**No.**	**%**	**No.**	**%**	***P***
Mean age, years	50.1		53.1		.017
Sex, No. male	86	74*	173	86	.001
Race, No. white	76	64	123	62	.628
Location, Detroit *v* Los Angeles	53	44	75	37	.161
Mean No. of years in practice	17.3		19.3		.115
Breast surgery volume, % of practice					
Low: 0%–15%	40	34	107	53	.002
Moderate: 16%–50%	56	48	76	38	
High: 51%–100%	21	18	18	9	
University affiliation	87	74	162	81	.193

* Four responders did not have available sex information.

work has found that nearly half also report practicing in a community hospital.[8] Those who logged in had a very positive response to the concept of Web-based research dissemination. They were supportive of the need to have access to published data regarding treatment practices and patient experiences. In the second, more passive phase of the study, the site received more than 500 hits, 411 of these via the ACoS CoC homepage. Although few of these users completed the survey, the usage data revealed that many of the pages were of interest to those visiting the site. Of note, in this phase, the ASCO abstracts and study figures were viewed more often, suggesting a slightly different target audience.

As the volume of scientific discovery rapidly expands, so does the burden on providers to stay current with this information. To date, the best example of attempts to disseminate research findings to clinicians in a standardized fashion has been practice guidelines.[9-13] Although numerous guidelines are available for use by physicians, there has been minimal formal evaluation of their impact on provider outcomes.[14] Importantly, there has been little assessment of alternative methods for disseminating specific research findings to providers[3,9,10,15] and whether such methods might be more effective than practice guidelines. In an editorial on bridging the gap between scientists and decision makers, Choi et al[16] suggest that there should be less effort spent on the generation of scientific data and more effort on translating the data into a product that can be effectively used by decision makers. O'Donnell[17] similarly contends that effective dissemination of scientific research depends on the ability to synthesize and tailor information to meet the needs of a specific target population. By disseminating research findings about the quality of breast cancer care through an engaging, easy-to-use Web site, we produced an innovative product that can be readily used by oncology surgeons in their clinical practice.

Surprisingly, there has been little prior work on using the Internet to disseminate quality-of-care information to providers with which to compare our results. A review of various dissemination methods intended to have a positive impact on provider behavior found that passive dissemination, such as mailing of materials, did not affect provider attitudes or change their behavior.[18] Our Web site was specifically designed not to passively disseminate research findings, but rather to connect directly with clinicians through the use of pop-up windows,

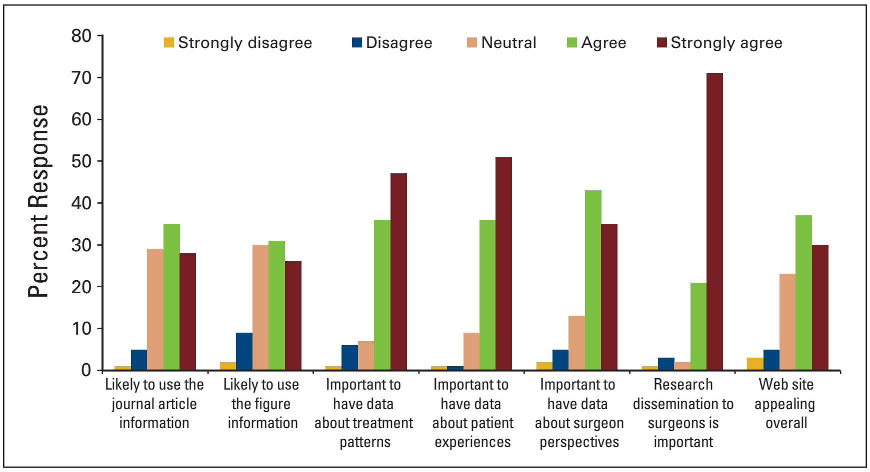

Figure 1. Participant answers to the Web site survey in phase 1.

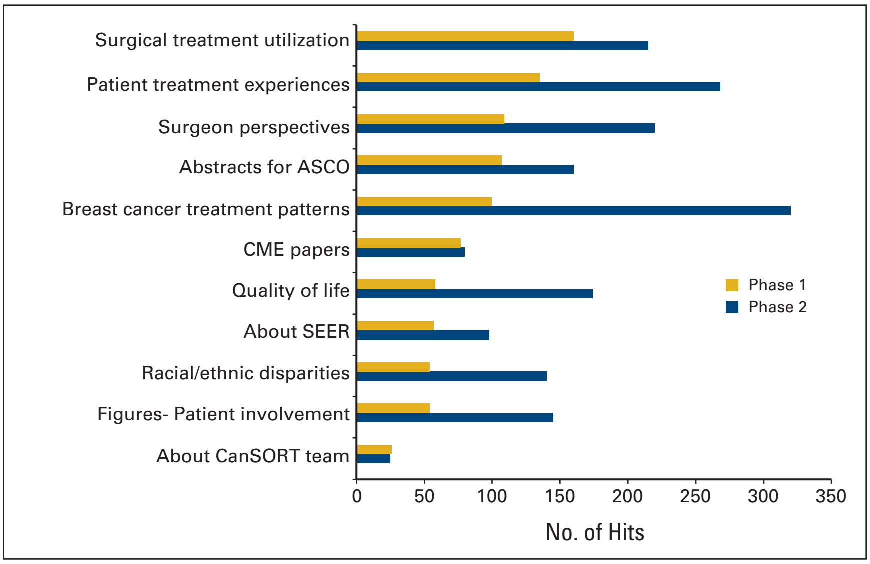

Figure 2. Frequency of page hits, by phase and page title. CME, continuing medical education; SEER, Surveillance, Epidemiology, and End Results; CanSORT, Cancer Surveillance and Outcome Research Team.

selected figures and tables, listing of key and recent abstracts, and the offer of CME credit.

A logical next step would be to allow surgeons to modify site content on the basis of their areas of expertise, interests, or gaps in knowledge. This approach would be more likely to have an impact on the quality of their clinical practice, as the information would be specifically tailored to the questions and/or characteristics of the users. Such a tailored approach could be likened to audit/feedback types of quality improvement metrics, which have been shown to be effective for changing provider behavior in multiple previous studies across various disease conditions and issues. Customizing the information delivered to users of a Web site such as ours would greatly increase the site's potential to affect clinical practice, in terms of changing both surgeons' attitudes and their behaviors. Furthermore, engaging community surgeons with individualized clinical information may stimulate interest in future research projects and increase participation.

Our pilot study has some limitations that need to be addressed. First, the selected sample of surgeons in phase 1 may not be representative of all breast cancer surgeons or of other types of providers. The hope, however, was to target community-based surgeons because they are not necessarily working in an environment that lends itself to keeping up with current practice developments. Second, the participation rate for those invited to view the site was 36%. However, compared with other studies that asked individuals to log in to a specific site, this rate could be considered high.[19-22] Finally, directly evaluating the impact of the Web site on clinical care was beyond the scope of this pilot study.

There is considerable money spent on the generation of important scientific information, yet little attention is paid to how best to disseminate this research to those most likely to use it.[16] Our results suggest that the Internet can be an effective tool for disseminating cancer quality-of-care research to clinicians in the community. Additional research is needed to determine how the results of this approach might be translated into everyday clinical practice.

Accepted for publication on January 14, 2011.

Acknowledgment

Supported by a supplement to National Institutes of Health (NIH) Grant No. R01 CA088370 to the University of Michigan to support dissemination of cancer surveillance research.

Previously presented at the third Annual NIH Conference on the Science of Dissemination and Implementation: Methods and Measurement, March 15-16, 2010, Bethesda, MD.

Authors' Disclosures of Potential Conflicts of Interest

The authors indicated no potential conflicts of interest.

Author Contributions

Conception and design: Stacey Shiovitz, Steven J. Katz, Sarah T. Hawley

Financial support: Steven J. Katz, Sarah T. Hawley

Administrative support: Ashley Gay, Steven J. Katz, Sarah T. Hawley

Provision of study materials or patients: John J. Graff, Steven J. Katz, Sarah T. Hawley

Collection and assembly of data: Stacey Shiovitz, Ashley Gay, John J. Graff, Sarah T. Hawley

Data analysis and interpretation: Stacey Shiovitz, Ashley Gay, Arden Morris, Sarah T. Hawley

Manuscript writing: Stacey Shiovitz, Arden Morris, Steven J. Katz, Sarah T. Hawley

Final approval of manuscript: Stacey Shiovitz, Ashley Gay, Arden Morris, John J. Graff, Steven J. Katz, Sarah T. Hawley

Corresponding author: Sarah T. Hawley, 300 N. Ingalls Building, Room 7C27, Ann Arbor, MI 48109; e-mail: sarahawl@med.umich.edu.

DOI: 10.1200/JOP.2010.000195

References

1. Choi BC: Understanding the basic principles of knowledge translation. J Epidemiol Community Health 59:93, 2005

2. Kerner J, Rimer B, Emmons K: Dissemination research and research dissemination: How can we close the gap? Health Psychol 24:443-446, 2005

3. Bowen DJ, Sorensen G, Weiner BJ, et al: Dissemination research in cancer control: Where are we and where should we go? Cancer Causes Control 20:473-485, 2009

4. Glasgow RE, Lichtenstein E, Marcus A: Why don't we see more translation of health promotion research to practice? Rethinking the efficacy to effectiveness transition. Am J Public Health 93:1261-1267, 2003

5. Fitch MI, Nicoll I, Keller-Olaman S: Breast cancer information dissemination strategies–finding out what works. Can Oncol Nurs J 17:206-218, 2007

6. Katz SJ, Morrow M, Hawley ST, et al: Coordinating cancer care: Patient and practice management processes among surgeons who treated breast cancer. Med Care 48:45-51, 2010

7. Katz SJ, Hawley ST, Abrahamse P, et al: Does it matter where you go for breast surgery? Attending surgeons influence on variation in receipt of mastectomy for breast cancer. Med Care 48:892-899, 2010

8. Katz SJ, Lantz PM, Janz NK, et al: Surgeon perspectives about local therapy for breast carcinoma. Cancer 104:1854-1861, 2005

9. Grimshaw J, Eccles M, Thomas R, et al: Toward evidence-based quality improvement. Evidence (and its limitations) of the effectiveness of guideline dissemination and implementation strategies 1966-1998. J Gen Inter Med 21:S14-S20, 2006

10. Grimshaw JM, Thomas RE, MacLennan G, et al: Effectiveness and efficiency of guideline dissemination and implementation strategies. Health Technol Assess 8:iii-iv, 1-72, 2004

11. Moorjani P, Fortnum H: Dissemination of information to general practitioners: A questionnaire survey. BMC Fam Pract 5:27, 2004

12. Wensing M, van der Weijden T, Grol R: Implementing guidelines and innovations in general practice: Which interventions are effective? Br J Gen Pract 48:991-997, 1998

13. Kryworuchko J, Stacey D, Bai N, et al: Twelve years of clinical practice guideline development, dissemination and evaluation in Canada (1994-2005). Implement Sci 4:49, 2009

14. Cabana MD, Rand CS, Powe NR, et al: Why don't physicians follow practice guidelines? A framework for improvement. JAMA 282:1458-1465, 1999

15. Farmer AP, Legare F, Turcot L, et al: Printed educational materials: Effects on professional practice and health care outcomes. Cochrane Database Syst Rev 3:CD004398, 2008

16. Choi BCK, McQueen DV, Rootman I: Bridging the gap between scientists and decision makers. J Epidemiol Community Health 57:918, 2003

17. O'Donnell MP: Synthesis and dissemination of research findings: A critical next step in the evolution of health promotion. Am J Health Promot 18:iv-v, 2004

18. Bero LA, Grilli R, Grimshaw JM, et al: Closing the gap between research and practice: An overview of systematic reviews of interventions to promote the implementation of research findings. BMJ 317:465-468, 1998

19. Mathys J, Steurer J: Evaluation of an Internet site on evidence-based medicine. Praxis 89:1700-1706, 2000

20. Olivieri JJ, Knoll MB, Arn PH: Education format and resource preferences among registrants of a pediatric-focused CME website. Med Teach 31:e333-e337, 2009

21. Greenlaw C, Brown-Welty S: A comparison of web-based and paper-based survey methods: Testing assumptions of survey mode and response cost. Eval Rev 33:464-480, 2009

22. Kongsved SM, Basnov M, Holm-Christensen K, et al: Response rate and completeness of questionnaires: A randomized study of Internet versus paper-and-pencil versions. J Am Int Res 9:e25, 2007

■ ■ ■