



Published in final edited form as:

*J Dent Educ.* 2013 February ; 77(2): 152–160.

## Information-Seeking Behaviors of Dental Practitioners in Three Practice-Based Research Networks

**Dr. Maria T. Botello-Harbaum, Ed.D., M.S.,**  
Outreach Manager, EMMES Corporation, Rockville, MD

**Dr. Catherine A. Demko, Ph.D.,**  
Associate Professor of Community Dentistry, School of Dental Medicine, Case Western Reserve University

**Dr. Frederick A. Curro, D.M.D., Ph.D.,**  
Executive Management Team, PEARL Network, and Director of Regulatory Affairs, Bluestone Center for Clinical Research, College of Dentistry, New York University

**Dr. D. Brad Rindal, D.D.S.,**  
Investigator and Clinician, Health Partners, Minneapolis, MN

**Mr. Damon Collie, M.S.H.S.,**  
PEARL Project Manager, EMMES Corporation, Rockville, MD

**Dr. Gregg H. Gilbert, D.D.S., M.B.A.,**  
Professor and Chair, Department of Clinical and Community Sciences, School of Dentistry, University of Alabama at Birmingham

**Dr. Thomas J. Hilton, D.M.D., M.S.,**  
Professor of Operative Dentistry, School of Dentistry, Oregon Health & Science University

**Dr. Ronald G. Craig, D.M.D., Ph.D.,**  
Executive Management Team, PEARL Network, and Associate Professor of Basic Sciences and Craniofacial Biology, College of Dentistry, New York University

**Dr. Juliann Wu, Ph.D.,**  
Biostatistician, EMMES Corporation, Rockville, MD, and PEARL Data Coordinating Center

**Dr. Ellen Funkhouser, Dr.P.H.,**  
Associate Professor, Department of Epidemiology, School of Public Health, University of Alabama at Birmingham

**Dr. Maryann Lehman, D.D.S., B.S.,**  
Executive Committee Member, PEARL

**Dr. Ruth McBride, Ph.D.,**  
Scientific Director, NW-PRECEDENT, Axio Research, LLC, Seattle, WA

**Dr. Van Thompson, D.D.S., Ph.D.,** and  
Executive Management Team, PEARL Network, and Professor and Chairman, Department of Biomaterials, College of Dentistry, New York University

**Dr. Anne Lindblad, Ph.D.**  
Vice President, EMMES Corporation, Rockville, MD, and PEARL Data Coordinating Center, The CONDOR Collaborative Group

## Abstract

Research on the information-seeking behaviors of dental practitioners is scarce. Knowledge of dentists' information-seeking behaviors should advance the translational gap between clinical dental research and dental practice. A cross-sectional survey was conducted to examine the self-reported information-seeking behaviors of dentists in three dental practice-based research networks (PBRNs). A total of 950 dentists (65 percent response rate) completed the survey. Dental journals and continuing dental education (CDE) sources used and their influence on practice guidance were assessed. PBRN participation level and years since dental degree were measured. Full-participant dentists reported reading the *Journal of the American Dental Association* and *General Dentistry* more frequently than did their reference counterparts. Printed journals were preferred by most dentists. A lower proportion of full participants obtained their CDE credits at dental meetings compared to partial participants. Experienced dentists read other dental information sources more frequently than did less experienced dentists. Practitioners involved in a PBRN differed in their approaches to accessing information sources. Peer-reviewed sources were more frequently used by full participants and dentists with fifteen years of experience or more. Dental PBRNs potentially play a significant role in the dissemination of evidence-based information. This study found that specific educational sources might increase and disseminate knowledge among dentists.

## Keywords

evidence-based dentistry; evidence-based practice; information-seeking behaviors; information sources; continuing dental education; dental practitioners; dentists; practice-based research networks

---

The term "information-seeking" is defined as the process of inquiry in which people purposefully engage to change their state of knowledge.<sup>1,2</sup> Previous research across numerous health disciplines has studied the information-seeking behaviors of a broad range of health providers.<sup>3-5</sup> The information-seeking sources available to and in use by health professionals, including dentistry, have diversified over the past years. Online databases (e.g., PubMed), continuing dental education (CDE), communication with colleagues, professional organizations, study clubs, and peer-reviewed journals have been reported as the most common evidence sources utilized by health professionals.<sup>6-9</sup> A study by Bennett et al. found that family physicians were more likely than specialists to search the Internet for patient-specific information, whereas specialists were more likely to use the Internet to access online journals, to conduct literature searches, to consult with colleagues, and to write prescriptions.<sup>7</sup> Whether information-seeking has an impact on provider-patient communication, patient health status, and quality of care remains an area of further inquiry, particularly in dentistry. A cross-sectional survey of dentists in northwest England found that when faced with clinical uncertainties, the most common sources of information were to consult their colleagues, a textbook, or an electronic database.<sup>10</sup> Those authors also found that 87 percent of dentists reported having changed their practice due to an article they had read.

There is limited information on how information-seeking behaviors explain changes in clinical practice, particularly in dentistry. Nonetheless, the barriers to access information sources among health professionals have been documented.<sup>11,12</sup> Variables such as credibility, relevance, access, speed, and ease are the main factors that clinicians consider when searching clinical information.<sup>11</sup> The translation of knowledge between discovery and implementation in dental practice could potentially be reduced by understanding the evidence-seeking behaviors of dental practitioners and how their learning process impacts

clinical practice.<sup>13,14</sup> Dental practice-based research networks (PBRNs) offer an ideal setting to incorporate dental advances and treatment decisions into dental practice while improving patient care at the same time.<sup>15,16</sup> The advantages of PBRNs have been well documented;<sup>15</sup> for instance, PBRN practitioner-investigators bring practice-relevant topics onto the research agenda and are engaged in the study development process.<sup>17,18</sup>

Little empirical evidence is available on the use of information sources to impact dental clinical practice and the treatment decisions of dental practitioners. From a diffusion of innovations perspective, knowing what, how, and the frequency dental practitioners access dental clinical information would provide a better understanding of how to increase the uptake of evidence-based dental research in dentistry.<sup>19</sup> This study complements the work of Straub-Morarend et al.<sup>20</sup> on the acquisition and utilization of scientific information to support clinical decision making. In addition, the work by Haj-Ali et al.<sup>21</sup> provides a context in which this type of study can be used to address specific clinical decisions related to dental procedures.

Our study examined the association among information-seeking behaviors according to dentists' years of experience and participation level in a PBRN. The study sought to 1) identify the dental journals frequently read by dental practitioners; 2) examine their access to sources of CDE and their preferred format to obtain dental information; and 3) describe the frequency of use and impact of these information sources on practice guidance. We hypothesized that dental practitioners fully involved in a PBRN will access more evidence-based sources of dental information than their counterparts who were less involved in a PBRN. Similarly, dental practitioners with more years of experience will access more evidence-based sources of information than those less experienced.

## Methods

Study participants were members of or associated with one of the three National Institute of Dental and Craniofacial Research (NIDCR)-funded dental PBRNs, known collectively as CONDOR (Collaboration on Networked Dental and Oral Health Research). Within the three networks, all 1,453 practitioner-investigators (P-Is) received an e-mail and/or invitation to complete the survey either online or on a printed version. A total of 950 dentists (65 percent response rate) completed the survey. Sixty-three percent came from the Dental Practice-Based Research Network (DPBRN), 22 percent from the Practice-Based Research Collaborative in Evidence-Based Dentistry (PRECEDENT), and 15 percent from Practitioners Engaged in Applied Research and Learning (PEARL). Of the sample, 24 percent (n=226) were inactive network members (not trained, no participation in studies or meetings) or were associated with a network but were not participating members prior to the completion of the survey. These practitioners served as a reference group. The study protocol was reviewed and approved by an independent panel advisory to the NIDCR and was approved or received a waiver from each network Institutional Review Board.

The information-seeking variables were obtained from a self-reported core questionnaire developed by the three networks to assess practice change over time. Five questions were used to assess the sources and influence of information sought by dental practitioners. The questionnaire was pre-tested for clarity and readability among all networks and revised accordingly. A test-retest design was used to assess the intra-rater reliability of fifty-four respondents on two separate occasions across the networks.<sup>22</sup> Overall, the information-seeking questions showed good agreement with an overall median kappa coefficient of 0.59 (interquartile range [IQR]=0.15). Kappa coefficients were calculated for these categories: peer-reviewed journals (median kappa=0.70; IQR=0.30); other non-peer-reviewed journals (median kappa=0.74; IQR=0.08); other types of dental publications (median kappa=0.58;

IQR=0.18); online CDE sources (median kappa=0.75; IQR=0.35); extent of influence of information sources for practice guidance (median kappa=0.58; IQR=0.11); and frequency of use (median kappa=0.57; IQR=0.11).

A description of the six measures used for the study follows.

1. *Dental information sources*: Practitioners were asked: “Which of the following dental journals do you regularly read (check all that you regularly read)?” The sources were divided into three categories: peer-reviewed journals, other journals or information sources, and sources of CDE. The peer-reviewed journals category included *Journal of the American Dental Association (JADA)*, *General Dentistry*, *Journal of Esthetic & Restorative Dentistry*, *Quintessence International*, *Journal of Prosthetic Dentistry*, *Operative Dentistry*, and *Compendium of Continuing Education in Dentistry*. The other journals or information sources (non-peer-reviewed) were *American Dental Association News*, *Dentistry Today*, and *Inside Dentistry*. For the sources of CDE, one item measured where practitioners obtained CDE credits, with the question “Where do you get most of your continuing dental education (CDE) credits?” The original five responses were merged into three categories: dental meetings, CDE services, and symposiums. An open-ended option asked practitioners for “Other” options to receive CDE credits.

In addition, respondents had three options to select and/or specify other types of dental publications that they regularly read: “Other state or local publication (U.S., Canadian, or European)”; “Other U.S. or Canadian publication”; and “Other European publication.” The following procedure was used to examine the open-ended responses for these three categories as well as for responses for “Other” CDE credits. Two authors (CD, MBH) reviewed the responses and developed categories, and all responses were coded accordingly. The themes for the open-ended publications responses were as follows: peer-reviewed; professional organizations; and other non-peer-reviewed (e.g., *Alabama Dental News*, *New York State Dental Journal*). The “Other” CDE open-ended responses were categorized as study clubs, organizational courses (outsourced vs. in-house), dental meetings, and lectures. A third reviewer (FC) evaluated all the “Other state or local publication” journal responses to ensure that the appropriate code was applied for each of the responses, similarly for the “Other U.S. or Canadian publication” and the CDE open-ended responses. The results of these questions are available from the corresponding author upon request.

2. *Reading preference* was measured by the question “Where do you most frequently read journals?” The response options were print and online.
3. *Extent of influence* was measured by the question “Which have the greatest influence on how you practice?” Respondents were asked to rank each of the ten informational sources that had the greatest influence on their practices. Response options were 1=little influence, 2=some influence, and 3=most influence.
4. *Frequency of use* was measured by the question “How frequently do you make use of the following resources for practice guidance?” Respondents were asked to respond regarding each of the ten informational sources that had the greatest influence on their practices. Response options were 1=never; 2=rarely (defined as <10 percent of when available or once per year); 3=sometimes (defined as 10 to 50 percent of when available or one to six times per year); and 4=quite frequently or every time available (defined as >50 percent of when available or >6 times per year).

5. *Participation level* was defined in three categories. “Full participant” was a fully trained practitioner who has participated in one or more studies with patient recruitment and has attended one or more network meetings. “Partial participant” was a fully trained practitioner who has not participated in a study with patient recruitment, but may have attended one or more network meetings and/or completed surveys. “Reference” was an inactive network member who had not received training and has not participated in studies or network meetings prior to survey completion, e.g., “Friends of PRECEDENT.”
6. *P-Is’ sociodemographic and practice-related characteristics*: Self-reported sociodemographic characteristics were gender, ethnicity, and race. The P-Is’ practice-related characteristics were years since dental degree and practice size. Practice size was measured by asking the practitioner “Approximately how many patients are seen each week in your practice?” The response options were 1=less than 21 patients, 2=21–30 patients, 3=31–40 patients, 4=41–50 patients, 5=51–60 patients, 6=61–80, 7=81–100, and 8=more than 100. Years since dental degree was collected in the following categories: 5 or fewer years, 6–15 years, 16–20 years, 21–25 years, and 26 years or more. All characteristics were measured at the time of enrollment into their respective network or association with the network (e.g., “Friends of PRECEDENT”).

Chi-square statistics were used to examine the sociodemographic and practice-related characteristics across networks, as well as to examine the dental information sources by network participation level and years of experience since dental degree. Fisher’s exact test was used when cell sizes were sparse. The data were analyzed using SAS version 9.2. All qualitative responses were analyzed using Microsoft Excel 2003.

## Results

### Sociodemographic and Practice- Related Characteristics

A total of 950 P-Is participated in this baseline questionnaire (Table 1). The majority were male (81 percent) and identified themselves as non-Hispanic whites (87 percent). Thirty-three percent of the P-Is had twenty-six years or more of practice experience. Almost a quarter (23 percent) see between thirty-one and forty patients in a week, followed by sixty-one patients or more (22 percent). The distribution of participation level of the respondents was full (40 percent), partial (36 percent), and reference comparison group (24 percent).

### Dental Information-Seeking Sources

Overall, 96 percent of the respondents indicated that they prefer to read print journals as compared to online journals (data not shown), and *JADA* was read by 76 percent of the respondents. Dentists who fully participated in a PBRN were more likely to read *JADA* than the reference group (81 percent vs. 69 percent, respectively;  $p=0.004$ ) (Table 2). The next most regularly read journal was *General Dentistry* (49 percent). P-Is who fully participated in the PBRN were more likely to read *General Dentistry* than those in the reference group (53 percent vs. 40 percent; chi-square=9.4,  $df=2$ ,  $p=0.01$ ). Among non-peer-reviewed publications, the *American Dental Association News* was read by almost three-quarters of the sample (74 percent), followed by *Dentistry Today* (48 percent) and *Inside Dentistry* (23 percent).

About 20 percent of the respondents said they regularly read an “Other state or local publication (U.S., Canadian, or European),” followed by 17 percent who regularly read an “Other U.S. or Canadian publication” while only 2 percent regularly read an “Other European publication.” Following the analysis of the journal open-ended responses, 50

percent of the responses were categorized as “Other peer-reviewed/state publication,” while the peer-reviewed and professional organization publications were observed for 26 percent and 24 percent of respondents, respectively. Further analysis of the “Other U.S. or Canadian publication” option showed that almost half of the responses (48 percent) could be categorized as peer-reviewed publications, while one-third of the publications were considered professional organization publications. The responses in the “Other European publication” category were categorized as peer-reviewed.

The majority of the dental practitioners reported obtaining their CDE credits from state and local meetings (69 percent), 26 percent from national dental meetings and symposiums, and only 5 percent online. The source of CDE was associated with participation level: full participants were less likely to attend dental meetings and more likely to attend symposiums compared to the partial participants and the reference dentists ( $p < 0.0001$ ) (Table 2).

Table 3 shows the use of dental information sources by years since dental degree. Dental practitioners with more than fifteen years since their dental degree were more likely than practitioners with fewer years since dental degree to read the following peer-reviewed journals: *JADA* (80 percent), *Journal of Esthetic and Restorative Medicine* (27 percent), and *Journal of Prosthetic Dentistry* (11 percent). Similarly, dental practitioners with more than fifteen years since obtaining their dental degree were more likely to read other dental sources compared to their counterparts with fewer years since dental degree: *American Dental Association News* (79 percent), *Dentistry Today* (54 percent), and *Inside Dentistry* (26 percent). Responses to other sources of CDE credits indicate that 66 percent of the dental practitioners usually obtained their credits from professional organization courses followed by study clubs (24 percent), whereas 6 percent were from dental meetings and 4 percent from lectures sponsored by their workplace (data not shown).

### Extent of Influence and Frequency of Use

Table 4 shows the self-reported extent of influence of the information sources for practice guidance and the corresponding frequency of use. The most influential information source was said to be state or local meetings (52 percent), followed by symposiums or other offerings by a school of dentistry (49 percent) and printed peer-reviewed journals (48 percent). Online CDEs and online chatrooms were considered most influential by 4 percent and 3 percent, respectively. Of interest, 62 percent of the respondents indicated that study or journal clubs had some influence for practice guidance, followed by national dental meetings (57 percent); conversely, less than a third (28 percent) of the respondents indicated that informal conversation with colleagues was most influential for practice guidance.

The information sources that were considered most influential for practice guidance were not necessarily used quite frequently. Forty percent of practitioners said they read printed peer-reviewed journals quite frequently, 38 percent attended state or local dental meetings, and 28 percent engaged in informal conversation with colleagues. Only 25 percent reported attending symposiums and other offerings by a school of dentistry quite frequently.

### Discussion

This study sought to examine the association among information-seeking behaviors of dental practitioners according to their level of involvement in a dental PBRN and years of experience since dental degree. Our findings showed that dental practitioners access a variety of dental information sources to stay abreast of new developments in dentistry to improve quality of care and stay informed. A significant difference was observed among level of involvement in a PBRN with dental journals regularly read as well as CDE sources. Full participants in a PBRN were less likely to use dental meetings as a source of CDE



credits and were more likely to use symposiums when compared to the partial and reference groups. Dentists with more than fifteen years since their dental degree were more likely to access peer-and non-peer-reviewed dental journals than those with fewer years of experience. This finding might provide further insights into the field of adult learning and how years of professional experience influence information-seeking sources. In particular, possible explanations for these observations are that more established dentists may have more time for reading, treat more dentally complex or medically complex patients and are seeking treatment information for specific cases, are monitoring for the introduction of innovative procedures or materials, or simply can afford membership in more professional organizations resulting in additional publications being delivered to them. In contrast, newer professionals may perceive themselves as already up-to-date or may lack the time and resources in their early careers to routinely access information.

Previous investigations of medical practitioners, as well as dentists, have found that personal and professional characteristics, patient characteristics, and perceived knowledge status were factors associated with information-seeking behaviors.<sup>23–25</sup> Similar to Selvi and Ozerkan, our findings showed that conventional methods to access information, such as printed journals, were preferred when compared to online information sources.<sup>24</sup> In addition, dental practitioners reported several sources of CDE, including study clubs and professional meetings in their workplace.<sup>11</sup> In a rural medical PBRN, online journals were used never or almost never by more than half of the sample (52 percent), whereas print journals were used a few times a week or daily by 42 percent.<sup>26</sup> Andrews et al.'s investigation suggests that the geographical setting might be considered as another factor that influences the information-seeking behaviors of primary care practitioners.

PRBNs are an important venue to incorporate evidence-based findings from clinical dental research into dental practice.<sup>27</sup> However, limited research has been conducted about information sources among P-Is who belong to dental PBRNs. P-Is may have an increased interest in evidence-based practice, and perhaps this is not representative of the majority of the dentists in the general population. It is worth mentioning that the majority of the P-Is in this sample were general practitioners working in private practice.

These findings suggest that diverse educational approaches are likely needed to facilitate the translational process of research into practice. Knowledge acquisition is not always followed by its implementation in clinical practice, given that numerous factors contribute to practice change.<sup>14</sup> In addition, the value that health professionals place on an innovation is also a main predictor of adoption of the innovation, as stated by Rogers.<sup>28</sup> A systematic literature review found that educational outreach visits and interactive educational meetings were effective interventions to promote change among health professionals, whereas passive diffusion through electronic publications and lectures were deemed less effective approaches.<sup>29</sup> The most influential source of information (state/local meetings) is the most episodic, likely explaining the apparent disconnect between influence and frequency. Source credibility is a known factor in the influence of information given the amount of information that is available for dentists;<sup>7</sup> meeting speakers are often recognized authorities in their field, prompting a greater level of trust in their information.

Our study has some limitations. The results we report regarding source of information that influenced practice are self-reported, and verification and documentation of the actual influence were not performed. Although we included a reference group, this group may not adequately differentiate between dentists interested in research involvement due to some affiliation with a PBRN. In addition, the sample used in the study may not reflect the overall dental provider population. The practice-related characteristics of the sample surveyed could have changed since their enrollment to their network; a second survey was released to

collect follow-up information on these information-seeking variables. The information needs and barriers to access of dental clinical information of dental practitioners were not assessed; previous investigations have reported that the most common information needs among general dentists were those related to symptoms, treatment options, the treatment procedure, and the effect of treatment.<sup>30</sup> In addition, information on pharmacology or prescribing information as well as diagnostic process was sought among primary care physicians.<sup>31</sup>

The uptake and adoption of evidence-based information in dentistry have not been well documented in the literature. A major national dental initiative, known as the National Dental Practice-Based Research Network (NDPBRN), has been established to promote dental practice-based research across the United States.<sup>32</sup> The NDPBRN studies conducted in participating dental offices will help to expand the profession's evidence base and further refine care. Thus, the findings from our study could provide an initial framework that would explore the best sources of information in which evidence-based information can be disseminated. The knowledge of these information sources would help to improve and accelerate the translation of research into dental clinical practice and into the curriculum design of dental education.<sup>17</sup> For curriculum development, this study shows that the graduate dentist would benefit from learning skills to continue to read peer-reviewed journals. Access to information sources that would enhance the didactic-academic experience with practice-based research remains an area of vital consideration to close the gap between research and practice.<sup>33,34</sup>

Despite the limitations, this study contributes to the limited research on information-seeking behavior among dental practitioners in the context of a practice-based research network. Our results suggest that when dental practitioners seek clinical evidence, their sources of information vary according to their level of participation in a research network and according to their years of practice experience. Scientists involved in the field of dissemination research in dentistry need to be aware of these information sources and preferences, so that tools and interventions to implement practice change can effectively reach the agent of change: the dental provider. Understanding the appeal of the various sources would also provide a basis for new dissemination strategies to be tested.

## Acknowledgments

This study was supported by grants U01-DE-16746, U01-DE-16747, U01-DE-16750, U01-DE-16752, U01-DE-16754, U01-DE-16755, and U19-DE-22516 from the National Institute of Dental and Craniofacial Research (NIDCR), National Institutes of Health. The authors also thank the PIRG data management and clinical coordinating team for their support, as well as Abigail Matthews for her assistance with statistical programming. Opinions and assertions contained herein are those of the authors and are not to be construed as necessarily representing the views of their respective organizations or the National Institutes of Health.

## References

1. Hojat M, Veloski J, Gonnella J. Measurement and correlates of physicians' lifelong learning. *Acad Med.* 2009; 84(8):1066–74. [PubMed: 19638773]
2. Marchionini, G. *Information-seeking in electronic environments.* Cambridge, UK: Cambridge University Press; 1995.
3. Martin D, Uchechukwu S. Knowledge management in clinical practice: a systematic review of information-seeking behavior in physicians. *Int J Med Informatics.* 2003; 71(1):9–15.
4. Gruppen LD. Physician information-seeking: improving relevance through research. *Bull Med Libr Assoc.* 1990; 78(2):165–72. [PubMed: 2183904]
5. Weinberg AD, Ullian L, Richards WD, Cooper P. Informal advice and information-seeking behavior between physicians. *J Med Educ.* 1981; 56(3):174–80. [PubMed: 7205918]



6. Turpin DL. Study clubs share their secrets of success. *Am J Orthod Dentofacial Orthop*. 2010; 137:573–4. [PubMed: 20451761]
7. Bennett NL, Casebeer LL, Kristofco R, Collins BC. Family physicians' information-seeking behaviors: a survey comparison with other specialties. *BMC Med Inform Decision Making*. 2005; 5:9.
8. Byrnes JA, Kulick TA, Schwartz DG. Information-seeking behavior changes in community-based teaching practices. *J Med Libr Assoc*. 2004; 92(3):334–40. [PubMed: 15243639]
9. Scheler T, Pham T. Online continuing dental education. *J Am Dent Assoc*. 1999; 130(6):848–54. [PubMed: 10377644]
10. Iqbal A, Glenny AM. General dental practitioners' knowledge of and attitudes towards evidence-based practice. *Br Dent J*. 2002; 193(10):587–91. [PubMed: 12481184]
11. Bennett N, Casebeer L, Kristofco R, Strasser S. Physicians' internet information-seeking behaviors. *J Contin Educ Health Prof*. 2004; 24:31–8. [PubMed: 15069910]
12. Pitts N. Understanding the jigsaw of evidence-based dentistry: 3. Implementation of research findings in clinical practice. *Evid-Based Dent*. 2004; 5(3):60–4. [PubMed: 15448642]
13. Kahn K, Ryan G, Beckett M, Taylor S, Berrebi C, Cho M, et al. Bridging the gap between basic science and clinical practice: a role for community clinicians. *Implementation Sci*. 2001; 6:34.
14. Fox RD, Bennett NL. Learning and change: implications for continuing medical education. *BMJ*. 1998; 316:466–8. [PubMed: 9492684]
15. Gilbert GH, Williams OD, Rindal DB, Pihlstrom DJ, Benjamin PL, Wallace MC, et al. The creation and development of the dental practice-based research network. *J Am Dent Assoc*. 2008; 139(1):74–81. [PubMed: 18167389]
16. Curro FA, Craig RG, Van Thompson P. Practice-based research networks and their impact on dentistry: creating a pathway for change in the profession. *Compend Contin Educ Dent*. 2009; 30(4):184–7. [PubMed: 19441734]
17. Curro R, Grill A, Thompson VP, Craig RG, Vena D, Keenan AV, et al. Advantages of the dental practice-based research network initiative and its role in dental education. *J Dent Educ*. 2011; 8(10):1053–60. [PubMed: 21828299]
18. Gilbert GH, Richman JS, Gordan VV, Rindal DB, Fellows JL, Benjamin PL, et al. Lessons learned during the conduct of clinical studies in the dental PBRN. *J Dent Educ*. 2011; 4(4):453–65. [PubMed: 21460266]
19. Oldenburg, B.; Parcel, GS. Diffusion of innovations. In: Glanz, K.; Rimer, BK.; Lewis, MF., editors. *Health behavior and health education: theory, research, and practice*. San Francisco: Jossey-Bass; 2002. p. 312-34.
20. Straub-Morarend CL, Marshall TA, Holmes DC, Finkelstein MW. Informational resources utilized in clinical decision making: common practices in dentistry. *J Dent Educ*. 2011; 75(4):441–52. [PubMed: 21460265]
21. Haj-Ali RN, Walker MP, Petrie CS, Williams K, Strain T. Utilization of evidence-based informational resources for clinical decisions related to posterior composite restorations. *J Dent Educ*. 2005; 69(12):1251–6. [PubMed: 16275688]
22. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics*. 1977:159–74. [PubMed: 843571]
23. Olatopkun W, Ajagbe E. Analyzing traditional medical practitioners' information-seeking behavior using Taylor's information-use environment model. *J Librarianship Inform Sci*. 2010; 42(2):122–35.
24. Selvi F, Ozerkan A. Information-seeking patterns of dentists in Istanbul, Turkey. *J Dent Educ*. 2002; 66(8):977–9. [PubMed: 12214845]
25. Ashin ER. Informational needs of practicing dentists. *Bull Med Libr Assoc*. 1986; 74(3):227–30. [PubMed: 3742116]
26. Andrews JE, Pearce KA, Ireson C, Love M. Information-seeking behaviors of practitioners in a primary care practice-based network (PBRN). *J Med Libr Assoc*. 2005; 93(2):206–12. [PubMed: 15858623]

27. DeNucci, DJ. CONDOR Dental Practice-Based Research Networks. Dental practice-based research networks. In: Giannobile, WV.; Burt, BA.; Genco, RJ., editors. Clinical research in oral health. Boston: Wiley-Blackwell; 2010.
28. Rogers, EM. Diffusion of innovations. 4. New York: Free Press; 1995.
29. Bero LA, Grilli R, Grimshaw JM, Harvey E, Oxman AD, Thomson MA, et al. Closing the gap between research and practice: an overview of systematic reviews of interventions to promote the implementation of research findings. *BMJ*. 1998; 317:465–8. [PubMed: 9703533]
30. Song M, Spallek H, Polk D, Schleyer T, Wali T, Song M, et al. How information systems should support the information needs of general dentists in clinical settings: suggestions from a qualitative study. *BMC Med Inform Decision Making*. 2010; 10:7.
31. Gonzalez-Gonzalez AI, Dawes M, Sanchez-Mateos J, Riesgo-Fuertes R, Escortell-Mayor E, Sanz-Cuesta T, et al. Information needs and information-seeking behavior of primary care physicians. *Ann Fam Med*. 2007; 5(4):345–52. [PubMed: 17664501]
32. National Institutes of Health, National Institute of Dental and Craniofacial Research. [Accessed: April 30, 2012] NIDCR establishes national dental practice-based research network. At: [www.nidcr.nih.gov/Research/ResearchResults/NewsReleases/CurrentNewsReleases/NDPBRN.htm](http://www.nidcr.nih.gov/Research/ResearchResults/NewsReleases/CurrentNewsReleases/NDPBRN.htm)
33. Ballweg R, Berg J, DeRouen T, Fiset L, Mouradian W, Somerman MJ. Expanding dental education partnerships beyond the four walls. *J Dent Educ*. 2011; 75(3):300–9. [PubMed: 21368254]
34. McAndrew M. Community-based dental education and the importance of faculty development. *J Dent Educ*. 2010; 74(9):980–5. [PubMed: 20837739]

**Table 1**

Characteristics of dental practitioners in study (n=950)

Characteristic	Number	Percentage
Gender (missing=92)		
Male	693	81%
Female	165	19%
Ethnicity (missing=133)		
Not Hispanic	790	97%
Hispanic	27	3%
Race (missing=104)		
White	738	87%
Black	35	4%
Asian	55	7%
Native American	8	1%
Other or mixed racial	10	1%
Years since dental degree (missing=120)		
5 or fewer	112	13%
6–15	177	21%
16–20	108	13%
21–25	155	19%
26+	278	33%
Practice size <sup>a</sup> (missing=116)		
Less than 21 patients	45	5%
21–30 patients	99	12%
31–40 patients	194	23%
41–50 patients	168	20%
51–60 patients	145	17%
61 patients or more	183	22%
Network membership <sup>b</sup>		
DPBRN	595	63%
PEARL	147	15%
PRECEDENT	208	22%
Participation level <sup>b</sup>		
Full	378	40%
Partial	346	36%
Reference	226	24%

<sup>a</sup>Practice size refers to the number of patients seen per week.

<sup>b</sup>DPBRN (Dental Practice-Based Research Network); PEARL (Practitioners Engaged in Applied Research and Learning); PRECEDENT (Practice-Based Research Collaborative In Evidence-Based Dentistry).

<sup>c</sup>Full participant: respondent has participated in at least one network study recruiting patients. Partial participant: respondent is a fully trained member of the network or has attended at least one meeting or participated in other survey studies. Reference: inactive member of the network (not trained, no participation in studies or meetings) or is outside the network, e.g., Friends of PRECEDENT.

**Table 2**

Information sources by network participation level, by number and percentage

Information Source	Total	Full Participation 378 (40% of total)	Partial Participation 346 (36% of total)	Reference 226 (24% of total)
Peer-reviewed journals				
J American Dental Association (JADA) <sup>a</sup>	723 (76%)	306 (81%)	261 (75%)	156 (69%)
General Dentistry <sup>b</sup>	465 (49%)	200 (53%)	174 (50%)	91 (40%)
J Esthetic & Restorative Dentistry	224 (24%)	84 (22%)	92 (27%)	48 (21%)
Quintessence International	88 (9%)	36 (10%)	30 (9%)	22 (10%)
J Prosthetic Dentistry	82 (9%)	31 (8%)	31 (9%)	20 (9%)
Operative Dentistry	45 (5%)	22 (6%)	17 (5%)	6 (3%)
Compendium of Continuing Education in Dentistry	570 (60%)	218 (58%)	209 (60%)	143 (63%)
Other dental information sources (non-peer-reviewed)				
American Dental Association News	701 (74%)	277 (73%)	259 (75%)	165 (73%)
Dentistry Today	459 (48%)	171 (45%)	176 (51%)	112 (50%)
Inside Dentistry	216 (23%)	74 (20%)	90 (26%)	52 (23%)
Other state or local publication (U.S., Canadian, or European)	197 (21%)	77 (20%)	66 (19%)	54 (24%)
Other U.S. or Canadian publication	171 (18%)	70 (19%)	56 (16%)	45 (20%)
Other European publication	18 (2%)	11 (3%)	2 (0.6%)	5 (2%)
Source of continuing dental education <sup>c</sup>				
Dental meetings	613 (69%)	206 (59%)	244 (76%)	163 (75%)
CDE services	44 (5%)	21 (6%)	10 (3%)	13 (6%)
Symposiums or other	228 (26%)	123 (35%)	65 (20%)	40 (19%)

<sup>a</sup>Chi-square=11.2; df=2, p=0.004. Further analysis by PBRN reveals that it was significant for DPBRN (p=0.04) and PRECEDENT (p=0.03).

<sup>b</sup>Chi-square=9.4; df=2, p=0.01.

<sup>c</sup>Missing=65. Source of continuing dental education was recoded as follows: 1=dental meetings ("State or local dental meetings"; "National dental meetings"); 2=CDE services ("Online CDE services"; "Other CDE services, e.g., tapes, journals, articles"; and 3=Symposiums/ other ("Symposium or other offerings by a school of dentistry"; "Other"). After merging these categories, source of CDE credits was highly associated with participation level (chi-square=32.4; df=4, p<0.0001). Further analysis by PBRN reveals that it was highly significant for DPBRN (p<0.0001).

**Table 3**

Information sources by years since dental degree, by number and percentage

Information Source	Total	<5 yrs. 102 (13%)	6–15 yrs. 170 (21%)	>15 yrs. 539 (66%)
Peer-reviewed journals <sup>a</sup>				
J American Dental Association *	638 (77%)	79 (71%)	127 (72%)	432 (80%)
General Dentistry	411 (50%)	50 (45%)	86 (49%)	275 (51%)
J Esthetic & Restorative Dentistry ***	194 (23%)	10 (9%)	38 (21%)	146 (27%)
Quintessence International	74 (9%)	7 (6%)	16 (9%)	51 (9%)
J Prosthetic Dentistry *	71 (9%)	5 (5%)	7 (4%)	59 (11%)
Operative Dentistry	40 (5%)	2 (2%)	7 (4%)	31 (6%)
Compendium of Continuing Education in Dentistry	491 (59%)	67 (60%)	112 (63%)	312 (58%)
Other dental information sources (non-peer-reviewed)				
American Dental Association News ***	617 (74%)	65 (58%)	122 (69%)	430 (79%)
Dentistry Today ***	392 (47%)	35 (31%)	65 (37%)	292 (54%)
Inside Dentistry **	186 (22%)	18 (16%)	27 (15%)	141 (26%)
Other state or local publication (U.S., Canadian, or European)	173 (21%)	17 (15%)	25 (14%)	131 (24%)
Other U.S. or Canadian publication †	151 (18%)	16 (14%)	29 (16%)	106 (20%)
Other European publication	13 (2%)	1 (1%)	1 (0.6%)	11 (2%)
Source of continuing dental education <sup>b</sup>				
Dental meetings	539 (70%)	73 (69%)	125 (74%)	341 (68%)
CDE services	32 (4%)	4 (4%)	6 (4%)	22 (4%)
Symposiums	201 (26%)	29 (27%)	37 (22%)	135 (27%)

<sup>a</sup>Missing=120.<sup>b</sup>Missing=178. Source of continuing dental education was recoded as follows: 1=dental meetings (“State or local dental meetings”; “National dental meetings”); 2=CDE services (“Online CDE services”; “Other CDE services, e.g., tapes, journals, articles”; and 3=Symposiums/ other (“Symposium or other offerings by a school of dentistry”; “Other”).

\* p-value &lt;0.05;

\*\* p-value &lt;0.01;

\*\*\* p-value &lt;0.001.

† Chi-square=10.7; df=2, p=0.005. 13 percent of the data are missing.

**Table 4**  
Dentists' utilization of information sources for practice guidance, by number and percentage

Information Source	Extent of Influence <sup>a</sup>				Frequency of Use <sup>b</sup>		
	Number	Some Influence	Most Influence	Number	Sometimes	Quite Frequently	Number
Printed peer-reviewed journals	941	423 (45%)	451 (48%)	943	444 (47%)	373 (40%)	943
Printed non-peer-reviewed sources	938	386 (41%)	14 (1%)	940	339 (36%)	71 (8%)	940
Online CDE	928	327 (35%)	34 (4%)	938	220 (23%)	32 (3%)	938
Online chatrooms or other interactive online services	927	156 (17%)	22 (2%)	938	103 (11%)	23 (3%)	938
Informal conversation with colleagues	933	578 (62%)	260 (28%)	940	528 (56%)	262 (28%)	940
Study or journal clubs	926	332 (36%)	327 (35%)	938	304 (32%)	227 (24%)	938
State or local dental meetings	938	355 (38%)	486 (52%)	940	411 (44%)	353 (38%)	940
National dental meetings	933	344 (37%)	374 (40%)	939	347 (37%)	199 (21%)	939
Symposiums or other offerings by a school of dentistry	931	355 (38%)	454 (49%)	937	392 (42%)	234 (25%)	937
Symposiums or other offerings by a private institute or organization	930	311 (33%)	315 (34%)	940	283 (30%)	170 (18%)	940

<sup>a</sup>Extent of Influence scale: 1=little influence, 2=some influence, 3=most influence.

<sup>b</sup>Frequency of use scale: 1=never, 2=rarely (<10% of when available or 1-6 times per year), 3=sometimes (10-50% of when available or 1-6 times per year), 4=quite frequently or every time available (>50% of when available or >6 times per year).