New Mexico practitioners' access to and satisfaction with online clinical information resources: an interview study using qualitative data analysis software*†

Patricia V. Bradley, MLS, AHIP;
Christina M. Getrich, PhD;
Gale G. Hannigan, PhD, AHIP

See end of article for authors' affiliations.

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Questions: What information resources are available to health care practitioners not affiliated with the University of New Mexico? How satisfied are they with those resources?

Setting: The state is rural and medically underserved.

Methods: The authors interviewed practitioners, using a nine-item guide. Interview transcripts were coded using QSR NVivo 9 software.

Main Results: Fifty-one practitioners were interviewed. Most use online information resources. Many have access to a point-of-care resource within an electronic health records system. They often expressed dissatisfaction with available patient education resources.

Conclusion: New Mexico practitioners routinely use electronic information resources but indicate they need better patient information.

INTRODUCTION

The University of New Mexico's (UNM's) Health Sciences Library and Informatics Center (HSLIC) is the only academic health sciences library and National Network of Libraries of Medicine (NN/LM) Resource Library in the state. HSLIC has an extensive collection of medical and health journals and online resources. However, only current faculty (including preceptors), staff, and students can use these resources remotely. The purpose of the study was to find out how health care practitioners in New Mexico who are not affiliated with UNM find their information for patient care. The results will be used to increase practitioners' awareness of free, quality information resources for clinical care and information for their patients.

BACKGROUND

New Mexico is one of the most rural and medically underserved states in the country. It averages 17 people per square mile, compared to 87.4 people per square mile in the United States [1], and ranks thirtieth among states in the number of doctors per 100,000 residents [2]. The Health Resources and Services Administration designates all but 1 of New Mexico's 33 counties as Medically Underserved Areas [3].

UNM's Health Sciences Center (HSC) established a strategic plan called Vision 2020 and set the goal of ''improving a state's population's health and health equity as a measure of the institution's success'' [4]. Library faculty made a commitment to participate in Vision 2020, with efforts to identify and address disparity in information access. An NN/LM outreach contract [5] provided support for a needs assessment study. An HSC Community Engagement Mini-Grant funded formal collaboration with a qualitative research specialist (Getrich) from the Department of Family and Community Medicine's Research Involving Outpatient Settings Network (RIOS Net).

At the outset of this study, the authors did not know the extent and quality of Internet access in rural areas or the specific resources that unaffiliated practitioners generally turn to when they have clinical questions. A review of the literature, including a 1996 survey of ninety-nine New Mexico surgeons, indicated ''burdensome practice demands, which allow little or no time for doctors to keep up…If there is time, the surgeons are not sure how to access up-to-date information appropriately'' [6, p. 494].

Several previous studies have also sought to answer questions about practitioners' information needs and resources for meeting those needs at the time of the patient care encounter. Thirty years ago, Covell and colleagues surveyed and observed 47 office-based internists in Los Angeles County. Approximately 2 questions arose for every 3 patients seen, and only 30% were answered at the time of the visit. Although physicians reported that print materials were their main source of information, it was observed that colleagues were consulted most of the time. Physicians reported very little use of ''computerized resources'' [7]. More than 10 years later, Ely and colleagues inventoried and recorded the use of resources available onsite at the offices of 103 Iowa family physicians. On average, physicians had 56 books onsite. Twenty-six percent had computers in their private offices, and 16% reported using computers to answer clinical questions. Based on observation, books were the most-used sources of information, followed by colleagues [8]. In 1999, Chimoskey and Norris reported on a survey of rural generalist physicians in Washington state. Based on 258 responses, 95% or more agreed with the statements, ''If I

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A supplemental appendix is available with the online version of this journal.

need an answer to a clinical problem, I consult a clinical reference book'' and ''If I need an answer to a clinical problem, I consult with my colleagues.'' Sixteen percent agreed with the statement ''I don't have time to use a computer'' [9]. In 2005, Andrews and colleagues reported on their survey of rural family practitioners, general practitioners, nurse practitioners, and physician assistants in Kentucky. Based on 59 responses, most sought information for patients several times per week (58%), and most reported looking for information while the patient waited (68%). Most (76%) cited the lack of time as the main barrier to seeking information. Although use of Internet resources was reported (e.g., 50% indicated they went online for drug information ''a few times a week/daily''), online access to information was less than use of print materials overall (e.g., 61% used printed drug reference sources ''a few times a week/daily'') [10].

Two very recent articles complement one another in characterizing the current status of information needs and information-seeking behavior by clinicians. Salinas compared findings of a survey of physicians primarily in solo or group practices administered in 2009 (n>2,000) and then again in 2013 (n>1,000). Results showed an increase in the number of clinical questions that arose per week (6 versus 15) and the amount of time spent searching for information online (2.8 versus more than 4 hours) [11]. Del Fiol and colleagues' systematic review identified 72 articles, through May 2011, about clinicians' information-seeking behavior. ''Clinicians'' included physicians, physician assistants, nurse practitioners, nurses, dentists, and care managers. Their analyses indicated that little has changed over time: questions arise in the clinical context, many go unanswered, and lack of time is a main barrier to seeking information [12].

Many of the studies reviewed predate widespread use of the Internet and the availability of electronic health records (EHR); no study compared clinicians with and without access to an EHR. Although the recent articles were not available when our study was designed, the authors did assume that questions arose during the clinical encounter and that lack of time would probably be a barrier to answering questions. We were well aware of the impact of online access to clinical information in the HSC. We did not know what the quality of Internet access was for unaffiliated practitioners or if they routinely used electronic resources to answer their questions, especially given the extreme rurality of New Mexico.

METHODS

For this exploratory study, we selected practice sites through library contacts and recommendations from the UNM HSC Office of Community Health, Health Extension Rural Office, making sure to include representation from all four quadrants of the state and the diverse populations of New Mexico. The native and distance services librarian made contacts, arranged visits, travelled to the sites, and conducted most of the interviews. She conducted interviews until she reached data saturation, the point at which no new themes or relevant information emerged [13].

We used a semi-structured interview guide consisting of nine open-ended questions, which were approved by the UNM Human Research Protections Office (HRPO #12-469). The interview questions are listed in the online only appendix. We developed the questions in consultation with HSLIC library faculty and researchers from the Office of Community Health and RIOS Net, New Mexico's practice-based research network at UNM. We interviewed practitioners in private rooms at the location of their practices or by telephone, recorded the interviews on iPads, transcribed them, and erased the recordings once the interview transcripts were verified for accuracy. No identifiers were collected except for type of practitioner.

Qualitative analysis of the interviews followed the principles of grounded theory [14] and featured an iterative process. We analyzed the data using NVivo9, a qualitative data-coding software package. NVivo enables researchers to organize data and code text. The team read through a set of three transcripts and then developed a list of initial codes that we organized into a coding tree. We tested an additional two transcripts by coding them by hand to ensure that we had included all necessary codes and were applying the codes uniformly. Once we finalized the coding tree and created it in NVivo, we imported the transcript files into NVivo and coded them by question and by emergent themes. Finally, we generated NVivo coding reports of relevant codes so that we could discuss emergent themes and interpret the data. This inductive analytic process allowed us to identify the themes presented in this paper.

RESULTS

We interviewed fifty-one practitioners, mostly in person and at the site of their practices. The native and distance services librarian completed seven trips between December 2012 and April 2013, covering nine primarily rural practice sites. In addition, she interviewed seven practitioners at the conference in Albuquerque of the New Mexico Chapter of the American Academy of Family Physicians, which was attended by practitioners from throughout the state. The distribution in New Mexico of health care practitioners by type of practice and of interviewees by type of practice is shown in Table 1. We did not include the single interview with a pharmacist in our analysis. We report results first by the responses to the questions and then by emergent themes.

Responses to questions

Based on responses to specific questions, practitioners seek information about a broad spectrum of clinical topics. A nurse in a public health clinic can anticipate many of the common topics that will arise (e.g., family planning, vaccinations), but the emergency room physician in a small hospital and the school nurse covering four schools are less able to predict their

Table 1
Distribution of health care practitioners in New Mexico* and in current study

Type of practitioner	New Mexico	%	Study	%
MD/DO	2,235	15%	21	42%
Nurse	11,858	79%	13	26%
Physician assistant	298	2%	7	14%
Nurse practitioner	595	4%	9	18%

* Minus Bernalillo County, which includes University of New Mexico Health Sciences Center.

information needs. ''Everything, being a rural hospital'' is what one physician said when asked what topics were of particular interest.

Although they used a wide variety of information resources to support patient-related decisions, from the Centers for Disease Control and Prevention website to colleagues, a significant number of practitioners reported having access to UpToDate in their electronic records systems. As one physician said, ''Most of the time I go to UpToDate on my computer. The facility pays for that, so I utilize it.'' Some mentioned that they used it because they had it, and at least one person indicated that there was an agreed-upon policy to use it: ''I usually go to UpToDate which is what we determined as a clinic organization to use for our primary source of information so that we would all be on the same page with the information that we use to make decisions, clinical decisions.''

Most practitioners said that they attempted to answer clinical questions immediately rather than research them later, indicating that they found the information immediately between 70%–90% of the time and had to look later between 10%–30% of the time. They were confident in their abilities to do this based upon their years of experience and the onsite availability of resources. As one nurse practitioner put it, ''most of the time I can answer it. If I can't answer it, it is really easy to get online and do it.''

When asked about their favorite resources for clinical care information and satisfaction with availability, most cited UpToDate, Google, or ''the Internet'' and expressed satisfaction with availability. More than 50% of interviewees responded they had not used PubMed in the past year. Those who had used PubMed mentioned difficulties, mostly with regard to lack of access to full-text articles and time spent searching. As one nurse practitioner explained, ''I find it difficult to find what I am looking for to be honest with you. It is so big of a database that you find one thing but then you have to try to truncate it down to find exactly what you need.'' Another nurse practitioner said, ''I'd love to be able to have access to the full PubMed background—all their resources.''

When asked about a favorite resource to give to patients and its availability, there was little consensus and some dissatisfaction. To find information for their patients, most cited programs on their electronic health records systems, Micromedex, the Centers for Disease Control and Prevention, Mayo Clinic, American Family Physicians websites, and UpToDate. To quote two comments about satisfaction with resources to give to patients: ''Probably not so fair—just finding things that are succinct and concise and easy…to read; it can be more challenging. UpToDate has nice handouts but sometimes not specifically for what we are looking for''; and ''we also have a lot of illiterate people and it [UpToDate] is not going to work.'' No one mentioned MedlinePlus.

We asked interviewees to tell us about additional information resources that would help in clinical decision making. They mentioned information in Spanish, continuing education and evidence-based resources, PubMed, reputable sources besides UpToDate, Epocrates, and access to UNM resources, practice guidelines, and online textbooks. A nurse summarized the general sentiment by saying, ''I think it would be nice if we had links for various resources outside of what we already have, so that we can utilize the various resources—we can't find the information off of one or two sites.''

According to our respondents, the ideal health information portal would include authoritative information for patients that is appropriate for culture and literacy levels, lists of medical specialists, insurance information, evidence-based practice guidelines, age-specific information, and information about medication interactions. It would have the full text of articles and multimedia. As a physician's assistant said, ''someplace [to] one stop shop for everything for clinical providers, easy for patient information.''

The ideal health information portal would be easy to navigate and access, searchable by disease and symptom, well indexed, user friendly, and free, and provide quick, short answers: ''It has to be user friendly, it needs to be quick; and it should have in there whatever patient information kind of stuff we want; both that we can print it off for the patient and give it to them as well as just speak with them'' was how one physician summarized it.

Emergent themes

In addition to the responses to the interview questions, we identified four themes that emerged from the interviews: the institutionalization of computer-based resources, patient education and shared decision making, the need for additional resources, and time.

Practitioners in even the most rural clinics had online access to information, often through an electronic medical records system. UpToDate was generally available, which we did not expect, and was a favorite resource for clinical care. Cell phone use was prevalent, even in the most rural areas, but preference for access via mobile devices was not mentioned. For now, computer access seemed sufficient. This might be because, for many practitioners, clinical information was available only onsite through their medical records system.

Practitioners expressed the need for better resources for patients, even before the question was asked. As

one school nurse put it, ''It's not really my clinical decision making, it's trying to help parents get a, make a decision.'' Desirable qualities for patient education resources included being able to search by disease and by symptom, and to provide printed handouts. The practitioners we interviewed indicated that the primary targets of enhanced patient education would be pregnant women, parents, and children, and that the topics they would like more educational materials on would be immunizations, diabetes, sexually transmitted diseases, hypertension, pain management, asthma, and routine health maintenance.

Although they had online access to some information resources, practitioners felt they were underresourced in general. A nurse practitioner noted that it was ''tough finding good clinical resources in a place like this that are accessible. It's hard to find specialty information. Finding a way to get people to resources is tough in places like this, rural.'' In addition to patient-specific education materials, they would like access to full-text journal articles, direct contact with specialists at the university, and decision-support tools.

Previous studies often indicated that lack of time was a major barrier to pursuing answers to clinical questions. Our respondents indicated time limitations were a fact of life and not a complaint or excuse. This might reflect increased ease of online access to information, the availability of point-of-care information resources, and a growing expectation that looking up information is an integral part of practice.

DISCUSSION

Ours was a small, convenience sample, but the frequency of similar answers suggests that we reached data saturation (i.e., had we interviewed more practitioners, the responses would likely have been the same). Compared to the distribution of practitioners statewide, physicians were overrepresented and nurses were underrepresented in our study. We did not intend to perform analyses by type of practice. We did observe that responses and themes were similar across practitioner type. Also, this study reported what practitioners told us about their ability to find information; we did not independently verify their use of resources or the quality of the information that they were able to locate.

We were impressed by the changing landscape of rural practice compared to just a few years ago. We approached this study expecting rural practitioners to lack adequate information resources. We learned that online resources were available and used. Online access to information, whether through an Internet search or an electronic health record system, was the preferred way in which practitioners in this study found information, for themselves and for their patients. At least at the worksite, reliable Internet access did not seem to be a problem. Electronic health records are now an integral part of the clinical environment, even in the most rural areas, and it is apparent, based on our study, that UpToDate has taken a lead in integrating their product into health records systems. Practices, rather than individuals, are funding access to UpToDate. In one group, there was a practice-wide expectation to rely on that resource.

Many interviewees mentioned evidence-based practice and their responsibility for locating quality information. Even those with access to point-of-care information resources indicated that they wanted additional resources. Practitioners actively engaged in patient education at the point of care. They acknowledged the importance of shared decision making and noted the lack of appropriate resources for their patients. In response, we intend to ramp up promotion of MedlinePlus and other high-quality consumer and patient education information resources. We recently received funding from the NN/LM South Central Region to develop online continuing education modules targeted to the unaffiliated practitioners [15]. These modules will highlight and promote the use of freely available evidence-based clinical and patient education resources.

Based on this study, we conclude that unaffiliated practitioners in New Mexico today have reliable Internet access and use online resources to answer questions at the point of care but still want better information resources, especially for their patients.

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AUTHORS' AFFILIATIONS

Patricia V. Bradley, MLS, AHIP, pbradley@salud.unm.edu, Native and Distance Services Librarian, Health Sciences Library and Informatics Center, University of New Mexico, MSC 09 5100, 1 University of New Mexico, Albuquerque, NM 87131-0001; **Christina M. Getrich, PhD,** cgetrich@umd.edu, Assistant Professor, University of Maryland, College Park, 1111 Woods Hall, College Park, MD 20742; **Gale G. Hannigan, PhD, AHIP,** ghannigan@salud.unm.edu, Research Professor, Health Sciences Library and Informatics Center, University of New Mexico, MSC 09 5100, 1 University of New Mexico, Albuquerque, NM 87131-0001

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