

Patient-centered Radiology: Where Are We, Where Do We Want to Be, and How Do We Get There?¹

Jennifer L. Kemp, MD
Mary C. Mahoney, MD
Vincent P. Mathews, MD
Max Wintermark, MD
Judy Yee, MD
Stephen D. Brown, MD

Purpose:

The objectives of the Radiological Society of North America (RSNA) Patient-Centered Radiology Steering Committee survey were to (a) assess RSNA members' general attitudes and experiences concerning patient-centered radiology, with specific attention paid to radiologist-to-patient communication; (b) examine the members' barriers to communicating more directly with patients; and (c) explore their perceptions of how such barriers can be overcome.

Materials and Methods:

A total of 5999 radiologists were invited by e-mail to complete an anonymous electronic survey developed by the Steering Committee and the RSNA Department of Research. Participants were asked to identify aspects of patient-centered care important to their practice, report on their interactions with patients, and share their opinions on radiologist-patient communication. Statistical analyses were performed by using the χ^2 test and analysis of variance.

Results:

The response rate was 12% ($n = 694$, 109 invitations were undeliverable). Most respondents (89%, 611 of 684) agreed that promoting awareness of the role of radiology in patients' overall health care is important to how they practice. The majority (73%, 421 of 575) reported that time or workload frequently prevented them from communicating directly with patients. The majority (74%, 423 of 572) reported that a personal sense of satisfaction was likely to motivate them to communicate more directly with patients, but many commented that changes to reimbursement and compensation would help them communicate with patients more directly.

Conclusion:

Many radiologists support the concept of communicating more directly with patients but report they are constrained by time or workload. Changes to reimbursement schemes may help mitigate these barriers to one crucial aspect of patient-centered care.

©RSNA, 2017

Online supplemental material is available for this article.

¹From Diversified Radiology of Colorado, 1746 Cole Blvd, #150, Lakewood, CO 80401 (J.L.K.); Department of Radiology, University of Cincinnati Medical Center, Cincinnati, Ohio (M.C.M.); Department of Radiology, Medical College of Wisconsin, Milwaukee, Wis (V.P.M.); Department of Radiology, Stanford University School of Medicine, Stanford, Calif (M.W.); Department of Radiology, VA Medical Center, University of California, San Francisco, San Francisco, Calif. (J.Y.); and Department of Radiology, Boston Children's Hospital, Boston, Mass (S.D.B.). Received September 13, 2016; revision requested October 25; revision received February 21, 2017; accepted March 20; final version accepted March 31. Address correspondence to J.L.K. (e-mail: jkemp@divrad.com).

In 2005, the Radiological Society of North America (RSNA) Public Information Committee identified a growing need to support and promote the practice of patient-centered radiology. At the 2006 RSNA Scientific Assembly and Annual Meeting (RSNA 2006), the committee presented *Patient-Centered Radiology: Use It or Lose It*. This course, and others like it, continued to evolve through 2015 as Public Information Committee members and other radiology professionals presented it in various forms at RSNA annual meetings and other societies' and institutions' educational events.

In 2009, the Public Information Committee sponsored the first of several annual patient-centered radiology workshops, during which attendees discussed how best to communicate the importance of patient-centeredness to the radiology community. In 2011, the

RSNA Board approved the formation of the Patient-Centered Radiology Steering Committee with a charge to develop an awareness campaign promoting the need for—and benefits of—patient-centered radiology.

Practicing patient-centered radiology entails more than just talking to patients. In fact, in many cases, meeting with patients is simply not an option. Being patient-centered means considering the patient experience holistically, from scheduling through the imaging examination itself to reporting, billing, and future communications. It means making an effort to improve patient care and experience overall, not just the delivery of results.

At RSNA 2012, the Society launched the *Radiology Cares* campaign with a dedicated Web site (<http://www.radiologycares.org>) offering an online library of educational resources along with a campaign mission statement, goals, and tenets. Subsequent efforts focused on producing awareness videos, developing practice resources, launching an electronic Caring Quilt illustrating radiology's impact on patient care, and conducting a small informal survey of attendees at the 2014 RSNA Annual Meeting.

In 2015, the Patient-Centered Radiology Steering Committee decided to obtain a better understanding of the state of patient-centered care within the radiology community by surveying RSNA members about their

general attitudes and experiences concerning patient-centered radiology, with specific attention paid to radiologist-to-patient communication. Survey objectives were to assess (a) the current state of patient-centered radiology, (b) radiologists' barriers to communicating more directly with patients, and (c) what radiologists and the profession can do to overcome these barriers.

Materials and Methods

The Patient-Centered Radiology Steering Committee collaborated with the RSNA Research Department to develop a survey (Appendix E1 [online]) consisting of nine five-point Likert-scale and open-ended items. Self-administration time was approximately 20 minutes.

In May 2015, an e-mail invitation with a link to the Web-based questionnaire was sent to a random sample of 1994 RSNA members from the United States. After an initially low response rate, the same invitation was sent to a second random sample ($n = 4005$) 2 weeks later. Both samples reflected the regional distribution of RSNA members within the United States. Each sample received two reminder emails; data collection closed 1 month after the last reminder. Additional demographic questions collected information on practice type, years in practice, and subspecialization. No individually identifiable information was collected.

Advances in Knowledge

- Relatively few (31%, 184 of 601) radiology practices regularly promote awareness of the role of radiology in patients' overall health care; however, many, if not most, radiologists believe it is important.
- Relatively few (21%, 128 of 603) radiology practices commonly convey imaging results to patients in person.
- Many, if not most (73%, 421 of 575), radiologists believe that time or workload frequently prevents them from communicating directly with patients, although many radiologists would receive personal satisfaction from doing so.
- Although this survey indicates that enhanced financial reimbursement would effectively provide incentives for many radiologists to communicate more directly with patients, this is not likely forthcoming; more immediately available avenues to direct communication may include social media and integration of radiologists into clinical practice settings.

Implications for Patient Care

- Many radiologists feel constrained by time or workload from communicating more directly with patients, which potentially hampers both optimal patient-centered care and radiologist satisfaction.
- Short of increased financial remuneration for patient-centered services, more immediate avenues available for direct radiologist-to-patient communication include social media and integration of radiologists into clinical practice settings.

<https://doi.org/10.1148/radiol.2017162056>

Content codes: **HP** **PR**

Radiology 2017; 285:601–608

Abbreviation:

RSNA = Radiological Society of North America

Author contributions:

Guarantors of integrity of entire study, J.L.K., S.D.B.; study concepts/study design or data acquisition or data analysis/interpretation, all authors; manuscript drafting or manuscript revision for important intellectual content, all authors; approval of final version of submitted manuscript, all authors; agrees to ensure any questions related to the work are appropriately resolved, all authors; literature research, all authors; clinical studies, J.L.K.; statistical analysis, J.L.K.; and manuscript editing, all authors

Conflicts of interest are listed at the end of this article.

Table 1

Respondents' Geographic Location (Regions Defined by U.S. Census Bureau)

United States Census Bureau Region	Total Respondents (n = 689)	Total RSNA Member Population (n = 13 519)
Northeast	27.4 (189)	24.3 (3281)
Midwest	21.9 (151)	25.0 (3382)
South	31.1 (214)	31.3 (4229)
West	19.6 (135)	19.4 (2627)

Note.—Data are percentages, and data in parentheses are number of respondents.

Statistical analyses were performed by using the χ^2 test and analysis of variance. For χ^2 analysis, the Likert responses *strongly agree*, *agree*, *very often*, *often*, *very likely*, and *likely* were collapsed into one category. The responses *neither agree nor disagree*, *disagree*, and *strongly disagree* were combined into a second group. For analysis of variance, means were calculated for each item by using the following values: strongly agree, 1; agree, 2; neither agree nor disagree, 3; disagree, 4; and strongly disagree, 5. Analyses were performed for region (Northeast, Midwest, South, West), practice type (academic, private, both), years in practice (≤ 10 , 11–20, 21–30, 31–40, 41–50), and degree of patient contact (generally does not have patient interaction, generally has patient interaction). Analysis of variance results are reported as *P* values.

Results

In total, 694 respondents were included in the analysis. Not all respondents answered all questions; the number of respondents who answered each question is indicated. The response rate was 12% (694 of 5890) and was calculated by dividing the number of completed questionnaires ($n = 694$) by the total number of e-mailed individuals ($n = 5999$) after subtracting the 109 invitations that were returned as undeliverable.

Demographic Characteristics

The regional distribution of respondents was similar to that of the selected sample and reflected the population

distribution of RSNA members in the United States (Table 1). A total of 561 respondents provided their number of years in practice. Of those, the majority (66% [372 of 561]) had been in practice for 11 or more years (Table 2). A total of 563 respondents provided practice setting information. Of those, 59% (332 of 563) were in academic practice, and 41% (231 of 563) were in private practice.

Respondents were dichotomized according to subspecialization: those who characteristically have more patient interaction (mammographers, interventionalists, pediatric radiologists, and radiation oncologists) were in one group, and those who characteristically have less patient interaction (all other radiology subspecialists) were in the other. A total of 519 respondents provided subspecialty information. Of those, 31% (162 of 519) were in specialties that characteristically have more patient interaction.

Attitudes, Experiences, and Practices Regarding Patient-centered Care

Respondents were asked about the extent to which they viewed specific patient-centered activities as important to the way they practiced (Fig 1). The vast majority (89% [611 of 684]) agreed that promoting awareness of radiology's role in patients' overall health care is important to the way they currently practice radiology. No substantial differences were found for practice region, practice type, or subspecialty (degree of patient interaction). Those in practice 21–30 years (83% [130 of 156]) or 31–40 years (87% [52 of 60]) were slightly less likely to agree with this statement

Table 2

Respondents' Number of Years in Practice

Time in Practice (y)	Total Respondents (n = 561)
≤ 10	33.7 (189)
11–20	25.7 (144)
21–30	27.8 (156)
31–40	10.9 (61)
41–50	2.0 (11)

Note.—Data are percentages, and data in parentheses are number of respondents.

($P = .035$) than those in practice for 10 years or less (94% [177 of 189]) or 11–20 years (92% [131 of 143]). The majority also agreed that it was important to be available to patients for questions immediately after (71% [482 of 682]) and immediately before (60% [407 of 683]) the patients' procedures or examinations. Fewer respondents agreed that conveying imaging results to patients in person (41% [283 of 683]) or interacting with patients by using social media (32% [219 of 682]) was important to their current practice.

Some significant differences in responses were found for practice type (academic vs private practice) and specialty type (more or less patient interaction). When compared with respondents from academic practices, those in private practice were less likely to agree that the following factors were important to the way they practiced: (a) communicating with patients before examinations (51% of those in private practice [118 of 230] vs 69% of those in academic practice [205 of 299], $P < .001$), (b) conveying imaging results in person (36% of those in private practice [82 of 231] vs 46% of those in academic practice [138 of 298], $P = .015$), (c) being available to patients after examinations (63% of those in private practice [145 of 231] vs 76% of those in academic practice [227 of 297], $P < .001$), and (d) interacting with patients by using social media, video programs, or online patient portals (28% of those in private practice [64 of 231] vs 37% of those in academic practice [109 of 297], $P = .007$).

Figure 1

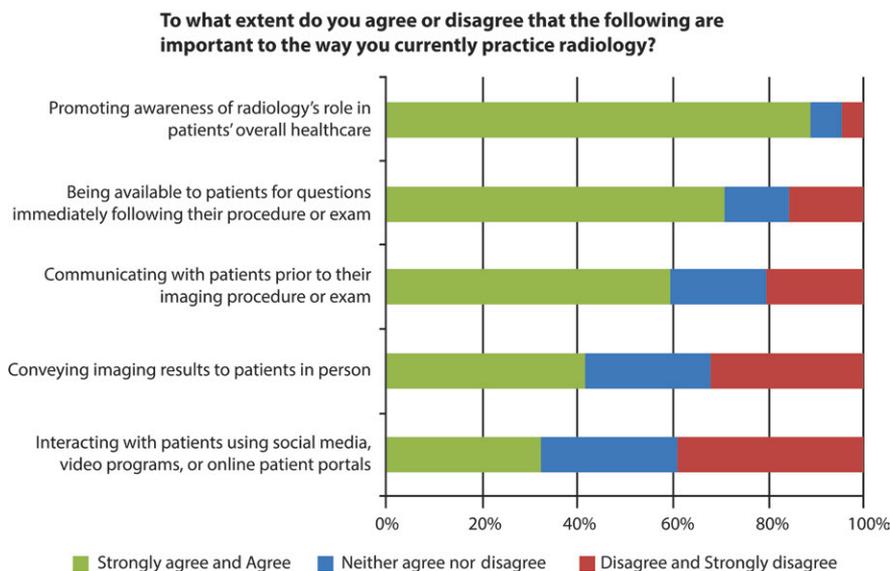


Figure 1: Graph shows results from survey question assessing radiologists' opinions about different types of patient-centeredness.

Similarly, when compared with radiologists from specialties that characteristically have more patient interaction, significantly fewer radiologists from specialties with less patient interaction agreed that it was important to their practice to communicate with patients before examinations (55% [194 of 355] vs 76% [122 of 161], $P < .001$), convey imaging results in person (32% [115 of 355] vs 65% [104 of 161], $P < .001$), or be available to patients after examinations (67% [237 of 354] vs 80% [129 of 161]; $P < .001$). Despite these variances, there were no differences between academic practice and private practice or between subspecialty groups regarding the perceived importance of promoting awareness of the role of radiology in patients' overall health care.

Table 3 depicts respondents' reports on how often their practices engaged organizationally in the patient-centered activities described previously. According to respondents, 54% (328 of 602) of practices communicate often or very often with patients before their imaging procedure or examination, and 49% (295 of 604) of practices make someone available often or very often to patients

for questions immediately after their examinations. Fewer practices (31% [184 of 601]) regularly promote awareness of the role of radiology in patients' overall health care, and fewer still (21% [128 of 603]) commonly convey imaging results to patients in person. Radiologists in an academic practice were significantly more likely to report that their practice actively communicated with patients before imaging examinations (60% [176 of 293]) than were radiologists in a private practice (48% [111 of 230]) ($P = .028$). When compared with radiologists in specialties that characteristically have more patient interactions, radiologists in specialties that characteristically have less patient interaction were significantly less likely to report that their group communicated with patients before imaging examinations (51% [181 of 354] vs 65% [103 of 158], $P = .012$), conveyed results to patients in person (11% [39 of 353] vs 44% [71 of 160], $P < .001$), or made someone available for patients' questions after procedures (45% [160 of 354] vs 59% [94 of 160], $P = .008$).

Regarding barriers to direct patient communication, the majority of respondents (73% [421 of 575]) identified time or workload as the

factor that most frequently prevented them from communicating more directly with patients (Fig 2). Thirty-five percent (200 of 574) of all respondents reported that resistance from referring providers commonly prevented radiologists from communicating with patients. No significant differences existed between those in academic and private practice for any of the queried domains. However, significant differences across all domains were seen between radiologists from specialties with characteristically more patient interaction and those from specialties with characteristically less patient interaction. Those in specialties with characteristically less patient interaction were more likely to indicate that all of the provided barriers often prevented them from communicating with patients (less interaction vs more interaction: time/workload, 80% [279 of 350] vs 60% [97 of 161] [$P < .001$]; administration rules, 25% [86 of 348] vs 14% [22 of 159] [$P = .001$]; resistance to culture change, 35% [122 of 350] vs 22% [36 of 160] [$P = .003$]; referring physician preferences, 40% [140 of 350] vs 25% [41 of 161]; $P < .001$).

When asked what could encourage more communication with patients, the most commonly cited likely motivators were personal sense of satisfaction (74% [423 of 572]) and reimbursement from the Centers for Medicare & Medicaid (57% [323 of 570]) (Fig 3). Recognition from peers or employers and fulfillment of professional certification competencies were less frequently cited motivators. Radiologists with characteristically less patient interaction were less likely to agree that personal sense of satisfaction would be a motivator (70% [247 of 355] vs 83% [135 of 162], $P < .001$). When compared with respondents in academic practice, respondents in private practice were less likely to agree that recognition from their employer would motivate them to communicate more with patients (30% [70 of 230] vs 51% [151 of 298], $P < .001$).

Asked what changes in the field of radiology would help radiologists communicate more directly with patients,

Table 3

How Often Group or Practice as an Organization Is Engaging in Specified Patient-centered Activities

Activity	Very Often	Often	Sometimes	Almost Never	Never	Total
Communicate with patients prior to their imaging procedure or examination (n = 602)	31.6 (190)	22.9 (138)	29.1 (175)	12.5 (75)	4.0 (24)	100
Convey imaging results to patients in person (n = 603)	11.1 (67)	10.1 (61)	44.8 (270)	28.4 (171)	5.6 (34)	100
Make someone available to patients for questions immediately after their procedure or examination (n = 604)	23.8 (144)	25.0 (151)	28.8 (174)	17.4 (105)	5.0 (30)	100
Interact with patients through social media, video programs, or online patient portals (n = 599)	4.2 (25)	8.2 (49)	21.7 (130)	31.6 (189)	34.4 (206)	100
Promote awareness of the role of radiology in patients' overall health care (n = 601)	11.6 (70)	19.0 (114)	41.4 (249)	21.5 (129)	6.5 (39)	100

Note.—Data are percentages, and data in parentheses are number of respondents.

Figure 2

How often do the following prevent you from communicating directly with patients?

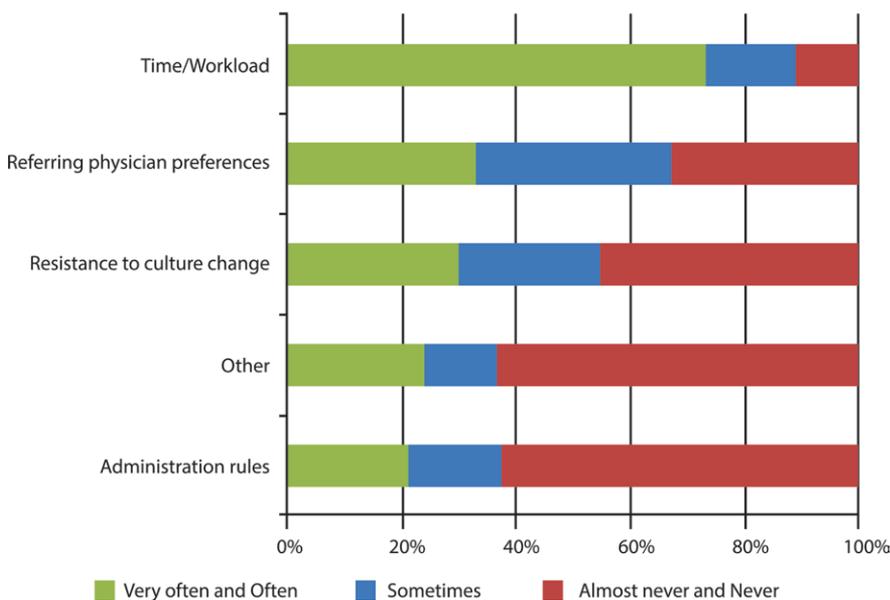


Figure 2: Graph shows results from survey question assessing barriers to patient communication.

respondents made more comments about reimbursement and compensation concerns than they did about any other category.

Discussion

A major shift is occurring in radiology, as it moves from volume-based

to value-based care (1,2). One core component of value-based care is the patient experience (3–6). The fundamental premise of patient-centered care is not only to orient health care to the best interests of patients but also to more fully accommodate their values and preferences (7). In this survey, we focused on one major element of patient-centered radiology: radiologist-to-patient communication. A growing literature on patient preferences regarding direct communication with radiologists has focused on results reporting and associated consultation (8,9).

Numerous articles report that many patients continue to prefer to receive their imaging results from their referring providers (10–12), but the available data also suggest that a substantial number of patients do desire direct consultation with radiologists (8,13,14). Moreover, although several studies suggest that many patients do not know who radiologists are or what they do, some studies have demonstrated convincingly that patients who do understand the roles of radiologists are more likely to prefer consultation with a radiologist (8,15,16).

The growing literature on patient preferences for direct communication with the radiologist is in contrast to the paucity of literature on radiologists' experiences. Indeed, to our knowledge, no prior research has surveyed radiologists' attitudes and practices regarding aspects of patient-centered care that focus on direct patient communication. Our survey aimed to fill this gap by exploring radiologists' current attitudes and practices around patient-centered care, focusing specifically on patient-related communication. We further sought to probe the barriers to such care and identify measures that might alleviate them.

Our results point to an important contradiction between what radiologists value and how they practice. Although a large majority of the radiologists in our survey believed in the importance of promoting awareness of the radiologist's role in health care and of being available for questions immediately after a patient's imaging study

Figure 3

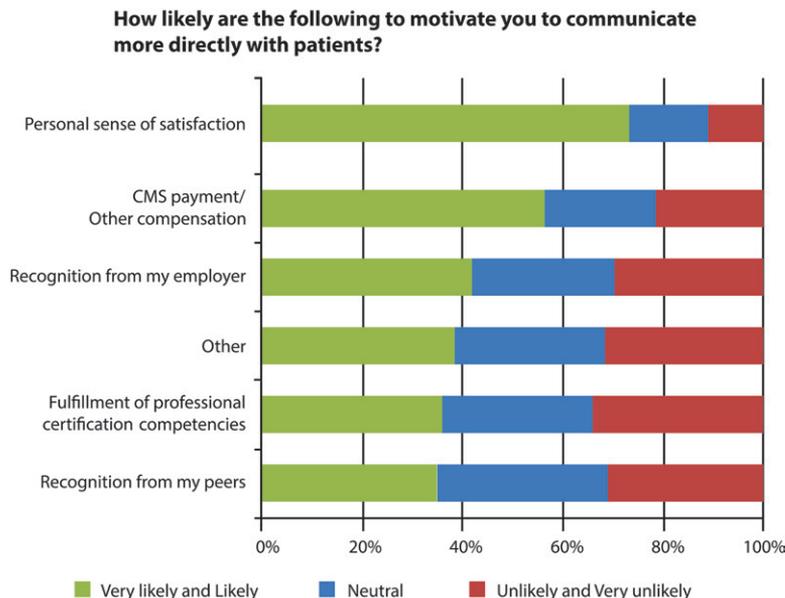


Figure 3: Graph shows results from survey question assessing what would motivate radiologists to communicate more directly with patients. *CMS* = Centers for Medicare & Medicaid Services.

or procedure, only a minority of these radiologists' practices are implementing measures to achieve these goals. Moreover, twice as many radiologists in our survey believed in the importance of conveying imaging results to patients as were actually doing it in practice.

Perhaps more importantly, our results suggest an important disconnect between the values espoused by radiology leadership and the values and practices in the field. Indeed, individual and societal leaders in radiology have long emphasized the need for radiologists to be more directly communicative with patients, both as a matter of patient-centered care and as a matter of long-term professional viability (17). Some have even advocated that the interests of both patients and radiologists would be best served by having radiologists sacrifice revenue for the sake of more direct patient care engagement (2). The RSNA's *Radiology Cares* campaign and the American College of Radiology's *Imaging 3.0* initiative have pushed patient-centered care and more direct patient communication into the limelight. However, our survey results

suggest that these endeavors have not yet gained enduring traction within the larger community of radiologists.

In developing strategies to bridge this gap and facilitate greater engagement of radiologists in patient-centered care, at least as it relates to patient communication, it is noteworthy that the majority of responding radiologists across all demographic groups saw personal satisfaction as an important incentive for participating directly in such communication. Insofar as job satisfaction is associated with physician well-being, including radiologists, increased personal satisfaction from more direct patient engagement could help mitigate radiologists' experience of burnout (18,19). This might be beneficial to radiologists whose pressured drive to maintain income by driving relative value units contributes to conditions that fuel burnout. At the same time, our results persuasively show that time and workload are significant barriers to more direct patient communication by radiologists, which highlights a key conundrum: Radiologists' success in striving so arduously to maintain

income may create impediments to the satisfaction and well-being of both patients and radiologists (20). To further understand this paradox, future assessments of radiologist job satisfaction should incorporate patient-centered practices and patient interaction among the variables that have been historically included.

Although our results suggest that increased financial remuneration for patient-centered services would lower the barrier to ideal practice, herein lies the rub: Radiologists could immediately reduce their workload and increase their available time by hiring more radiologists into their practice. This, of course, would reduce per capita revenue. Thus, there is a fundamental economic dynamic functioning here that cannot be dismissed, and it points to a fundamental tension currently at play within radiology. Our data suggest that calls for increased interactions with patients would gather more steam if the reduction in revenues brought by increased direct interactions with patients were offset by demonstrably enhanced reimbursement for the noninterpretive time. It would seem reasonable to suggest that future strategies should focus on promoting patient-centered radiology in a way that is compatible with maintaining productivity and revenue if the notion is to gain a stronger foothold among radiologists in general.

Several early avenues do hold promise in enhancing patient-centered practices without compromising revenue. The integration of reading rooms within subspecialty clinics may serve both to maintain revenue through newer value-based reimbursement models and to enhance patient care through more primary radiologist engagement with providers and patients (21). Social media platforms now offer interesting opportunities to enhance radiologist-patient communication without compromising productivity and revenue (22). The Society of Abdominal Radiology, for example, sponsors a Twitter account that directly answers patients' questions about prostate cancer (23). Individual radiology practices could establish similar initiatives for their own targeted

populations. The Centers for Medicare & Medicaid Services Physician Quality Reporting System 2016 Radiology Preferred Specialty Measure Set now includes patient-centered quality metrics, such as appropriate use and radiation reduction, but does not yet address radiologist and patient communication. Further efforts toward incorporation of direct communication into these metrics may prove a useful focus of political advocacy.

Radiology leaders have made a compelling argument that if radiologists do not make a more successful transition to patient-centered care immediately, radiology as a profession will seriously decline over the long term. Radiologists who do not adopt more direct patient engagement into their practices now, even without immediate revenue offset, may find themselves in retrospect to have been short-sighted and to have acted outside contemporary standards of best practice.

Of course, many other aspects of patient-centered care do not involve direct radiologist-to-patient engagement. The full embodiment of patient-centered radiology incorporates every aspect of the patient interface with radiologic services. These include the ease of scheduling and registration, waiting room comfort, wait times, sedation protocols, transparent billing practices, and the availability of radiologic reports on patient portals. To help better understand barriers and potential solutions for implementation, future research should address radiologists' views toward other aspects of patient-centeredness.

This study had some important limitations. Although we had close to 700 respondents who were well matched geographically to radiologists in the United States, the response rate was disappointingly low. This strongly suggests the possibility of nonresponse bias, although our data do not permit calculation of how nonrespondents and respondents might have differed. The low rate may have, in some part, reflected the substantial downward trend in survey response rates reported more broadly (24). Further, we did not offer

a financial incentive. Such payments substantially increase survey response rates among busy medical specialists (25). Another source of potential bias is the relatively large proportion of radiologists among our respondents who were in academic practice relative to the American College of Radiology's most recent workforce survey (26). The reasons and effect of this disproportion are speculative, at best.

In conclusion, as radiology continues to shift from a volume-based to a value-based practice, the art of patient-centered care will continue to grow in prominence and importance because of its potential to enhance the patient experience throughout the continuum of care. Practicing patient-centered radiology has the added benefit of making the essential role of the radiologist in health care more visible to our patients. Most importantly, it assures patients that the care we provide to them is no less than the care we would provide a loved one.

Although patient-centeredness in radiology encompasses a broad range of potential patient interactions with radiologic services, direct communication with patients has been the aspect of patient-centeredness that has received the most attention among radiology leaders and within the literature. In regard to this key aspect of patient-centeredness, our survey results suggest that a disconnect exists between what radiology leadership has espoused and how many, if not most, radiologists currently practice. These results show a contradiction between what radiologists value and how they currently practice; future efforts to make patient-centered radiology a reality should include a focus on how to better implement goals and ideals about communication into day-to-day academic and private practice. Specific efforts of political advocacy, scholarship, and practice would be useful to develop and promote additional patient-centered initiatives that maintain productivity and revenue. At the same time, our radiology culture may need to adapt to decreased income to accomplish more ideal patient-centered care. Ultimately, radiologists might find themselves more satisfied for having

done so. Regardless, if this change is not internally motivated, external forces may impose it as the health care system evolves.

Acknowledgments: The authors thank their colleagues from RSNA's now-retired Patient-Centered Radiology Steering Committee for their expertise, input, and assistance in survey design, data organization and analysis, and manuscript drafting and revision, including Brian S. Funaki, MD, Susan D. John, MD, and Volney F. Van Dalsem, III, MD. The authors also thank Bradford Petersen of the RSNA for his assistance in the survey questionnaire design and data collection and analysis used in this article. The authors also thank Marijo Millette and Donald Ferreira of RSNA for their support in writing the survey, collecting and analyzing the results, and editing the manuscript before submission.

Disclosures of Conflicts of Interest: J.L.K. disclosed no relevant relationships. M.C.M. disclosed no relevant relationships. V.P.M. disclosed no relevant relationships. M.W. Activities related to the present article: disclosed no relevant relationships. Activities not related to the present article: disclosed no relevant relationships. Other relationships: is a member of the General Electric National Football League advisory board. J.Y. Activities related to the present article: disclosed no relevant relationships. Activities not related to the present article: received a grant from Echopixel, institution holds a patent for enhanced CT colonography. Other relationships: is a member of the General Electric National Football League advisory board. S.D.B. disclosed no relevant relationships.

References

1. Patti JA, Berlin JW, Blumberg AL, et al. ACR white paper: the value added that radiologists provide to the health care enterprise. *J Am Coll Radiol* 2008;5(10):1041-1053.
2. Krishnaraj A, Weinreb JC, Ellenbogen PH, Patti JA, Hillman BJ. Radiology in 2022: challenges and opportunities in the coming decade: proceedings of the 12th annual ACR forum. *J Am Coll Radiol* 2013;10(1):15-20.
3. Swan JS, Pandharipande PV, Salazar GM. Developing a patient-centered radiology process model. *J Am Coll Radiol* 2016;13(5):510-516.
4. New ACR Commission on Patient Experience to Advance Patient Centered Radiology. Next Phase of Imaging 3.0. American College of Radiology. <http://www.acr.org/About-Us/Media-Center/Press-Releases/2015-Press-Releases/20150707-New-ACR-Commission-on-Patient-Experience-to-Advance-Patient-Centered-Radiology>. Published July 7, 2015. Accessed March 3, 2016.
5. Rosenkrantz AB, Pysarenko K. The service encounter in radiology: acing the "moments

- of truth” to achieve patient-centered care. *Acad Radiol* 2015;22(2):259–264.
6. Rosenkrantz AB, Pysarenko K. The patient experience in radiology: observations from over 3,500 patient feedback reports in a single institution. *J Am Coll Radiol* 2016;13(11):1371–1377.
 7. Truog RD. Patients and doctors: evolution of a relationship. *N Engl J Med* 2012;366(7):581–585.
 8. Pahade J, Couto C, Davis RB, Patel P, Siewert B, Rosen MP. Reviewing imaging examination results with a radiologist immediately after study completion: patient preferences and assessment of feasibility in an academic department. *AJR Am J Roentgenol* 2012;199(4):844–851.
 9. Schreiber MH, Leonard M Jr, Rieniets CY. Disclosure of imaging findings to patients directly by radiologists: survey of patients’ preferences. *AJR Am J Roentgenol* 1995;165(2):467–469.
 10. Kuhlman M, Meyer M, Krupinski EA. Direct reporting of results to patients: the future of radiology? *Acad Radiol* 2012;19(6):646–650.
 11. Cabarrus M, Naeger DM, Rybkin A, Qayyum A. Patients prefer results from the ordering provider and access to their radiology reports. *J Am Coll Radiol* 2015;12(6):556–562.
 12. Mangano MD, Rahman A, Choy G, Sahani DV, Boland GW, Gunn AJ. Radiologists’ role in the communication of imaging examination results to patients: perceptions and preferences of patients. *AJR Am J Roentgenol* 2014;203(5):1034–1039.
 13. Johnson AJ, Easterling D, Williams LS, Glover S, Frankel RM. Insight from patients for radiologists: improving our reporting systems. *J Am Coll Radiol* 2009;6(11):786–794.
 14. Ragavendra N, Laifer-Narin SL, Melany ML, Grant EG. Disclosure of results of sonographic examinations to patients by sonologists. *AJR Am J Roentgenol* 1998;170(6):1423–1425.
 15. Brown SD. Communication of radiology reports to patients: does one size fit all? *J Am Coll Radiol* 2015;12(10):1007–1008.
 16. Mangano MD, Bennett SE, Gunn AJ, Sahani DV, Choy G. Creating a patient-centered radiology practice through the establishment of a diagnostic radiology consultation clinic. *AJR Am J Roentgenol* 2015;205(1):95–99.
 17. Berlin L. Communicating results of all outpatient radiologic examinations directly to patients: the time has come. *AJR Am J Roentgenol* 2009;192(3):571–573.
 18. Ramirez AJ, Graham J, Richards MA, Cull A, Gregory WM. Mental health of hospital consultants: the effects of stress and satisfaction at work. *Lancet* 1996;347(9003):724–728.
 19. Harolds JA, Parikh JR, Bluth EI, Dutton SC, Recht MP. Burnout of radiologists: frequency, risk factors, and remedies—a report of the ACR Commission on Human Resources. *J Am Coll Radiol* 2016;13(4):411–416.
 20. Brown SD, Goske MJ, Johnson CM. Beyond substance abuse: stress, burnout, and depression as causes of physician impairment and disruptive behavior. *J Am Coll Radiol* 2009;6(7):479–485.
 21. Rosenkrantz AB, Lepor H, Taneja SS, Recht MP. Adoption of an integrated radiology reading room within a urologic oncology clinic: initial experience in facilitating clinician consultations. *J Am Coll Radiol* 2014;11(5):496–500.
 22. Kadom N, Nagy P, Hawkins CM. The role of social media in quality improvement. *J Am Coll Radiol* 2017;14(4):577–578.
 23. Turkbey B, Rosenkrantz AB. Engaging and educating patients in prostate imaging via social media. *Abdom Radiol (NY)* 2016;41(5):798.
 24. Assessing the Representativeness of Public Opinion Surveys. Pew Research Center US Politics & Policy. Case 2:13-cv-00193, Document 730-4, May 15, 2012, Files in TXSD November 17 2014.
 25. Keating NL, Zaslavsky AM, Goldstein J, West DW, Ayanian JZ. Randomized trial of \$20 versus \$50 incentives to increase physician survey response rates. *Med Care* 2008;46(8):878–881.
 26. Bluth EI, Cox J, Bansal S, Green D. The 2015 ACR Commission on Human Resources Workforce Survey. *J Am Coll Radiol* 2015;12(11):1137–1141.