



SELECTED
**INSTRUCTIONAL
COURSE LECTURES**

THE AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS

MARK W. PAGNANO

EDITOR, VOL. 62

COMMITTEE

MARK W. PAGNANO

CHAIR

CRAIG J. DELLA VALLE

KENNETH A. EGOL

ROBERT A. HART

PAUL TORNETTA III

EX-OFFICIO

DEMPSEY S. SPRINGFIELD

DEPUTY EDITOR OF THE JOURNAL OF BONE AND JOINT SURGERY
FOR INSTRUCTIONAL COURSE LECTURES

Printed with permission of the American Academy of Orthopaedic Surgeons. This article, as well as other lectures presented at the Academy's Annual Meeting, will be available in March 2013 in Instructional Course Lectures, Volume 62. The complete volume can be ordered online at www.aaos.org, or by calling 800-626-6726 (8 A.M.-5 P.M., Central time).



The Emerging Case for Shared Decision Making in Orthopaedics

Jiwon Youm, MS, Kate Chenok, MBA, Jeff Belkora, PhD, Vanessa Chan, MPH, and Kevin J. Bozic, MD, MBA

An Instructional Course Lecture, American Academy of Orthopaedic Surgeons

The Institute of Medicine outlined a standard for patient-centered care in its seminal publication *Crossing the Quality Chasm*¹. Patient-centered care has since been the centerpiece of health-care reform in the U.S. Shared decision-making interventions, which include decision aids and communication aids, are a formal embodiment of this philosophy. While the concept of shared decision making and its relevance to orthopaedics have been well documented, and despite evidence that shows shared decision-making tools to be effective, shared decision making has not been widely adopted by orthopaedists. In this article, benefits of shared decision making, barriers to adoption and implementation of shared decision making, and potential ways to encourage adoption of shared decision making are outlined from multiple perspectives: patient, provider, and payer-purchaser. Additionally, resources for adoption of shared decision making into clinical practice are provided. Finally, opportunities and incentives to adopt shared decision making in orthopaedics are discussed.

Total joint arthroplasty of the hip and knee can be an effective procedure for reducing pain and improving function in patients with disabling osteoarthritis of the hip or knee². Since the indications for total joint arthroplasty are heavily dependent on the quality of life and expectations of the patient, it is by definition a so-called preference-sensitive procedure. As with other preference-sensitive procedures, total joint arthroplasty utilization rates vary widely throughout different geographic regions of the U.S.³. A portion of this geographic variation may be attributed to patient characteristics such as sex^{4,5}, ethnicity⁶, and age⁷. However, variations are not explained by differences in population characteristics alone⁸⁻¹⁰. Decisions are also impacted by the calculations of patients with regard to the trade-off between the perceived risks and benefits, their views on potential outcomes of surgery and the severity of their disease, their willingness to undergo surgery¹¹, as well as their opinions about the role of their physician in medical decision making^{12,13}. Moreover, studies have suggested that supply-induced de-

mand (based on the density of specialist physicians in a particular geographic area), differences in physician practice patterns, or both may have a greater impact on the utilization of total joint arthroplasty than do patient or population characteristics^{14,15}.

To address geographic variation in practice patterns, multiple health-care stakeholders have suggested that an increased emphasis on informing patients, eliciting their preferences, and involving them in the choice of therapy are important tools^{10,14}. Indeed, the Institute of Medicine outlined a standard for patient-centered care in *Crossing the Quality Chasm*: "Providing care that is respectful of and responsive to individual patient preferences, needs, and values, and ensuring that patient values guide all clinical decisions."¹ Shared decision-making interventions are a formal embodiment of this philosophy.

What Is Shared Decision Making?

The term *shared decision making* was coined in 1982 in a report from the President's Commission for the Study of

Disclosure: One or more of the authors received payments or services, either directly or indirectly (i.e., via his or her institution), from a third party in support of an aspect of this work. In addition, one or more of the authors, or his or her institution, has had a financial relationship, in the thirty-six months prior to submission of this work, with an entity in the biomedical arena that could be perceived to influence or have the potential to influence what is written in this work. No author has had any other relationships, or has engaged in any other activities, that could be perceived to influence or have the potential to influence what is written in this work. The complete **Disclosures of Potential Conflicts of Interest** submitted by authors are always provided with the online version of the article.

Ethical Problems in Medicine and Biomedical and Behavioral Research entitled "Making Health Care Decisions: The Ethical and Legal Implications of Informed Consent in the Patient-Practitioner Relationship."¹⁶ At the time, Wennberg et al., in a study from Dartmouth, had documented a wide variation in procedure rates and were conceptually isolating warranted from unwarranted variation¹⁷. Other health services researchers noted that, in some conditions, physician recommendations often varied from care that had been proven effective¹⁸. These researchers defined effective care as care with known outcome rates, patient agreement on the ranking of outcomes, and a rate of good outcomes far outweighing the bad ones. Conversely, in preference-sensitive conditions, outcomes are uncertain and valued differently by different patients¹⁹. Examples of preference-sensitive conditions include hip osteoarthritis, knee osteoarthritis, prostate cancer, early-stage breast cancer, breast reconstruction, uterine fibroids, and coronary artery disease.

Shared decision making represented a movement to appeal to health-care consumers to become informed and involved in their health-care decision making so that they would obtain effective care when appropriate and negotiate preference-sensitive recommendations otherwise. By 1997, Charles et al. had operationalized the concept of shared decision making to include active participation by all parties, sharing of information about values as well as facts, and agreement on a course of action to be implemented²⁰.

The model of shared decision making that we focus on in the present study involves conversation between patients and physicians (or other providers) about the patients' options, needs, preferences and values, and possible outcomes. Frequently, but not exclusively, shared decision making can be facilitated by patient decision aids and communication aids. Decision aids are tools (print, video, or web-based resources) to inform patients about their choices and lead patients through critical reflection that will help them to articulate their values and preferences. Decision aids are asso-

ciated with increased patient knowledge and reduced decisional conflict or patient uncertainty about which choice best meets their needs²¹. Many groups have contributed to the development of decision aids, including the International Patient Decision Aid Standards Collaboration, Healthwise, Health Dialog, and the Informed Medical Decisions Foundation (IMDF) among others (Table I). Tools developed for patients with hip and knee osteoarthritis include video testimony from patients with hip and knee osteoarthritis who have chosen and undertaken different treatment options¹².

Communication aids include question lists and consultation audio recordings and summaries. Question lists are associated with increased question-asking²², while audio recordings and summaries are associated with increased information recall²³. Often a health coach assists patients in using communication aids, such as when a coach helps patients to develop a list of relevant questions and concerns to discuss with their physician, and ensures that they can record visits and obtain after-visit summaries^{5,24,25}. This approach has been used with breast cancer patients and has been tested in patients with hip and knee osteoarthritis²⁶.

What Is the Evidence for Shared Decision Making?

Evidence has shown that shared decision-making tools such as decision and communication aids are effective in informing and involving patients in their treatment decisions, especially for preference-sensitive treatments such as total joint arthroplasty. Generally, informed and involved patients have better psychosocial and, in some cases, physical outcomes²⁷.

The most comprehensive source of evidence for decision aids can be found in a Cochrane Review published in 2011²¹. This systematic review of eighty-six studies published through 2009 provides substantial deployment of and evidence for the benefits provided by decision aids. We summarize the major findings from this systematic review below.

Additionally, IMDF and Health Dialog have implemented shared decision making for patients with hip and knee

arthritis at a growing number of surgeon offices, health plans, and hospitals. One system-wide implementation has been at Group Health Cooperative, Seattle, Washington, where shared decision-making tools were implemented across twelve specialties, including orthopaedics. Study results were not published at the time of writing, but the system reports increased physician and patient satisfaction with decision quality.

What Are the Potential Benefits of Shared Decision Making?

Patient Perspective

The use of decision and communication aids increases patient knowledge and understanding of treatment options, risks, and benefits; creates more accurate expectations; increases active participation in decision making²⁸; and reduces decisional conflict related to feeling uninformed²¹. Their use also results in improvement in the match between patient values and subsequent treatment decisions¹⁴, higher patient satisfaction, and more informed decision making. Decision and communication aids may also reduce overuse of certain elective surgical procedures (e.g., those for a herniated disc) without apparent adverse effects on health outcomes²⁹. In addition, they may also reduce disparities in access to care among ethnic groups^{30,31}.

Provider Perspective

Time is one of the most valued commodities in modern medicine. Increasing clinical and administrative demands have resulted in decreased provider satisfaction^{32,33}. The aforementioned Cochrane Review included nine studies that evaluated the effect on consultation time (an eight-minute decrease to a twenty-three-minute increase). However, results were not pooled, given the heterogeneity of the clinical setting (e.g., atrial fibrillation, breast cancer genetic testing, and prostate cancer screening), the variability in the way length of time was recorded, and the variability in distributing decision aids (before consultation or at the time of consultation). Perhaps most importantly, none of the nine aforementioned studies evaluated the impact of shared decision making on the length of a visit in

TABLE 1 Resources for Adoption of Shared Decision Making into Clinical Practice

Organization	Resource Offered	Web-Site Address
Informed Medical Decisions Foundation (IMDF)	Online, video, and print decision aids for a variety of conditions including several related to orthopaedics (e.g., torn meniscus, early osteoarthritis, herniated disc, acute low back pain, chronic low back pain, knee osteoarthritis, hip osteoarthritis, spinal stenosis, and osteoporosis).	www.informedmedicaldecisions.org/
Health Dialog	Works with IMDF to produce and distribute decision aids and has additional programs that incorporate health coaching.	www.healthdialog.com
CareCoach	Online and smart phone communication aids, which include providing user with ability to listen to audio recordings from real clinical encounters for different conditions; ability to make a list of questions online and transfer them to smart phone via app; and ability to record consultation using smart phone app and store and share the recordings in an online "audio health record."	www.carecoach.com
National Health Service	Standardized online decision aid with a form that allows user to print a summary to give to the provider.	www.nhsdirect.nhs.uk/DecisionAids/.aspx
Agency for Healthcare Research and Quality (AHRQ)	Print and electronic resources for clinicians and patients, and an online interface for building and printing a list of questions for an upcoming visit.*	www.effectivehealthcare.ahrq.gov/index.cfm/tools-and-resources/patient-decision-aids/ for "Patient Decision Aids" and www.ahrq.gov/questions/ for "Questions Are the Answer"
Healthwise	Online decision aids for a wide variety of conditions, including those related to orthopaedics.	www.healthwise.org
Ottawa Hospital Research Institute	Links to freely available web-based decision aids and to other commercially available decision aids for specific conditions.	http://decisionaid.ohri.ca/
Dartmouth-Hitchcock Center for Shared Decision Making	Guidelines on how to integrate decision aids and decision support into practice and training modules for decision support as a clinical skill.	www.med.dartmouth-hitchcock.org/csdm_toolkits.html
International Patient Decision Aid Standards Collaboration	Checklist for evaluating quality of decision aids	http://ipdas.ohri.ca/

*AHRQ decision aid only available for prostate cancer as of May 1, 2012.

orthopaedics. Thus, it remains unclear what impact shared decision-making tools will have on the length of an orthopaedic office visit.

There are many reasons why shared decision making could be time-saving if decision aids are distributed prior to the appointment³⁴. Patients come with evidence-based information, not misconceptions picked up from the Internet and other sources³⁵ that often require time to clarify. More informed patients who ask better questions can also produce higher provider satisfaction²⁴.

One recurring frustration for surgeons who treat patients with advanced arthritis of the hip or knee may be the

amount of time spent discussing and fielding questions about surgical techniques, implant options, and perioperative care protocols with patients who then opt for nonsurgical treatment options. A major reason for this may be that physicians are not skilled at predicting patient preferences³. Instead, with decision aids, patients may advance in their stage of decision making even before the office visit. Thus, depending on the patient preference toward surgical or nonsurgical treatment option, the orthopaedist can spend more time discussing the option already preferred by the patient (e.g., surgical versus nonsurgical). This may not necessarily reduce the length of the

visit but would likely improve satisfaction for both patients and providers.

As the U.S. population continues to age, demand for total joint arthroplasties is expected to escalate. By 2030, the demand for total knee replacements in the U.S. is projected to grow by 673% to 3.48 million procedures³⁶. This enormous increase in the number of patients with hip and knee arthritis will necessitate more efficient approaches to assessing patient preferences for managing these disabling conditions.

Shared decision-making tools can also decrease the risk of medical malpractice claims. Physicians who incorporate shared decision making are less likely to be

sued for adverse outcomes because patients who participate in shared decision-making programs are more satisfied than those who do not³⁷. More satisfied patients are less likely to pursue legal action in cases with adverse outcomes³⁸.

Payer-Purchaser Perspective

Health-care purchasers and health plans are also interested in deployment of shared decision making. Costs for musculoskeletal care are one of the largest and most rapidly increasing components of medical costs³⁹. Patients themselves are increasingly responsible for sharing in the costs of their care. Therefore, it is vital that patients be engaged in their treatment decisions and choose care that aligns with their preferences. As discussed above, shared decision making results in higher-quality decisions, which may be associated with more appropriate and patient-centered utilization of surgical interventions¹¹. Reduction in overuse of elective surgery may be cost-saving^{40,41}. More importantly, as shared decision making reduces decisional conflict and time to treatment, patients may return to work earlier and be more productive.

Purchasers and health plans already offer a range of health education, second opinion, and wellness tools to their employees and members. While many of these include the same evidence presented in shared decision-making tools, such as those developed by Health Dialog⁴², the purchaser and payer cannot substitute for true shared decision making between patients and their physicians. Interviews with purchasers confirm the perceived importance of shared decision making and recognition that the tools they are providing are intended to be used by patients and their physicians. At the same time, purchasers believe that shared decision making is a vital component of high-quality care. Quality and process measures in use for patient-centered medical homes already include patient engagement measures, and it should be expected that measures for specialty care, such as those that will be used to evaluate accountable care organizations, may include similar measures.

What Are the Obstacles to Adoption and Implementation of Shared Decision Making?

Patient Perspective

Patients lack familiarity and experience with evaluating and expressing their values and preferences in conversations with physicians. In fact, more studies have shown that consumers have positive attitudes toward shared decision making rather than negative or passive attitudes; however, other studies have found lower rather than higher engagement in shared decision-making behavior⁴³. Furthermore, information overload may be a considerable barrier for patients whose health literacy is low. Decision-support intervention tools that are tailored to a patient's level of education may help to eliminate this barrier.

Provider Perspective

The initial barrier for most health-care providers is limited familiarity with the concept of shared decision making and available tools⁴⁴. Many providers also perceive that shared decision making creates additional workflow burden and increases costs.

However, the biggest obstacle may be our fee-for-service payment system, which creates disincentives for physicians to spend substantial time emphasizing the potential benefits of nonoperative treatment. If patients who use decision and communication aids are less likely to choose surgery²¹, the concern that physicians may have for decreased procedure volumes and the resultant decrease in compensation is logical, expected, and understandable. Furthermore, physicians are not currently reimbursed for the additional time spent discussing treatment options⁴⁵.

Health plans and purchasers are enthusiastic about the concept of patient engagement and providing information regarding treatment alternatives for specific conditions to patients that is culturally appropriate and tailored to their literacy level; however, their approaches are frequently through third-party providers (e.g., Healthwise and Health Dialog), and surgeons may not be aware of or be prepared to take

advantage of patients' preparation through these tools. Furthermore, patients may be mistrustful of information regarding treatment options that is provided by their health plan or employer rather than their physician.

Collectively, these challenges necessitate the development of specialized systems and processes for widespread incorporation of shared decision-making tools into clinical practice.

Potential Ways to Encourage Adoption of Shared Decision Making

Patient Perspective

To encourage the active participation of patients in shared decision making, they must first be educated in the benefits of actively engaging in their care, which can allow increased control over their health and treatment options. To facilitate engagement, access to decision and communication aids must be improved. Currently, decision and communication aids may be directly available to patients through their health plan (e.g., Group Health Cooperative), or indirectly through a third-party (e.g., Health Dialog). The Agency for Healthcare Research and Quality Innovations Exchange also summarizes available decision aids and makes some of their own decision aids available as well. The Dartmouth-Hitchcock Medical Center has a decision-aid library available for their patients. However, patients outside these networks do not have ready access to decision and communication aids. Additionally, financial incentives for patients must be created. Payers and purchasers can incentivize patients through novel benefit designs (e.g., a lower co-pay when engaging in shared decision making). Further research is needed to determine the role of providing culturally sensitive material and a level of detail appropriate for different levels of health literacy.

Provider Perspective

Despite several decades of research into the benefits of shared decision making, provider familiarity with shared decision making remains low⁷. This lack of familiarity likely stems from the absence of formal education in shared decision making during medical training. Thus,

training in shared decision making should be incorporated into the medical school and postgraduate medical education curriculum. For those who have already completed their training, the range of tools in use by third parties should be publicized widely, patient decision aids should be made available readily, and physicians should be trained to take advantage of them⁴⁶. A list of available resources and their web addresses are listed in Table I. Shared decision-making training could be included as part of licensure or certification as well. Practice models⁴⁴ must also be developed to facilitate implementation; of note, shared decision making is currently being used at several demonstration sites for certain conditions⁴⁷. Furthermore, higher levels of evidence will be necessary to convince physicians who remain skeptical of the benefits of shared decision making.

Perhaps most importantly, both financial and medicolegal incentives must be created to facilitate widespread adoption of shared decision making. Financial incentives are especially important, given the primary provider concern that adoption of shared decision-making tools may decrease the number of surgical procedures and therefore provider compensation.

In general, practical protocols and incentives at the system level will be necessary to facilitate widespread adoption of shared decision-making tools.

Opportunities for Orthopaedics

A number of federal and state mandates have been enacted to create both financial and medicolegal incentives for adopting shared decision making. The Patient Protection and Affordable Care Act (PPACA) of 2010 includes several demonstration projects that would provide additional reimbursement to clinicians who incorporate shared decision-making approaches into their practice. This could offset some of the costs associated with implementation and stimulate adoption of shared decision-making tools into clinical practices, especially if studies can demonstrate value in terms of improved patient satisfaction and more efficient resource utilization. Sections 3506 and

3013 specify funding for development, testing, and promotion of decision aids, and for the development of quality measures that address patient-centered care and shared decision making. In addition, the PPACA established the Patient-Centered Outcomes Research Institute to focus on patient-reported outcomes measures, including shared decision making.

As the fundamental model of provider reimbursement shifts from fee-for-service to value-based payment, shared decision making will play a major role. For example, Medicare reimbursement will increasingly be tied to shared decision making⁴⁸. The Hospital Value-Based Purchasing program, a provision of the PPACA that is funded by a 1% (and eventually 2%) withholding from participating hospitals' diagnosis-related group payments, will pay for better care based on clinical outcomes and patient experience. The latter is measured by the Hospital Consumer Assessment of Healthcare Providers and Systems hospital survey, which includes questions regarding provider assessment of patient preferences and values in medical decision making.

In the private sector as well as with Medicare, the move to other new payment models (e.g., bundled payments, accountable care organizations, and patient-centered medical homes) will eventually require orthopaedists to build shared decision making and other features of patient-focused care into their clinical workflow. In the final accountable care organizations ruling⁴⁹, patient engagement is one of the patient-centeredness criteria proposed by the Centers for Medicare & Medicaid Services. According to that ruling, measures to promote patient engagement "may include, but are not limited to, the use of decision support tools and shared decision making methods with which the patient can assess the merits of various treatment options in the context of his or her values and convictions." Patient activation increases adherence⁵⁰ and improves outcomes.

A parallel set of initiatives to improve informed consent is under way, and will also encourage the use of shared decision making. Washington State

passed legislation (Senate Bill 5930) in 2007 that provides for reduced professional liability for doctors who use shared decision-making interventions as part of an informed consent process. If a patient signs a written acknowledgement that he or she participated in shared decision making with use of certified decision aids, the burden for establishing a legal claim against the physician for tort violation of informed consent changes from "a preponderance of evidence" to "clear and convincing evidence." Patients are also asked to identify the name of the decision aid and agree that questions were answered to their satisfaction. In effect, this legislation provides substantial legal protection to physicians and an incentive for them to provide patients with certified decision aids proven to be effective in informing patients.

This is a critical time for orthopaedic surgeons to take a leading role in promoting shared decision making. A combination of legislative mandates, the creation of financial and medicolegal incentives for using shared decision making (and penalties for not using it), and growing interest among purchasers, health plans, and patients all create a moment ripe for action.

Jiwon Youm, MS
Jeff Belkora, PhD
Vanessa Chan, MPH
Kevin J. Bozic, MD, MBA
School of Medicine (J.Y.) and Philip R. Lee
Institute for Health Policy Studies
(J.B., V.C., and K.J.B.), University of California,
500 Parnassus, MU 320W,
San Francisco, CA 94143-0728.
E-mail address for K.J. Bozic:
kevin.bozic@ucsf.edu

Kate Chenok, MBA
Pacific Business Group on Health,
221 Main Street, Suite 1500,
San Francisco, CA 94105

Printed with permission of the American Academy of Orthopaedic Surgeons. This article, as well as other lectures presented at the Academy's Annual Meeting, will be available in March 2013 in Instructional Course Lectures, Volume 62. The complete volume can be ordered online at www.aaos.org, or by calling 800-626-6726 (8 A.M.-5 P.M., Central time).

References

1. Institute of Medicine. Crossing the quality chasm: a new health system for the 21st century. Washington, DC: National Academies of Sciences; 2001.
2. Cushman J, Bennett J, Reading I, Croft P, Byng P, Cox K, Dieppe P, Coggon D, Cooper C. Long-term outcome following total knee arthroplasty: a controlled longitudinal study. *Ann Rheum Dis*. 2009 May;68(5):642-7. Epub 2008 Jul 29.
3. Fischer GS, Tulsy JA, Rose MR, Siminoff LA, Arnold RM. Patient knowledge and physician predictions of treatment preferences after discussion of advance directives. *J Gen Intern Med*. 1998 Jul;13(7):447-54.
4. Farley FA, Weinstein SL. The case for patient-centered care in orthopaedics. *J Am Acad Orthop Surg*. 2006 Aug;14(8):447-51.
5. Leahy M. Viewing care through the eyes of patients and their families. 2010 Oct. <http://www.aaos.org/news/aaosnow/oct10/clinical5.asp>. Accessed 2010 Nov 3.
6. Weinstein JN. Partnership: doctor and patient: advocacy for informed choice vs. informed consent. *Spine (Phila Pa 1976)*. 2005 Feb 1;30(3):269-72.
7. Braddock C 3rd, Hudak PL, Feldman JJ, Bereckney S, Frankel RM, Levinson W. "Surgery is certainly one good option": quality and time-efficiency of informed decision-making in surgery. *J Bone Joint Surg Am*. 2008 Sep;90(9):1830-8.
8. Karlson EW, Daltroy LH, Liang MH, Eaton HE, Katz JN. Gender differences in patient preferences may underlie differential utilization of elective surgery. *Am J Med*. 1997 Jun;102(6):524-30.
9. Byrne MM, Souček J, Richardson M, Suarez-Almazor M. Racial/ethnic differences in preferences for total knee replacement surgery. *J Clin Epidemiol*. 2006 Oct;59(10):1078-86. Epub 2006 Jun 23.
10. Hudak PL, Clark JP, Hawker GA, Coyte PC, Mahomed NN, Kreder HJ, Wright JG. "You're perfect for the procedure! Why don't you want it?" Elderly arthritis patients' unwillingness to consider total joint arthroplasty surgery: a qualitative study. *Med Decis Making*. 2002 May-Jun;22(3):272-8.
11. Weinstein JN, Clay K, Morgan TS. Informed patient choice: patient-centered valuing of surgical risks and benefits. *Health Aff (Millwood)*. 2007 May-Jun;26(3):726-30.
12. Bozic KJ, Chiu V. Emerging ideas: shared decision making in patients with osteoarthritis of the hip and knee. *Clin Orthop Relat Res*. 2011 Jul;469(7):2081-5. Epub 2010 Dec 16.
13. Katz JN, Wright EA, Guadagnoli E, Liang MH, Karlson EW, Cleary PD. Differences between men and women undergoing major orthopedic surgery for degenerative arthritis. *Arthritis Rheum*. 1994 May;37(5):687-94.
14. Lurie JD, Weinstein JN. Shared decision-making and the orthopaedic workforce. *Clin Orthop Relat Res*. 2001 Apr;(385):68-75.
15. Ballantyne PJ, Gignac MA, Hawker GA. A patient-centered perspective on surgery avoidance for hip or knee arthritis: lessons for the future. *Arthritis Rheum*. 2007 Feb 15;57(1):27-34.
16. President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research. Making health care decisions: the ethical and legal implications of informed consent in the patient-practitioner relationship. Washington, DC: US Government Printing Office; 1982.
17. Wennberg JE, Barnes BA, Zubkoff M. Professional uncertainty and the problem of supplier-induced demand. *Soc Sci Med*. 1982;16(7):811-24.
18. A Dartmouth Atlas Project Topic Brief: Effective Care. Lebanon, NH: Center for the Evaluative Clinical Sciences; 2007. http://www.dartmouthatlas.org/downloads/reports/effective_care.pdf. Accessed 2012 Mar 15.
19. Wennberg JE. Tracking medicine: a researcher's quest to understand health care. New York: Oxford University Press; 2010.
20. Charles C, Gafni A, Whelan T. Shared decision-making in the medical encounter: what does it mean? (or it takes at least two to tango). *Soc Sci Med*. 1997 Mar;44(5):681-92.
21. Stacey D, Bennett CL, Barry MJ, Col NF, Eden KB, Holmes-Rovner M, Llewellyn-Thomas H, Lyddiatt A, Légaré F, Thomson R. Decision aids for people facing health treatment or screening decisions. *Cochrane Database Syst Rev*. 2011 Oct 5;(10):CD001431.
22. Kinnerley P, Edwards A, Hood K, Cadbury N, Ryan R, Prout H, Owen D, Macbeth F, Butow P, Butler C. Interventions before consultations for helping patients address their information needs. *Cochrane Database Syst Rev*. 2007 Jul 18;(3):CD004565.
23. Pitkethly M, Macgillivray S, Ryan R. Recordings or summaries of consultations for people with cancer. *Cochrane Database Syst Rev*. 2008 Jul 16;(3):CD001539.
24. Belkora JK, Loth MK, Chen DF, Chen JY, Volz S, Esserman LJ. Monitoring the implementation of Consultation Planning, Recording, and Summarizing in a breast care center. *Patient Educ Couns*. 2008 Dec;73(3):536-43. Epub 2008 Aug 28.
25. Belkora JK, Teng A, Volz S, Loth MK, Esserman LJ. Expanding the reach of decision and communication aids in a breast care center: a quality improvement study. *Patient Educ Couns*. 2011 May;83(2):234-9. Epub 2010 Aug 9.
26. Bozic KJ, Chiu V. Emerging ideas: Shared decision making in patients with osteoarthritis of the hip and knee. *Clin Orthop Relat Res*. 2011 Jul;469(7):2081-5. Epub 2010 Dec 16.
27. Griffin SJ, Kinmonth AL, Veltman MW, Gillard S, Grant J, Stewart M. Effect on health-related outcomes of interventions to alter the interaction between patients and practitioners: a systematic review of trials. *Ann Fam Med*. 2004 Nov-Dec;2(6):595-608.
28. Dartmouth-Hitchcock Medical Center Center for Shared Decision Making. http://www.dhmc.org/shared_decision_making.cfm. Accessed 2010 Nov 3.
29. Deyo RA, Cherkin DC, Weinstein J, Howe J, Ciol M, Mulley AG Jr. Involving patients in clinical decisions: impact of an interactive video program on use of back surgery. *Med Care*. 2000 Sep;38(9):959-69.
30. King JS, Eckman MH, Moulton BW. The potential of shared decision making to reduce health disparities. *J Law Med Ethics*. 2011 Mar;39 Suppl 1:30-3. doi: 10.1111/j.1748-720X.2011.00561.x.
31. Abellán Perpiñán JM, Sánchez Martínez FI, Martínez Pérez JE. [How should patients' utilities be incorporated into clinical decisions? 2008 SESPAS Report]. *Gac Sanit*. 2008 Apr;22 Suppl 1:179-85. Spanish.
32. Dugdale DC, Epstein R, Pantilat SZ. Time and the patient-physician relationship. *J Gen Intern Med*. 1999 Jan;14 Suppl 1:S34-40.
33. Saleh KJ, Quick JC, Sime WE, Novicoff WM, Einhorn TA. Recognizing and preventing burnout among orthopaedic leaders. *Clin Orthop Relat Res*. 2009 Feb;467(2):558-65. Epub 2008 Nov 22.
34. Llewellyn-Thomas HA, Weinstein J, Mimnaugh D. Patients' decision aids for elective total joint replacement: a national survey to identify orthopaedic surgeons' preferences. *Med Decis Making*. 2003;23:551.
35. Bozic KJ, Smith AR, Hairiri S, Adeyoye S, Gourville J, Maloney WJ, Parsley B, Rubash HE. The 2007 ABJS Marshall Urist Award: The impact of direct-to-consumer advertising in orthopaedics. *Clin Orthop Relat Res*. 2007 May;458:202-19.
36. Kurtz S, Ong K, Lau E, Mowat F, Halpern M. Projections of primary and revision hip and knee arthroplasty in the United States from 2005 to 2030. *J Bone Joint Surg Am*. 2007 Apr;89(4):780-5.
37. Frosch DL, Légaré F, Mangione CM. Using decision aids in community-based primary care: a theory-driven evaluation with ethnically diverse patients. *Patient Educ Couns*. 2008 Dec;73(3):490-6. Epub 2008 Sep 3.
38. Fowler FJ Jr. Shared decision making & medical costs. 2010 Oct. http://informamedicaldecisions.org/wp-content/uploads/2010/10/NewWP_SDMand.pdf. Accessed 2012 May 4.
39. Haralson RH 3rd, Zuckerman JD. Prevalence, health care expenditures, and orthopedic surgery workforce for musculoskeletal conditions. *JAMA*. 2009 Oct 14;302(14):1586-7.
40. Stacey D, Bennett C, Saaramamki A. How effective are patient decision aids? In: Edwards A, Elwyn G. Shared decision-making in health care: achieving evidence-based patient choice. 2nd ed. New York: Oxford University Press; 2009. p 201-8.
41. Hawker GA, Wright JG, Coyte PC, Williams JI, Harvey B, Glazier R, Wilkins A, Badley EM. Determining the need for hip and knee arthroplasty: the role of clinical severity and patients' preferences. *Med Care*. 2001 Mar;39(3):206-16.
42. DECISION Dialog. Population health solutions. Health Dialog. <http://www.healthdialog.com/Main/Solutions/PopulationHealthSolutions/DECISIONDialog>. Accessed 2011 May 5.
43. Williams N, Fleming C. Issue brief. Consumer and provider perspectives on shared decision making: a systematic review of the peer-reviewed literature. Princeton, NJ: Mathematica; 2011.
44. Moulton B, King JS. Aligning ethics with medical decision-making: the quest for informed patient choice. *J Law Med Ethics*. 2010 Spring;38(1):85-97.
45. Wennberg JE, Brownle S, Fisher ES, Skinner JS, Weinstein JN. Improving quality and curbing health care spending: opportunities for the Congress and the Obama Administration. Dartmouth Atlas White Paper. 2008. http://www.dartmouthatlas.org/downloads/reports/agenda_for_change.pdf
46. Légaré F, Ratté S, Gravel K, Graham ID. Barriers and facilitators to implementing shared decision-making in clinical practice: update of a systematic review of health professionals' perceptions. *Patient Educ Couns*. 2008 Dec;73(3):526-35. Epub 2008 Aug 26.
47. Frosch DL, Moulton BW, Wexler RM, Holmes-Rovner M, Volk RJ, Levin CA. Shared decision making in the United States: policy and implementation activity on multiple fronts. *Z Evid Fortbild Qual Gesundheitswes*. 2011;105(4):305-12. Epub 2011 Apr 29.
48. Wennberg JE, O'Connor AM, Collins ED, Weinstein JN. Extending the P4P agenda, part 1: how Medicare can improve patient decision making and reduce unnecessary care. *Health Aff (Millwood)*. 2007 Nov-Dec;26(6):1564-74.
49. Centers for Medicare & Medicaid Services. Medicare Shared Savings Program: Accountable Care Organizations. Updated 2012 May 29. <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharesavingsprogram/index.html?redirect=/sharesavingsprogram/>. Accessed 2012 May 5.
50. Skolasky RL, Mackenzie EJ, Wegener ST, Riley LH 3rd. Patient activation and adherence to physical therapy in persons undergoing spine surgery. *Spine (Phila Pa 1976)*. 2008 Oct 1;33(21):E784-91.