

The importance of communication in collaborative decision making: facilitating shared mind and the management of uncertainty

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Abstract

Rationale Quality medical decision making requires that clinicians and patients incorporate the best available clinical evidence with the patients' values and preferences to develop a mutually agreed upon treatment plan. The interactive process involved in medical decision making is complex and requires patients and clinicians to use both cognitive and communicative skills to reach a shared understanding of the decision.

Aims and objectives The purpose of this paper is to present a communication model to help better understand quality medical decision making, and how patient-centered, collaborative communication enhances the decision-making process.

Methods We present research on shared mind and cognitive and communicative skills to highlight how they can facilitate the management of uncertainty during the interactive process involved in medical decision making. We provide simple examples about how to frame messages to achieve shared mind and foster uncertainty tolerance.

Conclusions Strategies such as providing clear explanations, checking for understanding, eliciting the patient's values, concerns, needs, finding common ground, reaching consensus on a treatment plan, and establishing a mutually acceptable follow-up plan can facilitate collaborative decision making. Future research should explore ways to implement collaborative decision-making processes in existing health care systems.

Introduction

Many pragmatists argue that good medical decisions are those that produce good medical outcomes. However, decisions can be perceived positively and negatively at multiple levels. For example, a decision to continue life sustaining treatments might add days or months to living, but significantly lower quality of life. In addition, judging decision quality based on outcome is retrospective and does not inform how to determine quality at the time a decision is made. Thus a number of scholars [1–3] have defined quality medical decisions as those that (1) are based on the best clinical evidence; (2) incorporate the patient's values and preferences; (3) involve the patient in the decision-making processes to the extent that the patient wants or needs to be; (4) are endorsed by patient/family and clinicians; and (5) are feasible to implement. In this paper, we use this conceptualization to present a communication model to help better understand quality medical decision making, and how patient-centred, collaborative communication enhances the decision-making process. We will also focus our analysis on one of the most problematic aspects of decision making: the management of uncertainty.

Good decisions and good decision making

In clinical encounters, medical decision making is much more than a cognitive process. It is also a communicative process, one defined by the relationship and interactions between the clinician and patient/family [4]. Thus, elements of trust, role expectations, information exchange, persuasion, collaboration and negotiation all affect decision making. Additionally, communication about complex medical issues often occurs as a series of conversations over time, with multiple clinicians involved. This 'community of care' must acknowledge the multiple roles of each clinician (as well as the role of the patient/family members) to provide a foundation to address patients' needs [5].

The term 'shared decision making' has been used to describe a model of collaboration between patients and their clinicians to reach an agreement about a health decision [6–8]. We will use the term 'collaborative' decision making rather than 'shared' because collaboration connotes a process of mutual participation and co-operation among multiple clinicians, patients, and family members, whereas 'shared' connotes that participants made the

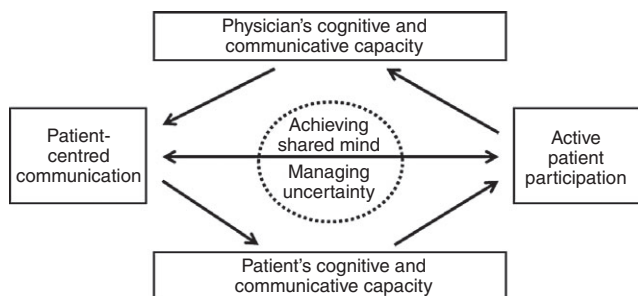


Figure 1 Model of collaborative decision making.

decision together. While this distinction may seem pedantic, it actually is quite important. Patients can be highly involved in the processes of decision making (e.g. sharing information, asking questions, deliberating about options, stating preferences) yet chose to defer the actual decision to the doctor(s) or family members. The process may be collaborative even if the decision is made by one party.

Collaborative decision making aims to help patients participate in medical decision making by improving knowledge and helping patients to clarify values for the risks and benefits of options [9]. It places importance on incorporating preferences into health decisions and encourages a patient–clinician discussion that goes beyond factual information giving. Through these discussions, clinicians can support and guide patients through decisions by encouraging and creating opportunities for patients to ask questions, state concerns, and share socio-cultural information that might influence their evaluation of treatment options.

Shared mind in decision making

Epstein and Peters [10] coined the term ‘shared mind’ to reflect both a process and an outcome of the medical consultation during collaborative decision making. As an outcome, ‘shared mind’ reflects the ideal situation where clinician and patient achieve an understanding of the patient’s health condition, have an accurate understanding of the other’s perspective on the situation, and are in agreement on the best treatment option. For example, in managing hypertension, shared mind would be achieved if patient and clinician agree that the patient’s blood pressure is a problem, the patient understands the clinical evidence about treatment options, the doctor understands the patient’s values and preferences, both agree to try one option first, and both agree to a follow-up visit to check whether the treatment is working and the patient is satisfied with his/her choice. As a process, achieving shared mind reflects a way of thinking and a way of communicating. As a way of thinking, shared mind involves a clinician being mindful of the patient’s values, thoughts and feelings as well as his or her own thoughts and feelings [10]. The same applies to patients as they try to understand the nature of their health and the clinical risks and benefits of treatment options.

Of interest in this essay is how the clinicians and patients communicate with one another to achieve shared mind with respect to decision making and the management of uncertainty. Figure 1 presents our model of collaborative decision making which

identifies key communicative elements for achieving shared mind in decision making.

Cognitive and communicative capacity

In order to successfully engage in collaborative decision making, clinicians and patient must have both *cognitive and communicative capacity* to do so. For clinicians, cognitive capacity represents knowledge of the clinical evidence, clinical experience, knowledge of the patients’ context, and perceptions of the patient. For the patient, cognitive capacity represents understanding of the clinical evidence, relevant personal experiences and perception of the clinician. Clinicians can have diminished cognitive capacity if they have unfavourable attitudes or biases towards patients [11,12], a non-critical belief in the value of particular treatments, or complacency with respect to clinical indicators and patient clues [13]. Clinicians are also limited cognitively if they do not engage in some level of reflective thinking as it relates to the impact of their beliefs and values on the conversation [14]. For patients, cognitive capacity for understanding clinical information can be limited if they have low health literacy, low numeracy skills, or biases that prevent open-minded consideration of clinical evidence [15,16]. Cognitive capacity may also be limited if patients are under great stress or emotional duress such that it interferes with their ability to process information.

Communicative capacity comes from the ability to perform key aspects of patient-centred communication. For the clinician, patient-centred communication involves (1) making efforts to elicit, understand and validate the patient’s perspective; (2) involving the patient in care and decision making to the extent he or she needs or wants to be; (3) providing clear, understandable explanations; and (4) fostering a relationship characterized by trust and commitment [1]. For the patient, communication requires active patient participation, characterized by involvement in consultation and the decision-making process by asking questions, stating preferences, expressing concerns, conveying understandings and offering opinions [17].

Managing uncertainty

One of the key aspects of good quality decisions is that they are based on the best clinical evidence. However, most medical choices involve uncertain or unknown evidence about risk/benefit information guiding clinical decisions [18]. Even policy makers and individual clinicians often disagree based on uncertainty. Collaborative decision making assumes that the uncertainty that complicates medical decisions is explicitly discussed with patients [9], either through decision support tools or through decision discussions in medical consults to achieve shared mind; yet discussing uncertainty rarely occur in decision tools or clinical practice [19,20]. Doctors may be hesitant to communicate uncertainty for several reasons. They may have been trained to display confidence to patients and emphasize an illusion of certainty to increase patients’ trust in the information presented [21,22]. Doctors also fear that the complexity of uncertainty might lead to confusion and anxiety [23,24] and could lead patients to delay or reject decision making as a result. Doctors’ own discomfort with uncertainty might also lead them to engage in a more paternalistic style of decision communication [25]. However, communicating uncer-

tainty is the first step in helping patients to manage uncertainty about the clinical evidence in order to make a good quality decision.

Communication to achieve shared mind on the clinical evidence can range from simple to extremely complex. In its simplest form, evidence can strongly support a particular diagnosis or treatment option. The clinician's tasks are to explain the diagnoses or treatment option using clear language, check for understanding, and provide further clarification or additional information if the patient expresses confusion. For example, hypertension is routinely diagnosed following repeated elevated blood pressure readings, and there are several medications available that have proven effective at lowering blood pressure. Yet even in this situation, clinicians and patients should not assume simplicity without checking for understanding. In the case of hypertension, the clinical evidence can be conflicting when blood pressure readings in the clinic are different from readings at home. Patients might also be more willing to tolerate some side effects of some medications than others.

In more complex cases, achieving shared mind about the clinical evidence can be challenging. First, there can be a clash between an analytical understanding of disease and treatment (typically the clinician's view based on the clinical evidence) and an experiential understanding (often the patient's view based on personal experiences [26]). In the context of cancer decisions, for instance, the clinical evidence may indicate that chemotherapy will increase chances of survival and decrease the likelihood of a cancer recurrence. However, a patient may believe such treatment will be harmful or fail as a result of a relative's experience with severe side effects from chemotherapy and eventual death from cancer.

A second challenge occurs when the evidence is complicated or difficult to comprehend by a lay audience. Confusion can result from risk framing [27], conditions under which the evidence might not apply (e.g. an early stage breast cancer that cannot be treated with breast conservation because of a diffuse tumour), or limitations associated with patients' health literacy or numeracy abilities [15]. Patients often ascribe different meaning to numeric information than clinicians [28]. For instance, to a clinician, a 20% lifetime risk of developing a disease could be considered a 'very high risk.' To a patient, a 20% lifetime risk could be interpreted as 'low risk' [29]. Thus, it is not enough to simply convey risks and evidence to patients. Doctors may need to guide patients through interpreting this information in order to achieve shared mind.

Third, the clinical evidence may be uncertain or insufficient to recommend a particular course of action or to confidently make a clinical diagnosis. There are numerous sources of uncertainty about medical decisions. The most common definition of uncertainty in medical settings is the fundamental *stochastic uncertainty* about the future occurrence of an outcome [30]. This type of uncertainty includes general information about the chance or risk of an unknown future event. Another type of uncertainty can be classified as *ambiguity* or *probabilistic uncertainty*, or the strength of the scientific evidence used to generate risk numbers. Ambiguity results from missing or inconsistent or conflicting empirical data, differences in study design of randomized or observational trials used to generate recommendations, and other scientific factors [20,31]. In addition, *informational uncertainty* can result in the lack of available or useable information about particular clinical situations. For example, clinicians might have limited information to help patients with multiple, unexplained symptoms, or

on the likelihood certain treatments will work. Patients might contribute to informational uncertainty if they fail to recall family or personal history relevant to an illness. Patients with low health-literacy skills are often unaware of their family members' medical histories, and doctors often depend on this information when determining risks and benefits of screening or treatment for individual patients [32]. Some of this information might be easily addressable through information seeking and increased knowledge (e.g. asking living family members about their medical history). However, most uncertainty is irreducible (e.g. lack of available information about new or changing clinical situations; lack of evidence on how treatments will work for a patient with multiple chronic conditions complicating outcomes).

As a result of uncertain or insufficient evidence, clinical and policy guidelines can vary, complicating the decision-making process. For example, there have been recent conflicting guidelines about mammography screening, particularly for women between the ages of 40 and 50 years of age [33]. New guidelines suggested by the US Preventive Services Task Force recommend against routine mammography screening for women in this age group, but encourage a collaborative discussion between clinicians and patients about individual risk factors for breast cancer. Guidelines suggested by the American Cancer Society and other advocacy groups strongly encourage mammography screening for women in this age group. Under these more complex conditions, achieving shared mind about the clinical evidence depends on much more than simply providing a clear explanation, using appropriate formats for conveying the evidence, and allowing the patient to share his or her understanding. It also requires active communication (often across multiple health care visits) that acknowledges the uncertainty about the known and unknown aspects of the decision and that is characterized by efforts to mutually reach agreement on a course of action.

Finally, individual treating professionals involved in a patient's care might differ in their interpretation of uncertain or insufficient clinical evidence. For example, guidelines for the treatment of early stage prostate cancer include active surveillance (also called 'watchful waiting'), radiation therapy, or surgery depending on patients' individual circumstances and preferences. However, a radiation oncologist might recommend radiation as a first line treatment for prostate cancer, a surgeon might recommend surgery, and a gerontologist might recommend active surveillance, even while acknowledging the other valid treatment options. These practitioners need to be proactive in managing the uncertainty that often is created by multiple conversations with multiple treating professionals [5]. Importantly, in order to help the patient make an informed decision, there will need to be some effort among the health care team to reconcile their differences or at least have one clinician serve as an arbitrator of the conflicting opinions in order to help the patient understand the differences and the uncertainty associated with any choice.

Managing uncertainty: incorporating the patient's values and preferences into decisions

Quality medical decisions are not only based on the best clinical evidence, they are consistent (to the degree possible) with the patient's values and preferences. However, clinicians are often not aware of patients' goals, values, understandings, and preferences

[34,35]. In many contexts, patients who more actively participate in clinical encounters by asking questions, expressing concerns and stating preferences are explicitly alerting clinicians to their beliefs, worries and desires. Clinicians can then use this information to provide more personalized care, achieve a better understanding of the patient's perspective, and increase the likelihood that clinicians and patients agree on the potential benefits of treatment under uncertainty [36]. When patients do not actively express their values and preferences, clinicians should engage in patient-centred communication to encourage patients to identify and express their values [10,37] through guided values clarification exercises or careful discussions, allowing the patient time to process the information. This alone could lead to quality decision making for decisions that are 'preference-sensitive' with multiple, equally viable treatment options from an evidenced-based standpoint [3].

For many health conditions, however, the clinical evidence will tilt towards one option more than another. Achieving shared mind will be more difficult when patient preferences are counter to the strongest clinical evidence. Under these circumstances, quality decision making will depend not only on clinician(s) and patient becoming aware of and understanding the other's position, but also engaging in a dialogue to find common ground, identify and reconcile differences, and negotiate or compromise to reach a collaborative, agreed-upon decision.

An additional complication related to integrating a patient's values into decisions is that patients might not have previously formed preferences because they find themselves in new, changing, emotionally intense situations. Clinicians should be mindful of the way in which information is presented because patients may have difficulty forming preferences when subjected to information overload, or when influenced by the clinicians' message framing (e.g. chance of survival vs. chance of death).

Practice recommendations

One of the stated aims of collaborative decision making is to help patients reduce their uncertainty and conflict about decisions [9]. The decision-making process is often evaluated based on whether patients report lower decisional conflict. However, uncertainty about risks and benefits of treatments, including ambiguity about the evidence used to develop guidelines for treatments, is often non-modifiable (at least not in the immediate future while patients are making health decisions). Communicating facts about most medical decisions necessitates acknowledging this to patients, and decisional conflict and uncertainty may be natural outcomes of a true understanding of the complexity of decisions. In fact, one of the initial theories used to develop widely used decision support frameworks is a psychological theory called the Decisional Conflict Theory [38]. This theory suggests that individuals actually need some level of anxiety or conflict in order to deliberate about options and recognize the significance of the choice. As a result, it might be more beneficial to help patients to tolerate and cope with uncertainty and decisional conflict, rather than to reduce it [23,24]. Clinicians can focus on primary targeted outcomes such as improved patient knowledge, clinician support for patient involvement in decisions, and patient-centred behaviours that encourage choices that are consistent with patients' values and preferences.

Managing uncertainty about clinical evidence and incorporating values clarification into the consultation does not have to add time

to the consultation. Rather, they can be achieved by the way messages are framed during the encounter. Clinicians and patients should have more success in effectively managing and tolerating uncertainty through more patient-centred communication and active patient participation in the decision-making process. We have alluded to some communicative techniques throughout the paper that can enhance decision discussions, facilitate shared mind, and foster uncertainty tolerance. Table 1 summarizes these techniques and provides simple examples about how to frame messages to achieve shared mind and foster uncertainty tolerance during collaborative decision making.

Action plans and collaborative goal setting

One additional tool for managing and tolerating uncertainty is the use of action plans and collaborative goal setting. Collaborative goal setting refers to the process by which clinicians and patients negotiate and agree on a health-related goal and a plan by which that goal can be achieved [39]. Although clinician-patient goal setting might take additional time in the initial decision consultation, establishing goals and action plans can help patients with chronic diseases achieve and maintain desired behaviours, and can improve their outcomes over time [40,41].

Action plans and goal setting might also help clinicians to model uncertainty tolerance during collaborative decision making from the beginning of decision implementation once an option is chosen. These plans outline specific actions for the patient to follow, list possible outcomes of these actions (e.g. side effects) and goals to reach through chosen options. For example, in managing hypertension, the action plan might include taking medication once per day, a possibility of light headedness once starting the medication, and a blood pressure goal to evaluate whether the medication is working [42]. In more complicated cases such as cancer treatment, the action plan might include the completing chemotherapy treatment, acknowledging the possibility of various side effects, and recognizing that treatment effectiveness can only be determined by lab tests after treatment is completed [43]. Action plans can also focus on the management of the side effects themselves, including what actions the patients could take to mitigate more negative experiences. Each action has associated uncertainty (about effectiveness, about the likelihood that side effects will occur), and part of the process of managing uncertainty is addressed through communicating about these possibilities and agreeing to continue with the plan in order to reach a desired health goal.

When initiating action plans, it is important to inform the patient about plans for a follow-up discussion for decisions that involve continuing evaluation. One component of facilitating uncertainty tolerance involves knowing when (if ever) uncertainty will be resolved. For instance, decisions about treatment for menopausal symptoms might require ongoing re-evaluation of symptom improvements, side effects of treatments and risks that might change over time [44,45]. Decisions about chemotherapy might require a follow-up discussion after several cycles of treatment to address the uncertainty about preliminary effectiveness of the chemotherapy regimen [43]. Knowledge about planned follow-up discussions can help a patient to cope with uncertainty, knowing that a decision can be re-evaluated at specified times with new knowl-

Table 1 Patient-centred communication to achieve shared mind and foster uncertainty tolerance

Strategies	Example conversation
Providing clear explanations	A clinician (MD) communicates about a biopsy decision to a patient (PT) who is anxious about finding a lump in her breast. Initially the options were to biopsy, or rescreen with mammography in 6 months.
Checking for understanding	MD: We have gone over the options, and I hear you saying that you do not want to wait 6 months to repeat the mammogram. That's completely fine. The wisest choice then would be to sample it, to take a few pieces of it with a needle, and figure out what it is. But I also hear you saying that you want the lump removed completely now. I am curious why you feel strongly about that. PT: Well, you know what? My sister had breast cancer 10 years, and the doctor kept saying it's just a cyst. It turns out it was cancer. I lost a sister over this, and I don't want to go there.
Eliciting the patient's values, concerns, needs	MD: I'm very sorry about your sister. I know you are worried about this. I want to let you know that this may not need to be removed just yet. Taking a piece of it – called a biopsy – is very safe. Even in the worst case scenario, if it's cancer, nothing gets spread and nothing gets outside of where it is now. And, even in the worst case scenario, if it is cancer, then just removing it is not the first thing we would do. You would need another workup before that before we know what choices you would have. So I think we need to know what this is before we rush into surgery. PT: Oh. How long will that workup take? I just don't want to leave this there for a long time.
Finding common ground	MD: We will know results of the test, the biopsy, within 2 weeks. I know that sounds like a long time to you, but if it is cancer, it will not change that quickly. As we talked about earlier, you could even have waited 6 months to repeat you mammogram instead of taking a biopsy now. By doing this test, this biopsy, first, it will only help us understand what we are working with. PT: Ok, so 2 weeks? I think I can handle that. And then we can do surgery if it's cancer?
Reaching consensus on a treatment plan	MD: Absolutely, but again, this does not look that suspicious or that worrisome. When I looked at it on your mammogram, I did not think it looked like cancer. We will still check to be sure with the biopsy so that what happened to your sister does not happen to you. (pauses) Do you have any other questions about the procedure or what we have talked about? PT: Do a lot of women have mammograms that look like that, and then it turns out that they do not have cancer when they have the biopsy?
Establishing a mutually acceptable follow-up plan	MD: It's very common for women around your age. PT: Ok. Thank you. Where do I go for the biopsy?

edge about how their chosen options are working. Overall, this involvement in goal setting and the planned re-evaluation of the action plan might help patients to tolerate clinical uncertainty and might influence their adherence during the set time period before follow up [41].

Conclusion

Managing uncertainty about clinical evidence, communicating about patients' values and preferences, and engaging in collaborative goal setting to achieve shared mind on clinical decisions requires patient-centred communication from both clinicians and patients. Clinicians must build a partnership with patients, family members, and other clinicians on the treating team, present recommendations, check for understanding and agreement to ensure that patients' informational, emotional, and decisional needs are met, and foster a relationship characterized by trust and commitment. Patients must actively communicate their preferences, concerns, opinions, and questions in order to contribute to this collaboration. These processes are challenging to achieve during a time-limited health care visit, and might require multiple visits or co-ordination across multiple treating clinicians. However, over time they might lead to increased patient adherence and improved outcomes. This paper presented a model of collaborative decision making to achieve shared mind about complex medical choices. More research is needed to examine the fundamental aspects of the

conversation between clinicians and patients about decisions and uncertainty that can influence tolerance of uncertainty and shared mind during collaborative decision making. More research is also needed examining the implementation of collaborative decision-making processes in the existing health care systems.

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References

1. Epstein, R. M. & Street, R. L. (2007) Patient-Centered Communication in Cancer Care: Promoting Healing and Reducing Suffering. Bethesda, MD: National Cancer Institute. NIH Publication No. 07-6225.
2. Sepucha, K., Ozanne, E., Silvia, K., Partridge, A. & Mulley, A. G. Jr (2007) An approach to measuring the quality of breast cancer decisions. *Patient Education and Counseling*, 65, 261–269.
3. Elwyn, G., Edwards, A., Kinnersley, P. & Grol, R. (2000) Shared decision-making and the concept of equipoise: the competences of involving patients in healthcare choices. *British Journal of General Practice*, 50, 892–899.
4. Street, R. L. (2007) Aiding medical decision making: a communication perspective. *Medical Decision Making*, 27, 550–553.
5. Haidet, P., Fecile, M. L., West, H. F. & Teal, C. (2009) Reconsidering the team concept: educational implications for patient-centered cancer care. *Patient Education and Counseling*, 77 (3), 450–455.

6. Charles, C., Gafni, A. & Whelan, T. (1997) Shared decision-making in the medical encounter: what does it mean? (or it takes at least two to tango). *Social Science and Medicine*, 44, 681–692.
7. Edwards, A. & Elwyn, G. (2006) Inside the black box of shared decision making: distinguishing between the process of involvement and who makes the decision. *Health Expectations*, 9, 307–320.
8. O'Connor, A. M., Stacey, D., Entwistle, V., *et al.* (2009) Decision aids for people facing health treatment or screening decisions (Cochrane Review). *Cochrane Database of Systematic Reviews*, Issue 3. Art. No. CD001431.
9. O'Connor, A. M., Llewellyn-Thomas, H. & Stacey, D. (2005) IPDAS collaboration background document. Available at: http://www.informedhealthchoice.com/pdf/IPDAS_background_2005.pdf (last accessed 30 April 2010).
10. Epstein, R. M. & Peters, E. (2009) Beyond information: exploring patients' preferences. *JAMA*, 302, 195–197.
11. Fincher, C., Williams, J. E., MacLean, V., Allison, J. J., Kiefe, C. I. & Canto, J. (2004) Racial disparities in coronary heart disease: a sociological view of the medical literature on physician bias. *Ethnicity and Disease*, 14, 360–371.
12. Hall, J. A., Epstein, A. M., DeClantis, M. L. & McNeil, B. J. (1993) Physicians' liking for their patients: more evidence for the role of affect in medical care. *Health Psychology*, 12, 140–146.
13. Levinson, W., Gorawara-Bhat, R. & Lamb, J. (2000) A study of patient clues and physician responses in primary care and surgical settings. *JAMA*, 284, 1021–1027.
14. Dobie, S. (2005) Viewpoint: reflections on a well-traveled path: self-awareness, mindful practice, and relationship-centered care as foundations for medical education. *Academic Medicine*, 82, 422–427.
15. Davis, T. C., Williams, M. V., Marin, E., Parker, R. M. & Glass, J. (2002) Health literacy and cancer communication. *CA: A Cancer Journal for Clinicians*, 52, 134–149.
16. Peters, E., Dieckmann, N., Dixon, A., Hibbard, J. H. & Mertz, C. K. (2007) Less is more in presenting quality information to consumers. *Medical Care Research and Review*, 64, 169–190.
17. Street, R. L. & Millay, B. (2001) Analyzing patient participation in medical encounters. *Health Communication*, 13, 61–73.
18. BMJ Clinical Evidence. Available at: <http://clinicalevidence.bmj.com/ceweb/about/knowledge.jsp> (last accessed 30 August 2010).
19. Braddock, C. H., Edwards, K. A., Hasenberg, N. M., Laidley, T. L. & Levinson, W. (1999) Informed decision making in outpatient practice: time to get back to basics. *JAMA*, 282 (24), 2313–2320.
20. Politi, M. C., Han, P. K. J. & Col, N. F. (2007) Communicating the uncertainty of harms and benefits of medical interventions. *Medical Decision Making*, 7 (5), 681–695.
21. Johnson, C. G., Levenkron, J. C., Suchman, A. L. & Manchester, R. (1988) Does physician uncertainty affect patient satisfaction? *Journal of General Internal Medicine*, 3 (2), 144–149.
22. Gigerenzer, G., Gaissmaier, W., Kurz-Milcke, E., Schwartz, L. M. & Woloshin, S. (2008) Helping doctors and patients make sense of health statistics. *Psychological Science in the Public Interest*, 8 (2), 53–96.
23. Babrow, A. S. & Kline, K. N. (2000) From 'reducing' to 'coping with' uncertainty: reconceptualizing the central challenge in breast self-exams. *Social Science and Medicine*, 51 (12), 1805–1816.
24. Brashers, D. E. (2001) Communication and uncertainty management. *Journal of Communication*, 51 (3), 477–497.
25. Légaré, F., O'Connor, A. M., Graham, I. D., Wells, G. A. & Tremblay, S. (2006) Impact of the Ottawa Decision Support Framework on the agreement and the difference between patients' and physicians' decisional conflict. *Medical Decision Making*, 26, 373–390.
26. Fagerlin, A., Wang, C. & Ubel, P. A. (2005) Reducing the influence of anecdotal reasoning on people's health care decisions: is a picture worth a thousand statistics? *Medical Decision Making*, 25, 398–405.
27. Lipkus, I. M. (2007) Numeric, verbal, and visual formats of conveying health risks: suggested best practices and future recommendations. *Medical Decision Making*, 27, 696–713.
28. Peters, E., Dieckmann, N. F., Vastfjall, D., Mertz, C. K., Slovic, P. & Hibbard, J. H. (2009) Bringing meaning to numbers: the impact of evaluative categories on decisions. *Journal of Experimental Psychology: Applied*, 15 (3), 213–227.
29. Fagerlin, A., Zikmund-Fisher, B. & Ubel, P. A. (2007) 'If I'm better than average, then I'm ok?': comparative information influences beliefs about risk and benefits. *Patient Education and Counseling*, 69, 140–144.
30. Edwards, A., Elwyn, G. & Mulley, A. (2002) Explaining risks: turning numerical data into meaningful pictures. *BMJ*, 324, 827–830.
31. Han, P. K. J., Korbin, S. C., Klein, W. M. P., Davis, W. W., Stefanek, M. & Taplin, S. H. (2007) Perceived ambiguity about screening mammography recommendations: association with future mammography uptake and perceptions. *Cancer Epidemiology Biomarkers and Prevention*, 16, 458–466.
32. Guttmacher, A. E., Collins, F. S. & Carmona, R. H. (2004) The family history: more important than ever. *New England Journal of Medicine*, 351, 2333–2336.
33. Esserman, L., Shieh, Y. & Thompson, I. (2009) Rethinking screening for breast cancer and prostate cancer. *JAMA*, 302, 1685–1692.
34. DesHarnais, S., Carter, R. E., Hennessy, W., Kurent, J. E. & Carter, C. (2007) Lack of concordance between physician and patient: reports on end-of-life care discussions. *Journal of Palliative Medicine*, 10, 728–740.
35. Janz, N. K., Wren, P. A., Copeland, L. A., Lowery, J. C., Goldfarb, S. L. & Wilkins, E. G. (2004) Patient-physician concordance: preferences, perceptions, and factors influencing the breast cancer surgical decision. *Journal of Clinical Oncology*, 22, 3091–3098.
36. Street, R. L., Richardson, M. N., Cox, V. & Suarez Almazor, M. E. (2009) (Mis)Understanding in patient-health care provider communication about total knee replacement. *Arthritis Care and Research*, 61, 100–107.
37. Johnson, E. J., Steffel, M. & Goldstein, D. G. (2005) Making better decisions: from measuring to constructing preferences. *Health Psychology*, 24, S17–S22.
38. Janis, I. L. & Mann, L. (eds) (1977) *Decision Making: A Psychological Analysis of Conflict, Choice, and Commitment*. New York: Free Press.
39. Bodenheimer, T. & Handley, M. A. (2009) Goal-setting for behavior change in primary care: an exploration and status report. *Patient Education and Counseling*, 76, 174–180.
40. Shilts, M. K., Horowitz, M. & Townsend, M. S. (2004) Goal setting as a strategy for dietary and physical activity behavior change: a review of the literature. *American Journal of Health Promotion*, 19, 81–93.
41. Bodenheimer, T., Lorig, K., Holman, H. & Grumbach, K. (2002) Patient self-management of chronic disease in primary care. *JAMA*, 288, 2469–2475.
42. Montgomery, A. A., Fahey, T. & Peters, T. J. (2003) A factorial randomised controlled trial of decision analysis and an information video plus leaflet for newly diagnosed hypertensive patients. *British Journal of General Practice*, 53, 446–453.
43. Whelan, T., Sawka, C., Levine, M., *et al.* (2003) Helping patients make informed choices: a randomized trial of a decision aid for adjuvant chemotherapy in lymph node-negative breast cancer. *Journal of the National Cancer Institute*, 95 (8), 581–587.
44. Politi, M. C., Schleinitz, M. & Col, N. F. (2008) Revisiting the duration of vasomotor symptoms during menopause: a meta-analysis. *Journal of General Internal Medicine*, 23 (9), 1507–1513.
45. Col, N. F., Ngo, L., Fortin, J. M., Goldberg, R. J. & O'Connor, A. M. (2007) Can computerized decision support help patients make complex treatment decisions? A randomized controlled trial of an individualized menopause decision aid. *Medical Decision Making*, 27 (5), 585–598.