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The role of perceived benefits and costs in patients' medical decisions

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Abstract

Background Many decisions can be understood in terms of actors' valuations of benefits and costs. The article investigates whether this is also true of patient medical decision making. It aims to investigate (i) the importance patients attach to various reasons for and against nine medical decisions; (ii) how well the importance attached to benefits and costs predicts action or inaction; and (iii) how such valuations are related to decision confidence.

Methods In a national random digit dial telephone survey of U.S. adults, patients rated the importance of various reasons for and against medical decisions they had made or talked to a health-care provider about during the past 2 years. Participants were 2575 English-speaking adults age 40 and older. Data were analysed by means of logistic regressions predicting action/inaction and linear regressions predicting confidence.

Results Aggregating individual reasons into those that may be regarded as benefits and those that may be regarded as costs, and weighting them by their importance to the patient, shows the expected relationship to action. Perceived benefits and costs are also significantly related to the confidence patients report about their decision.

Conclusion The factors patients say are important in their medical decisions reflect a subjective weighing of benefits and costs and predict action/inaction although they do not necessarily indicate that patients are well informed. The greater the difference between the importance attached to benefits and costs, the greater patients' confidence in their decision.

Introduction

The assumption underlying many theories of action, for example, the theory of reasoned action and its offshoots in psychology (1,2), leverage-salience theory in survey methodology (3) and various cost-benefit perspectives in economics (cf. 4), is that actors will behave in accordance with the importance of the perceived costs and benefits of a decision to them. Cost-benefit considerations have been shown to influence decisions to participate in biomedical research (4), in clinical trials (5,6) and in social research (7–11). The specific factors for or against a decision (i.e. its perceived benefits and drawbacks, or costs[1]) will, of course, vary between decision contexts.

The question we examine in the present article is a specific instance of this more general theory – namely, whether patients who made a variety of medical decisions behaved in accordance with the perceived importance of the benefits and costs of the decision to them. We also examine whether patients' perceptions of costs and benefits are related to the confidence they have that their final decision was the right one for them.

It is almost axiomatic that integrating patients' own goals and concerns into medical decisions is essential to patient-centred care and good decisions (12,13). Sepucha *et al.* (14), reviewing the literature on measuring the quality of a medical decision, argue that measuring what matters to patients is essential to measuring how well decisions, on average, are likely to reflect their goals and concerns. Thus, measuring what was important to patients faced with common medical decisions was an essential step in this project, which was designed to describe how such decisions were being made.

The article examines nine specific medical decisions (initiating cholesterol, blood pressure or anti-depressant medication; electing hip/knee, cataract or lower-back surgery; or undergoing screening for colon, breast or prostate cancer) falling into three broad categories: medication initiation, elective surgery and cancer screening. Our hypothesis is that patients decide to act with respect to each of these types of decisions if, on balance, the importance of factors regarded as benefits of a particular intervention outweighs the importance of factors regarded as costs.

[1]In this article, 'costs' is used in the general sense of drawbacks. When monetary costs are intended, that term is used, instead.

Methods

The decisions survey

In a list-assisted national telephone survey carried out in 2006–2007, we investigated how a probability sample of 3010 English-speaking adults 40 years and older reported making nine frequent medical decisions. Full details of the sampling frame, instrument development, data collection methodology, response rates and analysis weights can be found in the *Summary of Methods* (15). Further information can also be found in Zikmund-Fisher *et al.* (16). All procedures and instruments were approved by institutional review boards at the University of Michigan and Ann Arbor Veterans' Affairs Medical Center.

The National Survey of Medical Decisions defined a 'medical decision' as having taken place if a patient had either taken a medical action or discussed taking that action with a health-care provider (HCP). To minimize recall bias while maximizing available information, only decisions that occurred within 2 years of the interview date were assessed. To be eligible for the survey, sample members had to have made at least one medical decision within that period of time.

Of the 3010 persons interviewed, 2575 reported having discussed or acted on at least one medical decision and constitute the sample for the present analysis. The weighted response rate to the survey (American Association for Public Opinion Research RR4) was 51.6%. Of those eligible to participate, 86.5% co-operated. The average interview length was 27.7 min.

Participants were selected for detailed follow-up questions for up to two decisions, with selection probabilities designed to oversample rarer

Table 1 List of possible reasons for decisions, by type of decision, variable name and cost-benefit coding

Decision	Reason	Variable name	Benefit (+)/ Cost (–)
All decisions	Following your HCP's advice	Follow HCP advice	+/–
	The amount of money you would have to pay	Monetary cost	–
Screening	Fear of getting cancer	Fear	+
	Finding the cancer early	Find early	+
	The chance that the test might miss a cancer that's really there	False neg	–
	The chance that the test might give a false alarm when you do not in fact have cancer	False pos	–
	The discomfort of the test	Discomfort	–
	The risks and possible complications of the test	Complications	–
Surgery	Feeling/seeing better	Feel/see better	+
	Being able to do things you could not otherwise do	Do more	+
	How long it would take you to recover	Recovery Time	–
	The chance that the procedure would not help	No improvement	–
	The risks and possible complications of surgery	Complications	–
Medications	Feeling better	Feel better	+
	Being able to function better	Function better	+
	Getting your cholesterol/blood pressure to a desirable level	Good level	+
	Lowering your risk of a heart attack or stroke	Lower risk	+
	How long you would have to take the medication	How long meds	–
	Avoiding medication	Avoid meds	–
	The chance that the medication would not help you	No improvement	–
	The risks and complications of the medication	Complications	–

HCP, health-care provider.

decisions. Some 82.2% of those interviewed had made at least one decision in the preceding 2 years, and 56.0% had made two or more. Some 91% of the sample reported that they had health insurance, a figure comparable to that of the general population over 40 (17), and of these, 91% reported that their plan covered prescription medications. Almost 90% of the sample reported having a primary HCP. More than half (56.7%) of the sample was female; 26.5% were in their 40s, 29.5% in their 50s, 21.3% in their 60s and 22.8% in their 70s or above. Only 43.9% had a high school education or less, and 86.7% of the sample was Caucasian non-Hispanic.

Independent variables: reasons for patients' decisions

The survey had several aims. Chief among these was exploring the process of medical decision making, including how well informed patients were about the decision (18). Still another focus of the study was patients' ratings of the importance of a number of factors with respect to the three types of medical decisions described earlier, and the role these played in their decision. For each of the nine specific conditions falling into these three categories, a number of statements were developed, half of which were intended to describe benefits of the specific action, and half to describe its costs or drawbacks. These reasons were developed after extensive discussions among the research team following focus groups previously conducted by the Foundation for Informed Medical Decision Making with patients facing decisions about back, knee, and hip surgery and screening for colon and prostate cancer. Respondents were asked to rate how important each reason had been to them in making a particular decision. The exact question read as follows:

> When [thinking/deciding] about whether or not to [medical decision], some issues may be very important to you, while others may be less important. On a scale from 0 to 10, where 0 means not at all important to you and 10 means extremely

Table 2 (a) Medication initiation, (b) cancer screening, and (c) surgery: means and standard deviations of importance ratings (0–10)

(a)

	Cholesterol-lowering medication		Blood pressure medication		Anti-depressants	
Importance variable*	*N*	Mean (SD)	*N*	Mean (SD)	*N*	Mean (SD)
Follow HCP advice (+/–)	772	8.53 (2.30)	771	9.09 (1.83)	396	8.10 (3.15)
Lower risk (+/–)	768	9.37 (1.74)	776	9.55 (1.61)	–	–
Good level (+)	765	9.05 (2.12)	767	9.55 (1.39)	–	–
Complications (–)	759	7.67 (3.45)	766	7.10 (3.89)	395	7.82 (3.51)
Monetary cost (–)	762	5.89 (4.46)	765	5.87 (4.59)	393	5.68 (4.84)
No improvement (–)	725	6.26 (3.94)	732	6.17 (4.28)	377	6.55 (4.32)
How long meds (–)	749	7.07 (3.93)	759	6.72 (4.48)	386	7.10 (4.33)
Avoid meds (–)	747	6.39 (4.27)	748	6.02 (4.65)	390	5.90 (4.59)
Feel better (+)	–	–	–	–	395	9.26 (2.28)
Function better (+)	–	–	–	–	394	9.20 (2.50)
Mean benefits (mean pros) (+)	772	9.05 (1.72)	778	9.43 (1.31)	396	9.01 (2.13)
Mean costs (mean cons) (–)	774	6.69 (2.90)	778	6.44 (3.00)	399	6.67 (2.93)
Difference between mean benefits and costs (mean_diff) (+)	771	2.38 (3.17)	777	2.99 (3.03)	396	2.39 (3.28)

(b)

	Colon cancer screening		Breast cancer screening		Prostate cancer screening	
Importance variable*	*N*	Mean (SD)	*N*	Mean (SD)	*N*	Mean (SD)
Follow HCP advice (+/–)	840	8.42 (2.43)	862	8.69 (2.30)	369	8.55 (2.42)
Fear (+)	835	6.12 (3.88)	862	6.97 (3.53)	372	6.93 (3.71)
Find early (+)	835	9.21 (2.06)	863	9.41 (1.80)	369	9.12 (2.34)
False neg (–)	800	5.75 (4.05)	842	6.93 (3.41)	362	5.92 (3.85)
False pos (–)	804	4.47 (3.90)	840	5.72 (3.53)	365	5.00 (3.81)
Complications (–)	828	4.86 (3.94)	–	–	–	–
Discomfort (–)	826	4.85 (4.00)	860	5.06 (3.76)	365	2.94 (3.65)
Monetary cost (–)	829	4.06 (4.39)	851	3.99 (4.12)	364	3.46 (4.17)
Mean benefits (mean pros) (+)	841	7.86 (2.29)	871	8.31 (2.05)	373	8.16 (2.31)
Mean Costs (mean cons) (–)	843	4.85 (2.88)	869	5.44 (2.62)	372	4.35 (2.86)
Difference between mean benefits and costs (mean_diff) (+)	840	3.03 (3.08)	869	2.87 (2.87)	372	3.80 (3.23)

(c)

	Knee–Hip surgery		Cataract surgery		Lower-back surgery	
Importance variable*	*N*	Mean (SD)	*N*	Mean (SD)	*N*	Mean (SD)
Follow HCP advice (+/–)	138	8.70 (2.89)	198	9.29 (1.92)	115	8.10 (3.32)
Do more (+)	138	9.22 (2.34)	189	8.12 (4.18)	114	9.15 (3.02)
Complications (–)	136	7.62 (4.22)	189	6.44 (4.74)	113	7.93 (4.61)
Monetary cost (–)	136	5.36 (5.90)	193	5.58 (5.32)	115	5.66 (6.49)
No improvement (–)	130	6.73 (5.37)	185	6.27 (5.04)	111	8.19 (4.03)
Recovery time (+)	137	7.86 (4.01)	190	6.54 (4.68)	114	8.08 (4.54)
Feel/see better (+)	–	–	197	9.31 (2.54)	115	9.35 (2.09)
Mean benefits (mean pros) (+)	138	9.00 (2.38)	198	8.72 (2.86)	115	8.89 (2.37)

Table 2 Continued

(c)

	Knee–Hip surgery		Cataract surgery		Lower-back surgery	
Importance variable*	*N*	Mean (SD)	*N*	Mean (SD)	*N*	Mean (SD)
Mean costs (mean cons) (–)	139	6.98 (3.41)	198	6.51 (3.67)	115	7.55 (3.10)
Difference between mean benefits and costs (mean_diff) (+)	138	2.03 (3.85)	196	2.22 (3.74)	115	1.34 (3.66)

HCP, health-care provider.
*For a definition of variables, see Table 1. Benefits = (+), cost = (–). The range of responses for each variable is 0–10 except for the difference between mean benefits and costs, where minima range from −10 to +10.

> important, how important was each of the following in your [thinking/decision] about whether or not to [medical decision]?

The interviewer repeated the scale as necessary for each of the reasons.

The complete list of reasons is shown in Table 1, separately for each type of decision. Table 1 also shows the variable name associated with each reason as well as whether the reason was coded as a benefit or a cost. Note that 'following the HCP's advice' could be coded as either a benefit or a cost: if the doctor recommended against an action, it was coded as a 'cost' so far as taking action is concerned; if the doctor recommended an action, it was coded as a 'benefit'. Those few respondents who reported receiving conflicting advice with respect to a particular decision, perhaps because they had consulted more than one HCP, were not scored on that decision. A maximum of ten reasons was applicable to a given decision, but for some decisions, as few as seven were asked about.

Although the list is virtually identical for the three specific conditions under each decision type, they vary from one type to another, because these have different specific benefits and costs. Descriptive statistics for each variable for each condition are shown in Table 2a–c.

Analysis

To test the hypothesis that the preponderance of benefits over costs predicts action, we created a 'Mean Difference' score, described below, and analysed its predictive value by means of logistic regressions that also control for respondents' demographic characteristics. In addition, we examined the usefulness of two other predictors of action: separate indexes of benefits (Mean Pros) and costs (Mean Cons), and the importance of following the HCP's advice. Descriptive statistics for these variables are also shown in Table 2a–c. The hypothesis that confidence in the decision was related to the preponderance of benefits over costs was tested by means of linear regressions.

The analyses used the SURVEYLOGISTIC procedure in SAS 9.2, which adjusts the standard errors of the estimates to reflect the complex nature of the sample design. The analysis also accounts for the fact that some participants are represented twice in the data set, by adjusting for the non-independence of some observations.

Results

It is reasonable to assume that human action, in general, is governed by cost-benefit calculations, although these may not be well informed or weighted in a way doctors would consider rational (19–21). Specifically, we formulated the following hypotheses about medical decisions: (i) The more the perceived benefits of a decision outweigh the perceived costs, the more likely the respondent will be to take action; (ii) the more the perceived benefits of a decision outweigh the perceived costs, the greater the respondent's confidence in the decision will be.

As described in the preceding section, perceived costs and benefits were assessed by means of questions about how important a series of

reasons had been to the respondent in reaching a particular decision. We then averaged the positive (benefit) and negative (cost) ratings (on the 0–10 scale) separately for each respondent asked about a specific decision and computed the difference between the two. For example, if a respondent rated the importance of three costs as 5, 7 and 10, respectively, the average cost rating for that module would be 7.33. If the same respondent rated the importance of four benefits as 8, 8, 10 and 10, respectively, the average benefit rating for that module would be 9.0. The difference (benefits-costs) would be +1.7, indicating a balance in favour of perceived benefits. Positive values on the mean difference score indicate that benefits are rated as more important than costs, while negative values indicate that costs are weighed as more important than benefits, on average; a score of zero means benefits and costs are rated equally important, on average.

Results of the analyses testing Hypothesis 1 are shown in Table 3a–c, separately for the three types of decisions. The dependent variable for each analysis is a binary variable, whether or not in the past 2 years the respondent began taking medication, had elective surgery or had a screening test. The predictors are the individual medications, screening tests or surgeries within each type of condition; the difference between the average positive and negative importance scores; the interaction terms between the individual conditions and the mean difference scores (to account for differences between individual medications, screening tests and surgeries); and gender, age, race, Hispanic origin and education, to control for differences in exposure to the different medical conditions.

As predicted, the difference between the importance of the average benefits and the average costs is significant and positive in all three models. However, in the medications model (Table 3a), the two interaction terms are significant and negative, cancelling out the estimated overall effect of the benefit-cost difference on the likelihood of taking action. A one-point change in the difference between the mean benefits and mean costs (i.e. a 1-unit change) is associated with an odds ratio of medication initiation of 1.17 for depression, while the odds ratios are not significantly different from 1 for the other two medication types. Thus, the significance of the overall effect for medications is due largely to medications for depression. It is possible that in the case of blood pressure and cholesterol medications, patients are merely following the HCP's advice, which serves as a heuristic for a net benefit-cost calculation.

None of the interaction effects in the other two models is statistically significant. In the case of screening (Table 3b), a 1-unit increase in the difference score is associated with an increase in the odds of undergoing screening of 1.33 for breast cancer, 1.27 for prostate cancer and 1.08 for colon cancer. In the case of surgery (Table 3c), a 1-unit increase in the difference score is associated with an increase in the odds of surgery of 1.49 for lower-back pain, 1.18 for knee/hip replacement and 1.16 for cataracts.

We also examined two alternative models evaluating the effects of benefits and costs on medical decision making. The first of these assesses the independent effects of benefits and costs on action with respect to medications, surgery and screening. The results largely parallel those reported in Table 3a–c but provide more specific information about whether it is the importance attached to benefits or that attached to costs which appears to be driving the decision (data not shown). For medications, the importance of perceived benefits is significantly related to taking action, but the importance of perceived costs, though negative, is not; the interaction between high blood pressure and the importance of perceived benefits is significant and negative, while that between cholesterol and perceived benefits is also negative though not significant, again suggesting that the effect of perceived benefits on the decision to take medication is largely because of their effect on taking antidepression medication. With respect to surgery, as for medications, the importance of perceived benefits is significant in predicting action, but

Table 3 Logit coefficients and standard errors from logistic regression model predicting (a) medication initiation (b) surgery, and (c) cancer screening from difference between average importance ratings of benefits and costs (mean_diff)

	Coefficient	Standard error
(a)		
Intercept	−0.542	0.44
Modules		
Cholesterol	0.829**	0.255
High blood pressure	0.864**	0.293
Depression	–	–
Mean_diff	0.158**	0.057
Cholesterol × mean_diff	−0.142*	0.062
High_BP × mean_diff	−0.163*	0.065
Gender (1 = female)	−0.033	0.165
Age	−0.0083	0.0059
Race		
White	–	–
Black	0.715**	0.265
Other	0.077	0.292
Hispanic origin (1 = yes)	0.043	0.352
Education		
HS or less	–	–
Some college	−0.543**	0.187
College graduate	−0.437*	0.174
Number of observations	1942	
Number of respondents	1575	
(b)		
Intercept	−2.102*	0.974
Modules		
Surgery for lower-back pain	−0.953*	0.456
Cataract surgery	0.582	0.425
Knee/hip replacement	–	–
Mean_Diff	0.167*	0.081
Backpain × mean_diff	0.246	0.13
Cataract × mean_diff	−0.023	0.103
Gender (1 = female)	−0.018	0.294
Age	0.030*	0.013
Race		
White	–	–
Black	−0.332	0.434
Other	−2.024*	0.925
Hispanic origin (1 = yes)	1.834*	0.831
Education		
HS or less	–	–
Some college	0.644	0.383
College graduate	−1.138**	0.349
Number of observations	448	
Number of respondents	425	
(c)		
Intercept	−0.695	0.621
Modules		
Colon cancer screening	−0.009	0.38
Breast cancer screening	0.79	0.431
Prostate cancer screening	–	–
Mean_Diff	0.233**	0.076
Colon × mean_diff	−0.16	0.086
Breast × mean_diff	0.035	0.097
Gender (1 = female)	−0.385	0.225
Age	0.032**	0.008
Race		
White	–	–
Black	0.207	0.264
Other	0.478	0.341
Hispanic origin (1 = yes)	−0.14	0.389
Education		
HS or less	–	–
Some college	−0.066	0.223
College graduate	−0.188	0.192
Number of observations	2081	
Number of respondents	1758	

*$P < 0.05$, **$P < 0.01$.

the importance of perceived costs, while negative, is not; for these decisions, none of the interactions is significant. For screening, it is the importance of perceived costs, that is significant and negative, whereas the importance of perceived benefits, while positive, is not.

The second alternative model considered the possibility that it was not specific perceived benefits and costs, but the importance attached to one particular reason – following the HCP's advice – that determined whether the respondent took action or not. We construe the HCP's advice as a heuristic for the net benefit (or cost) associated with a particular medical decision. Patients who considered this highly important would tend to act if the HCP recommended action and would not act if the HCP recommended against it. For purposes of this analysis, we treated the HCP variable as binary, coded 1 if respondents rated the importance of following the HCP's advice as ten and 0 if they gave it any

Table 4 Estimates of variance explained (Nagelkerke's R^2) by models using three different cost-benefit measures plus demographic controls for three types of medical decisions*

Estimates of variance explained (Nagelkerke's R^2)			
Importance measure	Started medication	Had surgery	Had screening
Mean difference between benefits and costs	0.07	0.40	0.13
Mean pros and mean cons	0.11	0.50	0.15
Importance of following health-care provider's advice	0.12	0.41	0.11

*Each of the nine models includes the importance measure, the decision modules (e.g. colon cancer, breast cancer for screening), interactions between the importance measure and the decision modules, and demographic characteristics (gender, age, race, Hispanic origin and education).

other rating.[2] The effect of the HCP variable is significant and positive for all three types of decisions (data not shown); none of the interactions between following the HCP's advice and specific medical conditions is significant.

Which of these three alternative models explains the greatest amount of variance in the dependent variable, the decision to take action with respect to a particular medical condition? Nagelkerke's (22) max-rescaled R^2 estimates,[3] which can be interpreted as roughly comparable to a measure of the variance explained by the model, are shown in Table 4 for each of the three models and each of the three types of decisions.

As can be seen in Table 4, the three models lead to very similar conclusions. (Note that comparisons can legitimately be made only across models on the same population. Because of differences in the individuals involved, one cannot compare the amount of variance explained for surgery, for example, with either of the other two types of decisions.) Perceived benefits and costs, whether modelled as the difference between the importance of benefits and costs, or as two separate predictors, or as the heuristic of following one's HCP's advice, account for roughly similar amounts of variance in each type of decision.

Hypothesis 2 states that the greater the difference between the importance attached to benefits and costs, the greater the confidence in the decision will be – that is, the more certain respondents will be that the decision they made was the correct one. This relationship is hypothesized because a greater difference in the importance of benefits and costs implies less conflict with respect to taking action.

Confidence in one's decision to take action or not was assessed by means of the following question, which was asked prior to the question about how important various reasons were in thinking about the decision:

On a scale from zero to 10, where 0 means not at all confident and 10 means extremely confident, how confident are you that the decision (to take medication, undergo screening, have surgery) was the right one?

We tested this hypothesis separately for each type of decision by means of linear regression, controlling for gender, age, education, race, Hispanic origin, and whether the respondent took action or not, as well as the interaction between taking action and the difference between the importance attached to perceived benefits and costs.

[2]By far the largest fraction of respondents selected '10' (extremely important) as the importance rating for the HCP's advice: For initiating medication – cholesterol-lowering, 51%; blood pressure, 60%; anti-depressants, 45%; for surgery – knee/hip, 62%; cataract, 68%; lower-back pain, 52%; for cancer screening – colon, 46%; breast, 60%; prostate, 47%.

[3]No single index equivalent to R^2 in ordinary least squares (OLS) regression exists for logistic regression but several pseudo R^2 indices have been developed. However, Hosmer and Lemeshow (23) note that the pseudo R^2 indices tend to be smaller than R^2 values for equivalent OLS analyses and caution against misperceptions of these lower values as indicating poor models. The Cox and Snell (24) pseudo R^2 measure yields a coefficient similar in size to Hosmer and Lemeshow's pseudo R^2. However, this index is difficult to interpret as its maximum value is <1 and depends on the proportion of 'cases' versus 'controls' in the sample. To facilitate interpretation, the Nagelkerke index transforms the Cox and Snell index to a 0–1 scale.

The difference between the importance of perceived benefits and costs is significantly related to confidence with respect to all three types of medical decisions (medication: regression coefficient = 0.1765, SE = 0.0238, $P < 0.001$; surgery: regression coefficient = 0.0871, SE = 0.0386, $P < 0.05$; screening: regression coefficient = 0.1170, SE = 0.0277, $P < 0.001$). And except for starting medication, those who decided to take action are significantly more confident that they made the right decision than those who decided not to act (medication: regression coefficient = 0.0658, SE = 0.1130, $P < 0.56$; surgery: regression coefficient = 0.8604, SE = 0.2135, $P < 0.001$; and screening: regression coefficient = 2.8229, SE = 0.2938, $P < 0.001$).

Discussion and conclusions

Many factors may affect patients' medical decisions. These differ from one decision type to another, and even across specific decisions within a particular type. However, the results of aggregating individual factors into those that may be regarded as benefits and those that may be regarded as costs suggest that certain general principles underlie the decisions. The importance attributed to perceived benefits and costs is significantly related, in the expected direction, to a wide variety of medical decisions, and it is also significantly related to the confidence patients have in those decisions.

Because the measures of importance were ascertained after the decisions themselves, we cannot assert that the perceived benefits and costs caused these decisions. But there is a consistent and statistically significant relationship between action and the importance of perceived costs and benefits, whether these are modelled as individual predictors or combined into a single measure or whether following the doctor's advice is used as a heuristic for a decision's net benefit or cost. In general, the importance ratings of reasons that can be viewed as benefits are significantly associated with a tendency to act; the importance ratings of reasons that can be viewed as costs are significantly associated with a tendency not to act, although the strength of those relationships varies from one type of decision to another.

The fact that patients appear to weigh benefits and costs in making medical decisions does not mean that they are well informed, in the sense of knowing which benefits and costs are considered most important by medical experts or having accurate information about treatment options and their consequences (25). Two other articles based on this study provide evidence for this. Fagerlin *et al.* (18) document the fact that the patients in this sample were by and large not knowledgeable about important facts related to the decision they had made, and Sepucha *et al.* (26) show that whether or not patients regard themselves as well informed bears little relationship to their actual knowledge scores.

Our conclusion about the role of benefits and costs in medical decision making might be challenged on the grounds that people attempt to justify their decisions after the fact or to reduce what Festinger (27) referred to as cognitive dissonance. However, if attempts to reduce cognitive dissonance were the only explanation involved, we would expect the relationship between the ratings of benefits and costs and the decision to be stronger than it actually is.

The findings and conclusions above are limited by the retrospective design of the study. Sample members were asked whether, in the past 2 years, they had ever made a particular medical decision or talked to a HCP about such a decision. Although the 2-year time frame was chosen to maximize sample size and minimize forgetting, some forgetting inevitably occurs, and only those who could recall an action or discussion were included in the sample. Thus, people whose responses made them eligible for inclusion are biased towards those who, for whatever reason, were more likely to recall a decision or a discussion with their medical provider. Exclusion of those for whom the decision had little salience may therefore overestimate the rationality of the general population. At the same time, because of the 2-year recall period, sample members may have forgotten some details of the decision,

which may also lead to less accurate estimates of the decision's rationality.

A second limitation of the findings arises from the study's eligibility rules. Those who considered one of the decisions but never spoke to a HCP about it have no chance of inclusion in the sample. For example, those for whom cost is an important deterrent may not have a regular HCP; and those who are terrified by the possible complications of elective surgery may never raise the issue with their doctor. As a result, both groups would have been excluded from the sample, and measures of the importance of various reasons may be biased by their exclusion.

The variance explained in decisions about medication and screening is relatively small, suggesting either that not all factors important to patients were included in the survey, or that these actions are not presented to patients as requiring a decision. Future work in this area should try to uncover the reasons for the lack of explanatory power to improve the decisions patients make and how satisfied they are with those decisions.

Despite these limitations, the study provides important evidence, consistent with other research, that benefit-cost calculations inform patients' medical decision making. What is equally important, however, is that the importance attached to specific costs and benefits varies from one individual to another. This article has dealt with the implications of benefit-cost calculations for medical decision making in general. But to be useful to individual patients, HCPs must take time to discover how a particular patient facing a particular decision evaluates its specific benefits and costs for him- or herself. In discussing a decision about surgery, for example, one patient may give high importance to being able to function better, but may attach even greater importance to the possibility of serious side effects. For another patient, this calculus may be reversed. Only if HCPs are alert to such individual preferences can truly informed shared decision making come about.

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