Decisional Attributes of Patients With Diabetes

The aspirin choice

VICTOR M. MONTORI, MD, MSC[1]
SANDRA C. BRYANT, MS[2]
ANNETTE M. O'CONNOR, RN, MSCN, PHD[3]
NEAL W. JORGENSEN[2]
ERIN E. WALSH[4]
STEVEN A. SMITH, MD[1,5]

OBJECTIVE — The aim of this study was to determine personal characteristics and preferences that affect decision making (decisional attributes) in patients with diabetes. In particular, we were interested in relating these attributes to the choice of using aspirin to reduce cardiovascular risk.

RESEARCH DESIGN AND METHODS — We conducted a cross-sectional survey (70% response rate) of 206 diabetic patients (median age, 63 years; 42% women; 91% completed high school; median HbA_{1c}, 8%) attending a tertiary care diabetes clinic. Patients answered a 42-question survey exploring decisional attributes. Medical records provided the source of clinical information. We evaluated sociodemographic, clinical, and decisional predictors of aspirin use. We also conducted a multivariable analysis with aspirin use as a dependent variable.

RESULTS — Sixty-seven percent of patients surveyed used aspirin. Patients using aspirin were at higher risk of cardiovascular disease (odds ratio 1.4, 95% CI 1.0–2.1), knew more about the benefits of aspirin (1.9, 1.4–2.6) and less about the risks of aspirin (1.4, 1.2–1.8), and were more certain about using aspirin (0.5, 0.3–0.8) than patients not using aspirin. Patients using aspirin placed a higher value on preventing cardiovascular events than on avoiding the side effects of aspirin. Patients perceived that their diabetes provider and the American Diabetes Association had greater influence on their decision to use aspirin than family members or other patients with diabetes.

CONCLUSIONS — The decisional attributes of patients with diabetes are associated with aspirin use. Decisional attributes may be the target of research and interventions to reduce underutilization to levels consistent with patient preferences.

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Reports of underutilization of aspirin in patients with diabetes characterize this situation as a lost opportunity to reduce cardiovascular morbidity and mortality at low cost (1). Furthermore, national surveys continue to show very low use rates in patients at high risk of cardiovascular events, particularly in patients with diabetes (2,3). Several important reasons may explain why clinicians do not prescribe aspirin to eligible patients (e.g., system reasons, such as incentives and disincentives for action and reminders, and clinician reasons, such as lack of skills to identify at-risk patients and competing priorities during a busy clinical encounter). Patient decisional attributes may contribute to aspirin underutilization.

Decisional attributes are personal characteristics and preferences that affect decision making. The Ottawa Decision Support Framework places these attributes in context and guides the development of decision aids (4). Decision aids can be effective tools to improve decisions (5), i.e., to make decisions more consistent with the values and preferences of the informed patient.

According to the Ottawa Decision Support Framework, patients choosing between alternatives may start with a strong predisposition toward one or the other or be completely indifferent. The quality of their decision to accept or decline a therapy depends on several modifiable factors, such as what they know, expect, and value about the benefits and harms of options, how they perceive others' opinions and their role in decision making, and how certain they feel about their choice. The provider's role in providing decision support is to improve suboptimal attributes of decisions such as inadequate knowledge, unrealistic expectations, unclear values, misperceptions of others' opinions, mismatches between actual and preferred roles in decision making, and decisional uncertainty. Whether these decisional attributes affect aspirin use remains unclear.

Our objective was to determine decisional attributes in patients with diabetes. In particular, we were interested in relating these attributes to the choice of using aspirin to reduce cardiovascular risk.

RESEARCH DESIGN AND METHODS

The Mayo Foundation Institutional Review Board approved the study protocol and survey tool.

From the [1]Division of Endocrinology, Diabetes, Metabolism, and Nutrition and Internal Medicine, Mayo Clinic, Rochester, Minnesota; the [2]Section of Biostatistics, Department of Health Sciences Research, Mayo Clinic, Rochester, Minnesota; the [3]Ottawa Health Research Institute, University of Ottawa, Ottawa, Ontario, Canada; the [4]Mayo Medical School, Mayo Clinic, Rochester, Minnesota; and the [5]Division of Health Care Policy and Research and Department of Health Sciences Research, Mayo Clinic, Rochester, Minnesota.

Address correspondence and reprint requests to Victor Montori, MD, W18 Mayo Clinic, 200 1st St. SW, Rochester, MN 55905.

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A table elsewhere in this issue shows conventional and Système International (SI) units and conversion factors for many substances.

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Setting and patients

We conducted a survey in the waiting room of the outpatient practice of the Division of Endocrinology and Diabetes at Mayo Clinic (Rochester, MN). Eligible patients for this study included all adult patients presenting for diabetes consultation or continuing care during the survey period (a 6-week period between April and May 2002). Patients who, despite having diabetes, did not complete surveys and were excluded were *1*) patients whose visit was not for diabetes because we could not systematically identify them a priori and offer them a survey while waiting for their endocrinology visit (e.g., for thyroid disease, osteoporosis), *2*) patients who we deemed unable to participate because of physical (e.g., blindness) and diagnosed cognitive (e.g., dementia) impediments, and *3*) patients who had insufficient time to complete the survey before seeing the health professional.

Data collection

We pilot tested earlier versions of the survey with 20 volunteers (from the same population) and followed each survey with a tape-recorded, structured interview to assist in the development of the final instrument in order to test for question clarity, understand apparently inconsistent answers, and minimize responder burden. The final survey took 30 min to complete and contained 42 questions addressing sociodemographic information, clinical information, and decisional attributes. We asked patients to indicate their age, sex, number of years of school completed, employment status, and job description.

We assessed the degree to which the responder was leaning toward or away from using aspirin with a 7-point choice predisposition scale (question 1). Participants also answered three questions that correspond to the uncertainty subscale of O'Connor's Decisional Conflict Scale (6), a reliable scale that discriminates between those who make and those who delay making decisions (questions 6–8). A score results from inverting the answers from questions 6 and 7, rescaling the answers to a 5-point scale, adding the response to each of the questions, and then dividing this by the number of questions. A minimum score of one indicates low decisional conflict, and a maximum score of five indicates high decisional conflict.

Participants answered six questions that tested knowledge about the benefits of aspirin use to prevent cardiovascular disease (questions 9, 10, 12–15) and eight questions that tested knowledge about the risks of aspirin (questions 11, 16–22). To create a composite score for knowledge, we scored one point for each question answered correctly (i.e., answered with agree or strongly agree if the statement was true); thus, the maximum knowledge score was six for benefits and eight for risks.

We inquired about the importance of aspirin's known benefits and risks to determine how patients valued the pertinent outcomes when making a decision about using aspirin (questions 27–30).

To ascertain the role of others in patients' decision to use aspirin, we asked four questions each with seven response options inquiring how important for each participants' decision it was to know if other people with diabetes use aspirin, if their doctor or the American Diabetes Association recommends aspirin to people like the patient, and if family members with diabetes were taking aspirin (questions 23–26).

To assess patient preferences for their role in making decisions, we used the questions that Strull et al. (7) developed, which are similar to those in the Control Preferences Scale (8) (questions 4 and 5). We also asked participants for their perception (seven response options, from excellent to good to poor) of how much their diabetes care provider knew about the responder's values and beliefs (question 2).

Finally, we ascertained whether the patient may have had a cardiovascular event or a bleed. We also asked patients whether they were using aspirin (and in what dose). If they were not using aspirin, we asked the patients to give us the reasons why they were not using aspirin.

We reviewed the medical records of all patients with a diabetes visit during the survey period (survey responders and nonresponders; the nonresponders include patients that refused to fill the survey and those whom we deemed ineligible or unable to participate) and collected sociodemographic and clinical information. We determined use of aspirin using both self-report (survey questions 32–34) and medical record review when the former was not clear or not available. Thirty-three nonresponders and eight responders did not give the Mayo Clinic authorization to review their records according to Minnesota Statute and were excluded from the analyses of clinical characteristics obtained from medical records.

Statistical analysis

We compared the characteristics of the survey responders with those of all nonresponders who attended the clinic for a diabetes visit during the survey period using Fisher's exact tests to compare nominal proportions, Kruskal-Wallis exact tests to compare ordinal proportions, and Wilcoxon's rank-sum tests to compare medians.

To explore predictive factors of self-reported use of aspirin, and a priori, we created a hierarchy of predictors under the presumption that the most important reason patients are on aspirin is because their provider recommended it. Therefore, we placed documented contraindications (previous bleed), previous cardiovascular events (stroke, myocardial infarction), number of risk factors for cardiovascular risk in excess of diabetes (age $\geq$50 years, hypertension, hypercholesterolemia, and tobacco use), and use of other antithrombotic agents at the top of the hierarchy. This was followed by patient's perception of the influential role of their diabetes provider. Decisional conflict, knowledge of benefits and risks, importance of preventing heart attacks and strokes, and education level completed the hierarchy.

Using univariate analyses, we tested the statistical association between the predictor variables in the hierarchy and the dependent variable (use of aspirin). Then we introduced variables that were marginally significant ($P < 0.10$) in a forward regression procedure with predictors entering the model ordered by hierarchy and leaving the model if they became not significant. The dependent variable was use of aspirin.

RESULTS — Of the 482 patients with diabetes identified as attending the clinic during the survey period, 294 were eligible and 206 completed the survey (70% response rate). There were no differences in age, sex, smoking status, metabolic control, or proportion with cardiovascular complications between survey responders and nonresponders. Reasons for nonresponse were not ascertained. Fewer responders used insulin (53 vs. 71%; $P <$

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Table 1—*Clinical characteristics of the study sample by aspirin use*

Characteristics	Aspirin use		*P* value
	No	Yes	
Sociodemographic			
n	49	146	
Age (years)	57 (42.5–71)	64 (54–72)	0.007
Women	25 (51)	54 (37)	0.10
Education (years)	12 (12–14)	13 (12–16)	0.15
Employment			0.19
Not employed	4 (8)	9 (6)	
Retired	19 (39)	77 (53)	
Employed	26 (53)	58 (40)	
Patient origin			0.86
Local (Olmsted County)	10 (22)	31 (22)	
Regional (Minnesota and surrounding states)	29 (64)	92 (66)	
National (U.S.) or international	6 (13)	16 (12)	
Clinical			
BMI (kg/cm^2)	33.2 (27.5–41.5)	31.6 (28–36.8)	0.30
Cholesterol (mmol/l)	4.58 (3.89–5.39)	4.77 (4.12–5.59)	0.59
Creatinine (μmol/l)	92.8 (79.6–106.1)	97.2 (88.4–114.9)	0.07
HbA_{1c} (%)	8.4 (6.9–9.7)	8.0 (7.0–9.1)	0.70
Tobacco use			0.46
Never	34 (79)	92 (68)	
Quit	8 (19)	38 (28)	
Current	1 (2)	6 (4)	
Heart attack	7 (15)	30 (22)	0.40
Stroke	2 (4)	12 (9)	0.52
Number of cardiovascular risk factors*			0.03
0	6 (12)	6 (4)	
1	18 (37)	42 (29)	
2	13 (27)	38 (26)	
3	7 (14)	44 (30)	
4	5 (10)	15 (10)	
Bleeding from ulcer	5 (12)	8 (6)	0.31
Medication use			
NSAIDS, antithrombotic agents	6 (12)	14 (10)	0.59
Insulin	19 (49)	60 (52)	0.85
Antihypertensive agents	12 (48)	47 (49)	>0.99
Lipid-lowering agents	7 (28)	57 (60)	0.006

Data are median (interquartile range) or *n* (%). *Cardiovascular risk factors: age (≤50 years), hypertension, dyslipidemia, and tobacco (ever versus never). We calculated percentages using the total number of patients with complete data as a denominator for each characteristic. Interquartile range (25– 75%). NSAID, nonsteroidal anti-inflammatory drug.

0.001) and more used aspirin (67 vs. 39%; $P < 0.001$) compared with nonresponders. Table 1 lists the characteristics of survey responders classified by aspirin use (we could not determine aspirin use in 11 patients). Almost all patients were non-Hispanic Caucasian. Fifty-six percent of the patients had hypertension, 30% were current smokers or ex-smokers, 20% had had a myocardial infarction, and 8% had had a stroke. Patients had median HbA_{1c} 8.0% (interquartile range [IQR] 6.9–9.1), median cholesterol 4.64 mmol/l (4.11–5.57), and median creatinine 97 μmol/l (88–115).

Of those that reported their perceptions about their diabetes provider (n = 193), 44% considered their provider to have excellent knowledge about their values and beliefs; 19% considered this knowledge to be less than good. Of all respondents, 91% preferred to share decision making and reported actually sharing decision responsibility. Sixteen respondents preferred but were not sharing decision making; eight respondents sharing decision making preferred to transfer more decision responsibility to their diabetes provider.

If their diabetes provider asked them to make a choice about using aspirin, 137 patients (68%) would choose to use aspirin. Only nine (5%) of these patients who were ready to choose aspirin were not using aspirin. Of those not using aspirin, 26% were uncertain and 49% leaned toward choosing not to use aspirin. Those not using aspirin cited as reasons for not using aspirin (more than one reason could be noted): intolerance or contraindication (n = 15 [32%]), provider did not recommend it (18 [38%]), dislike taking medications (6 [13%]), and disbelief in aspirin efficacy (5 [11%]). Only one patient gave the cost of aspirin as the reason for not using it.

Table 2 describes patient knowledge about the benefits and risks of aspirin use. Fewer patients not using aspirin (32%) correctly answered all six questions about the benefits of aspirin than patients using aspirin (66%). In contrast, fewer patients using aspirin (9%) correctly answered at least six of eight questions about the risks of aspirin compared with patients not using aspirin (27%).

Patients using aspirin placed a relatively higher value on preventing cardiovascular events than on avoiding the side effects of aspirin; patients not using aspirin placed an equal value on preventing both cardiovascular events and the side effects of aspirin (Table 2). Patients considered the influence of their family members with diabetes and other patients with the disorder to be less important than the influence that their diabetes provider and the American Diabetes Association have on their decision to use aspirin (Table 2).

Patients not using aspirin had uncertainty scores of the Decisional Conflict Scale that were significantly greater than those of patients using aspirin (Table 3) and were consistent with choice delay. Those without a choice predisposition (uncertain about using aspirin) had a much greater uncertainty score (3.1 ± 0.89) than patients with a defined choice predisposition using (1.9 ± 1.07) or not using (2.4 ± 0.89) aspirin.

On univariate analysis, patients using aspirin were older, had less decisional

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Table 2—*Decisional attributes and use of aspirin*

Parameters	Aspirin use		*P* value
	No	Yes	
n	49	146	
Choice predisposition, median of 15 (IQR)*	8 (5.7–15)	1 (1–1)	<0.0001
Knowledge score			
Knowledge of benefits, [median of 6] (IQR)†	4 (3–6)	6 (5–6)	<0.0001
Knowledge of risks [median of 8] (IQR)†	3 (2–6)	2 (1–3)	0.007
Knowledge deficit about benefits: Subjects who disagreed or were uncertain			
Aspirin is effective in primary prevention	31 (66)	38 (26)	<0.0001
First heart attack	29 (60)	34 (23)	<0.0001
First stroke	28 (58)	40 (28)	0.0002
Aspirin is effective in secondary prevention	20 (43)	22 (15)	0.0002
Second heart attack or stroke	21 (44)	33 (23)	0.009
Aspirin prevents death from heart attack or stroke	29 (60)	56 (39)	0.01
Knowledge deficit about risks: Subjects who were unsure or in disagreement			
History of bleeding ulcers is a contraindication	21 (45)	93 (65)	0.02
Aspirin can cause upper gastrointestinal bleed	30 (63)	109 (76)	0.09
Aspirin can cause intracranial bleeding	36 (75)	128 (90)	0.03
Aspirin can cause fatal bleeding	40 (83)	134 (94)	0.03
Aspirin can cause "stomach" pain	33 (69)	127 (89)	0.002
Aspirin has side effects	31 (65)	110 (77)	0.13
Aspirin risk is dose dependent	20 (42)	50 (35)	0.39
There are risks for aspirin when used to prevent strokes and heart attacks	35 (73)	116 (81)	0.31
Outcome Importance [median of 5] (IQR)‡			
Protection from heart attack	4.3 (3.7–5)	5 (4.3–5)	0.001
Protection from stroke	4.3 (3.7–5)	5 (4.3–5)	0.0001
Side effects of aspirin	4.3 (3.2–5)	4.3 (3–5)	0.10
Risk of gastrointestinal bleeding with aspirin	4.3 (3.9–5)	4.3 (3–5)	0.15
Importance of others in decision [median of 5] (IQR)‡			
Most people with diabetes take aspirin	3 (3–4.3)	3 (3–4.3)	0.86
American Diabetes Association recommends aspirin for people in your situation	4.3 (3.7–5)	4.3 (3.4–5)	0.82
Your diabetes care provider recommends aspirin for people in your situation	4.3 (3–5)	4.3 (3.5–5)	0.88
Members of your family with diabetes take aspirin	3.7 (3–4.3)	3.7 (3–5)	0.48

Data are *n* (%) unless otherwise indicated. *Choice predisposition interpretation: 1, clearly predisposed toward using aspirin; 8, uncertain; 15, clearly predisposed against using aspirin; †higher knowledge scores reflect greater knowledge; ‡higher importance scores reflect greater importance of the attribute. IQR, interquartile range (25–75).

conflict, had greater knowledge of the benefits and lesser knowledge of the risks, placed a higher value on preventing heart attacks and strokes, and had more cardiovascular risk factors than those not using aspirin. There was a nonsignificant trend for patients using aspirin to have been less likely to have had a gastrointestinal bleed and more likely to have had a heart attack or stroke (Table 1): 16% of respondents with a heart attack or stroke were not using aspirin, and 61.5% of respondents with a history of a gastrointestinal bleed were using aspirin.

On multivariate analysis, the number of cardiovascular risk factors (odds ratio 1.44, 95% CI 1.004–2.05), the decisional conflict scale (0.53, 0.34–0.82), knowledge of the benefits (1.87, 1.37–2.57), and ignorance of the risks (1.42, 1.21–1.77) were all independent predictors of aspirin use.

CONCLUSIONS — This cross-sectional study in patients with diabetes shows that patients who use aspirin differ importantly in certain decisional attributes from patients who do not use aspirin: they were at higher baseline risk for cardiovascular disease, knew more about the benefits of aspirin and similarly less about the risks, and were more certain about the decision to use aspirin. Patients using aspirin placed a relatively higher value on preventing cardiovascular events than on avoiding the side effects of aspirin; patients not using aspirin placed equal value on preventing strokes, heart attacks, and aspirin side effects. Those not using aspirin identified aspirin intolerance or contraindication and lack of provider recommendation as the main reasons not to use aspirin. Both groups were equally interested in shared decision making and identified their diabetes provider and the American Diabetes Association as important external influences on their decision to use aspirin.

To our knowledge, this is the first study to ascertain decisional attributes in patients with diabetes using a theoretical framework, the Ottawa Decision Support Framework, and to confirm the general tenets of this framework in patients with diabetes. Our findings refer to a group of patients with diabetes who are well educated and have adequate access to diabe-

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Table 3—*Decisional Conflict Scale–Uncertainty Subscale by aspirin use*

Uncertainty Subscale Items	Aspirin use: No — Median (IQR)	No — *N* (%) score ≤2†	Yes — Median (IQR)	Yes — *N* (%) score ≤2†	*P* value‡
*n**	47		137		
The decision to use (or continue to use) an aspirin a day is easy for me to make	3 (1–3)	19 (39)	1 (1–3)	89 (61)	0.09
I am sure about using an aspirin a day to prevent heart attacks and strokes	3 (1–3)	13 (27)	1.7 (1–3)	90 (62)	<0.001
It is clear what choice about using or not using aspirin is best for me	3 (1.7–3)	13 (27)	1 (1–3)	85 (58)	<0.001
Uncertainty subscale	3 (2.3–3)	10 (21)	1.7 (1–3)	71 (52)	<0.001

*Total number of complete responses to the uncertainty subscale questions; †to score 2 (in the scale ranging from 1 [strongly agree] to 5 [strongly disagree]), the responder has to strongly agree or agree with the item; ‡this *P* value refers to the comparison of median scores from users and nonusers of aspirin. IQR, interquartile range (25–75%).

tes care. Thus, the suboptimal attributes in patients not using aspirin (knowledge deficit regarding benefits/risks, unclear preferences, uncertainty about the decision and the choices) represent a best-case scenario and underscore a significant, missed opportunity for intervention.

We draw the following limitations of our study to the reader's attention. Our response rate was 70%; although responders appeared to be representative of all patients receiving care at the clinic, they were more likely to be using aspirin. The cross-sectional design weakens causal inferences. Decisional attributes may differ and have different impact on aspirin use among patients with less formal education or of lower socioeconomic status. Participants had relatively few events (heart attacks, strokes, and gastrointestinal bleeds) to allow for precise measure of the relationship between these events and aspirin use. We did not ask patients why they used aspirin (i.e., whether they followed provider recommendations or decided on their own after reading a magazine article or an advertisement). The relatively large number of comparisons weakens inferences from univariate analyses with nominally significant *P* values. However, we planned all the analyses, including the hypothesis-driven multivariable analysis.

Our results are consistent with the survey of 6,048 patients from a health maintenance organization (58.6% were aspirin users) (9) and with a survey of aspirin use and counseling among 1,431 patients with diabetes receiving care in the Department of Veterans Affairs (10). As in our study, these authors found that patients at high baseline risk of cardiovascular events (by number of risk factors, mainly dyslipidemia and smoking, and by self-report of heart disease) were more likely to be using aspirin. Our study differs from these surveys in two important ways. We did not ascertain recall of a health professional recommendation to use aspirin or its effect on aspirin use. Both surveys showed an association between recalling a health professional recommending aspirin on aspirin use. Unlike these surveys, however, we ascertained patient decisional attributes associated with taking aspirin.

Our study is also consistent with an interview-based study of the treatment preferences of patients with previous cardiac events and heart failure (11). In this study, and using a probability tradeoff technique, patients placed a higher value on preventing strokes (in this case, embolic strokes associated with chronic atrial fibrillation) and relatively lower value on preventing major gastrointestinal bleeds associated with aspirin use. Our study did not ask participants to directly contrast these two outcomes but to express in absolute terms the importance that each one had in their decision-making process.

Taken together with previous studies, it is highly likely that diabetes provider recommendation may explain why patients at high risk for cardiovascular disease appear more likely to be using aspirin. It is also possible that provider advice also conveyed information that improved patient knowledge of the benefits of aspirin, decreased their uncertainty about their choice of aspirin use, and alleviated their conflict about using a daily aspirin to prevent heart attacks and strokes. Although a less likely explanation, we cannot exclude that patients at greater cardiovascular risk may have acquired information from other sources or developed preferences for aspirin use independent of provider advice.

This study highlights the missed opportunities for decision support in a significant number of nonaspirin users. Diabetes providers and guideline developers should take into account informed patient preferences when recommending aspirin use. Patients at very high risk of cardiovascular events may be appropriate candidates to receive aspirin even if they have had recent gastrointestinal bleeds, despite the nominal contraindication for its use (12). This is because patients place a relatively higher value in preventing strokes and cardiac events than in avoiding gastrointestinal bleeds.

However, patients not using aspirin appear to have different preferences for these outcomes. It remains unclear whether this is an effect of limited information about the benefits and risks of aspirin and about their own risk of cardiovascular events and bleeds. If so, it reminds providers of the importance of sharing information about benefits, risks, and patient values; this process is referred to as "shared decision making" (13,14), which was strongly endorsed in our sample. The minority that did not endorse shared decision making for the decision to use aspirin reminds providers to review with each patient what level of participation they prefer, a preference that may change from decision to decision.

For relatively simple interventions, how much information should the provider give to patients about risks and benefits? In particular, our data would suggest that knowledge of the benefits of

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aspirin is associated with use of aspirin and lack of conflict about the decision to use aspirin. It is possible that information about side effects may increase anxiety and conflict; however, several randomized trials of decision aids that explain benefits and harms of other treatments generally reduced conflict and had no greater effect on anxiety (5). It is unclear whether balanced information about benefits and harms will lead to lower rates of aspirin use or, perhaps more importantly, to higher rates of use consistent with patient preferences.

Time pressures may limit the ability of providers to share the decision-making process with their patients. In some cases where information provision seems critical, simple wall posters in clinics supplemented by written information may suffice. Alternatively, referral to a patient education service or nurse call center may streamline the process of counseling in those wanting more detailed risk assessment and discussion. However, referral to decision aids or call centers should supplement rather than replace counseling. Patients want to hear from their health provider what they think of an issue in their particular circumstance, even if it is a very short discussion (15).

Given the evidence of efficacy and safety of aspirin use in patients at risk of cardiovascular events (16,17) and the ever present tradeoff between benefits and risks, providers should engage in shared decision making and incorporate patient preferences into the decision-making process. Our study advances the field by making explicit what decisional attributes patients have at a point in time about a particular intervention. These attributes will have to be taken into consideration when studying underutilization of an intervention and interventions to improve uptake of preventive interventions.

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