Disclosing Medical Errors to Patients: Attitudes and Practices of Physicians and Trainees

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BACKGROUND: Disclosing errors to patients is an important part of patient care, but the prevalence of disclosure, and factors affecting it, are poorly understood.

OBJECTIVE: To survey physicians and trainees about their practices and attitudes regarding error disclosure to patients.

DESIGN AND PARTICIPANTS: Survey of faculty physicians, resident physicians, and medical students in Midwest, Mid-Atlantic, and Northeast regions of the United States.

MEASUREMENTS: Actual error disclosure; hypothetical error disclosure; attitudes toward disclosure; demographic factors.

RESULTS: Responses were received from 538 participants (response rate=77%). Almost all faculty and residents responded that they would disclose a hypothetical error resulting in minor (97%) or major (93%) harm to a patient. However, only 41% of faculty and residents had disclosed an actual minor error (resulting in prolonged treatment or discomfort), and only 5% had disclosed an actual major error (resulting in disability or death). Moreover, 19% acknowledged not disclosing an actual minor error and 4% acknowledged not disclosing an actual major error. Experience with malpractice litigation was not associated with less actual or hypothetical error disclosure. Faculty were more likely than residents and students to disclose a hypothetical error and less concerned about possible negative consequences of disclosure. Several attitudes were associated with greater likelihood of hypothetical disclosure, including the belief that disclosure is right even if it comes at a significant personal cost.

CONCLUSIONS: There appears to be a gap between physicians' attitudes and practices regarding error disclosure. Willingness to disclose errors was associated with higher training level and a variety of patient-centered attitudes, and it was not lessened by previous exposure to malpractice litigation.

KEY WORDS: medical errors; error disclosure; medical ethics; professionalism; doctor–patient relationships; malpractice litigation.
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INTRODUCTION

Medical errors are difficult to disclose, and this difficulty is acutely felt when a physician has to explain to an affected patient or family that his or her efforts to improve health have inadvertently caused harm. Challenges notwithstanding, patients and professionals support the disclosure of errors as an integral part of a physician's duty,[1–6] and the importance of this duty is widely emphasized by physicians,[7–15] patient safety experts,[16,17] hospital executives,[18,19] ethicists,[20,21] and hospital accrediting organizations.[22] However, it is not clear whether public and professional expectations for disclosure are matched by physicians in actual practice.

Given the difficulty and importance of disclosing errors to patients, there is a need to learn more about the practice of error disclosure and the diverse factors that may facilitate or impede it,[23,24] especially given the tension between the transparency promoted by the patient safety movement and the silence induced by the malpractice system.[25,26] To improve our understanding of error disclosure by physicians, we surveyed faculty physicians, resident physicians, and medical students in teaching hospitals and medical centers. We deliberately selected this setting because of the formative role teaching hospitals play in the development of physicians' attitudes and practices.

METHODS

Study Design and Conceptual Framework

We conducted a cross-sectional survey of faculty physicians, resident physicians, and medical students within a conceptual framework provided by our previous work, including an empirical taxonomy of factors that facilitate or impede physicians' disclosure of medical errors.[23,24]

Survey Questionnaire

Actual experiences with errors and disclosure were queried of faculty and resident physicians by asking if they had ever made a mistake that (a) prolonged treatment or caused discomfort or (b) caused disability or death and, in each case, inquiring whether they had told or not told the patient or the patient's family (see Table 2).

A hypothetical error vignette similar to that used by Blendon et al.[27] was followed by 3 different outcomes of varying severity—no harm, minor harm, and major harm (see Appendix). The question at the end of each outcome was followed by response options of very likely, likely, not sure, unlikely, and very unlikely. A modified version of the hypothetical vignette and responses was given to pediatric faculty and residents by changing the patient to a 7-year-old boy, specifying the patient's parents as the recipients of disclosed information, and adjusting the third clinical outcome by making no mention of a myocardial infarction and concluding that "the patient's condition stabilizes and he is transferred out of the intensive care unit after 24 hours."

Based on our prior focus group data, we did not make a distinction between medical error and medical mistake and printed the following statement in the questionnaire: "Definition: We use 'medical error' and 'medical mistake' interchangeably to describe a preventable adverse event that affects a patient by prolonging treatment or causing discomfort, disability, or death." The hypothetical vignette we employed also reflected the reality that medical errors do not necessarily result in harm.

To explore perceptions of the relationship between error disclosure and the risk of malpractice litigation, we presented an additional vignette:

> A physician forgets to monitor for signs of drug toxicity in a patient's care, resulting in moderate deafness. The patient does not realize the deafness is due to drug toxicity. The physician tells the patient what happened and admits responsibility for not monitoring the patient appropriately. How do you think disclosing this mistake to the patient will affect the physician's risk of being sued for malpractice?

Questions about attitudes to disclosure were based on a structured review of the literature[23] and an empirically derived taxonomy of factors that facilitate or impede disclosure.[24] Attitudinal questions used 5-point Likert scale responses ranging from strongly agree to strongly disagree. For the version of the survey given to medical students, some questions were rephrased to query respondents' beliefs about what their attitudes would likely be after becoming a physician.

Demographic variables included training level, specialty, gender, belief in forgiveness, experience giving medical–legal testimony, and being named as a defendant in a malpractice case. To assure anonymity of responses, we did not query age, year of graduation, or race/ethnicity.

The questionnaire was pilot tested for face validity, clarity, and stability over time with 8 faculty, 4 fellows, and 4 students. Two rounds of identical surveys were distributed to these participants, separated by 2 weeks. Based on the stability of each item (calculated using Spearman's correlation of each individual's response at time 1 and time 2), 1 question was clarified and 17 questions were removed. Items that had a correlation coefficient less than 0.50 were not included in the final questionnaire. All of the final questions had good to excellent reliability, with Spearman's Rho>=0.6.[28] The questionnaire is available upon request from the first author.

Participants

Faculty physicians, resident physicians, and medical students were drawn from 4 medical centers in the Midwest, Mid-Atlantic, and Northeast regions of the United States. After approval by the Institutional Review Boards at each of the participating institutions, potential participants were invited to complete a self-administered, paper-based survey, either at the end of an organized educational activity, as an independent activity, or through mailed correspondence. Participation was voluntary and included token incentives. The questionnaire required approximately 20 minutes to complete, and no personally identifying information was collected. To send a second or third invitation to those who did not respond to mailed correspondence, participation was tracked by using a response card separate from the survey. The card allowed potential participants to communicate that they had either completed the survey or did not wish to do so, without revealing whether or not they had actually completed the survey. Participants were assured that they and their institutions would remain anonymous.

Surveys were completed between June and September, 2004, with the exception of 32 resident physicians and 51 faculty physicians at one study site who completed surveys between January and March, 2005. Medical students completed surveys at the beginning of their third year, just prior to the start of their clinical rotations. Resident physicians were from family medicine, internal medicine, and pediatrics. Faculty physicians were from family medicine, general internal medicine, and general pediatrics, with the addition of 36 pediatric specialists from 1 study site. The pediatric specialists served as a comparison group to the generalist faculty physicians. When all variables were analyzed for differences, responses from pediatric specialists were not significantly different from generalist faculty responses, so responses from the pediatric specialists were included for analysis.

Statistical Analysis

Answers from the questionnaires were entered manually into an Access data file and then uploaded into PC SAS, version 8.1 (SAS Institute, Cary, NC, USA). For analysis, Likert scale responses were dichotomized as follows: (1) likely/very likely versus not sure/unlikely/very unlikely and (2) agree/strongly agree versus neutral/disagree/strongly disagree. By grouping undecided and negative responses together, this dichotomization intentionally placed primary analytic focus on positive responses. To simplify reporting in the "Results," *likely* signifies the combination of "likely" and "very likely" responses, and *agree* signifies the combination of "agree" and "strongly agree" responses.

We calculated frequency distributions of responses and used the 2-tailed Fisher's exact test or the chi square statistic to test differences between proportions. Demographic characteristics and attitudes toward error disclosure served as independent

variables, and actual disclosure of errors and answers to the hypothetical vignettes served as dependent variables. To incorporate multiple facilitating and impeding attitudinal variables into a multivariate analysis, we developed a "facilitators factor" and an "impediments factor" by performing a factor analysis on the 15 attitudinal variables in Table 4, using responses from the 338 faculty and resident physicians. We then developed a "facilitators scale" and an "impediments scale" by summing each 5-level variable (according to the 5-point Likert scale responses) in each of the 2 factors.

Logistic regression analyses were used to determine significant predictors of actual and hypothetical error disclosures among the 338 faculty and resident physicians. We included all 338 physician respondents in the models of actual disclosure to assess differences between those who acknowledged having disclosed an error to a patient and those who did not acknowledge having ever done so. Although some of the latter group may have never made a minor or major error (and therefore would not have acknowledged disclosing one), for the purposes of analysis we found it reasonable to assume that all faculty and residents had made at least 1 minor error in their careers and that many had probably made at least 1 major error. An additional reason for this inclusion decision was the overlap between disclosing and nondisclosing respondents, resulting in 2 populations that were not mutually exclusive. Multivariate analyses were conducted using backwards stepwise regression on the following variables: facilitators scale, impediments scale, training level, belief in forgiveness, gender, specialty, experience giving nonmalpractice-related testimony, experience giving malpractice-related testimony, and being named as a defendant in a malpractice case. Only variables significant at the alpha=0.05 level were retained in the final multivariate model for each of the outcomes.

RESULTS

Response Rates and Demographic Characteristics

Surveys were completed by 138 faculty physicians, 200 resident physicians, and 200 medical students. The overall response rate was 77%, with subgroup response rates of 82% (faculty), 69% (residents), and 83% (students). Table 1 describes respondents' demographic characteristics.

Table 1. Respondents' Demographic Characteristics

Characteristic	
Response rate (%)	77
Training level and specialty	
Faculty, total (*n*)	138
Internal medicine (*n*)	53
Family medicine (*n*)	21
Pediatrics (*n*)	64
Residents, total (*n*)	200
Internal medicine (*n*)	135
Family medicine (*n*)	12
Pediatrics (*n*)	53
Students (*n*)	200
Women (%)	51
Religiosity/spirituality	
Moderately or very religious (%)	52
Moderately or very spiritual (%)	70
Attend religious meetings a few times a month or more (%)	41
Forgiveness is an important part of my spiritual/religious belief system (%)	82
Percent of time spent in clinical practice (faculty)	
1–20 (%)	6
21–40 (%)	16
41–60 (%)	22
61–80 (%)	28
81–100 (%)	28
Location of clinical practice (faculty)	
All outpatient (%)	14
Mostly outpatient (%)	51
Equally outpatient and inpatient (%)	10
Mostly inpatient (%)	16
All inpatient (%)	9
Experience with medical–legal proceedings	
Have provided medical testimony in a legal deposition that was not related to a malpractice case (%)	
Faculty	51
Residents	3.5
Have provided medical testimony in a legal deposition that was related to a malpractice case (%)	
Faculty	36
Residents	0.5
Have been named as a defendant in a malpractice case (%)	
Faculty	22
Residents	0.5

Actual Experiences with Errors and Error Disclosure

We asked faculty and resident physicians about actual errors and their disclosure, as shown in Table 2. Forty-nine (15%) faculty and residents reported both causing a minor error they did disclose and causing one they did not disclose, and 3 (1%) reported both causing a major error they did disclose and causing one they did not disclose. Taking all acknowledged errors together (disclosed and not disclosed), 47% of physician respondents acknowledged having made at least 1 minor or major error (62% of faculty and 36% of residents), with 46% of faculty and residents acknowledging a minor error and 9% acknowledging a major error.

Of the faculty and resident physicians, 10% reported that on at least 1 occasion they had chosen not to tell a patient that a medical mistake had occurred because of concerns about legal liability. Among the faculty, 6% reported that on at least 1 occasion they had wanted to tell a patient that a medical mistake had occurred but an attorney instructed them not to do so.

Responses to Hypothetical Error Vignettes

The proportion of faculty and residents who were likely to disclose a hypothetical error varied according to the outcome of the error (Table 3). In answer to the additional vignette involving unmonitored drug toxicity resulting in moderate deafness, 18% of faculty and residents believed disclosure to the patient would decrease the risk of being sued for malpractice, 47% believed disclosure would increase such risk, and 35% believed there is no way to predict the impact of disclosure on malpractice risk.

Attitudes toward Disclosing Errors to Patients

Table 4 describes the frequency of faculty and residents' attitudes toward aspects of error disclosure. Table 5 shows that the following attitudes were statistically associated with actual error disclosure: feeling an obligation to tell the facts of

Table 2. Actual Experience with Disclosure and Nondisclosure of Errors among Faculty and Resident Physicians

Question*	Respondent	Number (%) of respondents answering yes
Minor errors		
Have you ever made a mistake that prolonged treatment or caused discomfort and told the patient (or the patient's family) that a mistake was made?	Faculty Residents Total	74 (54) 65 (33) 139 (41)
Have you ever made a mistake that prolonged treatment or caused discomfort and not told the patient (or the patient's family) that a mistake was made?	Faculty Residents Total	36 (26) 29 (15) 65 (19)
Major errors		
Have you ever made a mistake that caused disability or death and told the patient (or the patient's family) that a mistake was made?	Faculty Residents Total	12 (9) 5 (3) 17 (5)
Have you ever made a mistake that caused disability or death and not told the patient (or the patient's family) that a mistake was made?	Faculty Residents Total	11 (8) 4 (2) 15 (4)

Survey questions are presented verbatim

what happened, not believing disclosure would help alleviate feelings of guilt, and not believing that the decision to disclose depends on one's own assessment of whether the information will help or harm the patient. Table 6 shows that the following attitudes were statistically associated with hypothetical disclosure: feeling an obligation to tell the facts of what happened, feeling an obligation to make it clear that a mistake occurred, believing disclosure is right even if it comes at a significant personal cost, believing disclosure is important because that is how the respondent would want to be treated, believing that disclosure strengthens patient trust, and not believing that the decision to disclose depends on the respondent's assessment of whether the information will help or harm the patient.

Training Level, Specialty, Gender, Importance of Forgiveness, and Experience with Litigation

Faculty respondents were more likely than resident and student respondents to disclose an error resulting in no harm (80% vs 63% vs 50%, $p<0.001$), minor harm (99% vs 95% vs 93%, $p=0.06$), and major harm (97% vs 90% vs 94%, $p=0.03$). Faculty were less likely than residents and students to be concerned about malpractice litigation (76% vs 83% vs 91%, $p<0.001$), professional discipline (46% vs 66% vs 86%, $p<0.001$), loss of reputation, (54% vs 67% vs 76%, $p<0.001$), and blame from colleagues (47% vs 62% vs 75%, $p<0.001$). Faculty physicians were also less likely than residents and students to agree that the decision to disclose "depends on whether I think the information will help or harm the patient" (21% vs 44% vs 52%, $p<0.001$) or to believe that disclosure would help alleviate their guilt feelings (50% vs 69% vs 74%, $p<0.001$). Faculty and residents were more likely than students to agree that error disclosure "strengthens my patient's trust in me as a physician" (64% vs 65% vs 46%, $p<0.001$).

Pediatric faculty and residents were more likely than their internal medicine or family medicine colleagues to disclose a hypothetical error resulting in no harm or major harm (Table 6), and they were less likely to agree that the decision to disclose an error depends on whether the physician thinks the information will help or harm the patient (28% vs 40%, $p=0.02$). There were no significant gender differences regarding the likelihood of disclosing actual or hypothetical errors.

Respondents who agreed that forgiveness is an important part of their spiritual or religious belief system were more likely to disclose a hypothetical error resulting in minor harm (Table 6). Although such respondents were less likely to have disclosed an actual error resulting in major harm (Table 5),

Table 3. Responses to the Hypothetical Error Vignette among Faculty and Resident Physicians

How likely is it that you would disclose the error to the patient?	Outcome #1: no harm	Outcome #2: minor harm	Outcome #3: major harm
Very likely (%)	37	68	77
Likely (%)	33	29	16
Not sure (%)	14	1	6
Unlikely (%)	11	1	1
Very unlikely (%)	5	1	0

See Appendix for details of the hypothetical vignette and its 3 outcomes.

Table 4. Attitudes toward Error Disclosure among Faculty and Resident Physicians

Question (verbatim)	Number (%) of respondents who agreed
When a mistake occurs, I feel an obligation to tell my patient the facts necessary for him/her to understand what happened	320 (95)
When a mistake occurs, I feel an obligation to make it clear that what happened was a mistake	280 (83)
Disclosing medical errors is the right thing to do even if it comes at a significant personal cost (e.g., harms my reputation or increases my malpractice risk)	299 (89)
It is important for me to tell my patients about errors I have made because that is how I would want to be treated if I were a patient	304 (90)
If I made a medical mistake, disclosing the mistake to my patient would help alleviate my feelings of guilt	207 (61)
Telling my patient about a medical error I have made in their care strengthens my patient's trust in me as a physician	217 (65)
My decision to disclose an error to my patient depends on whether I think the information will help or harm him/her	116 (35)
When I make a medical mistake, I am my own worst critic	305 (92)
If there were no malpractice risks related to disclosing medical mistakes to patients, it would be much easier to talk with my patients about mistakes when they occur	291 (86)
In general, when thinking about disclosing medical mistakes, I am concerned about the following possible consequences:	
Negative patient/family reaction	292 (87)
Malpractice litigation	270 (80)
Professional discipline	195 (58)
Loss of reputation from colleagues	207 (61)
Blame from colleagues	188 (56)
Negative publicity	151 (45)

Table 5. Attitudes and Demographic Variables Associated with Actual Disclosure of Errors among Faculty and Resident Physicians

Attitude* or variable	Percent of respondents who reported actual disclosure of an error resulting in minor or major harm			
	Minor† harm	*p* value	Major‡ harm	*p* value
I feel an obligation to tell the facts necessary to understand what happened				
% agreeing	50	0.05	5	0.87
% disagreeing	25		6	
I feel an obligation to make it clear that what happened was a mistake				
% agreeing	49	0.77	6	0.65
% disagreeing	51		4	
Disclosure is right even if it comes at a significant personal cost				
% agreeing	50	0.44	6	0.5
% disagreeing	42		3	
Disclosure is important because that is how I would want to be treated				
% agreeing	49	0.49	5	0.75
% disagreeing	42		7	
Disclosure would help alleviate my feelings of guilt				
% agreeing	45	0.07	3	0.02
% disagreeing	56		9	
Disclosure strengthens my patient's trust in me				
% agreeing	50	0.73	6	0.33
% disagreeing	48		4	
My decision to disclose depends on whether I think the information will help or harm the patient				
% agreeing	41	0.07	4	0.31
% disagreeing	52		6	
When I make a medical mistake, I am my own worst critic				
% agreeing	50	0.33	5	0.5
% disagreeing	39		8	
Forgiveness is an important part of my spiritual or religious belief system				
% agreeing	48	0.83	4	0.03
% disagreeing	50		12	
Gender				
Male	47	0.56	4	0.2
Female	51		7	
Training level				
Faculty	67	<0.001	9	0.009
Residents	37		3	
Specialty				
Pediatrics	49	0.62	5	0.97
Family medicine	57		6	
Internal medicine	47		5	
Have provided medical testimony in a legal deposition that was not related to a malpractice case				
Yes	67	0.001	11	0.01
No	43		4	
Have provided medical testimony in a legal deposition that was related to a malpractice case				
Yes	75	<0.001	11	0.07
No	44		4	
Have been named as a defendant in a malpractice case				
Yes	88	<0.001	7	0.7
No	44		5	

p values were calculated using the 2-tailed Fisher's exact test or the chi square statistic.
**See Table 4 for verbatim statements of questions.*
†*Error resulting in minor harm was defined as a mistake that prolonged treatment or caused discomfort.*
‡*Error resulting in major harm was defined as a mistake that caused disability or death.*

they were less likely to have not disclosed an actual error resulting in major harm (4% vs 10%, $p<0.05$).

Experience with litigation was associated with increased actual and hypothetical error disclosure. Table 5 shows that respondents were more likely to have disclosed errors resulting in minor and major harm if they had provided medical testimony in a legal deposition, and more likely to have disclosed an error resulting in minor harm if they had been named as a defendant in a malpractice case. Table 6 shows that having provided legal testimony was associated with greater likelihood of disclosing a hypothetical error resulting in no harm. Having been named as a defendant was not associated with any significant differences in the likelihood of disclosing any of the hypothetical errors (Table 6). Further analysis revealed that having been named as a defendant in a malpractice case was not associated with increased nondisclosure of an actual error resulting in minor harm; however, respondents who had been named as defendants were more likely to have reported not disclosing a disabling or fatal error (19% vs 6%, $p=0.04$).

Factor Analysis and Multivariate Analyses

A facilitators factor and an impediments factor were developed by performing a factor analysis on the 15 attitudinal variables in Table 4. Five variables did not load significantly on either of

Table 6. Attitudes and Demographic Variables Associated with Hypothetical Error Disclosure among Faculty and Resident Physicians

Attitude* or variable	Percent of respondents who would likely disclose an error resulting in no, minor, or major harm					
	No harm†	*p* value	Minor harm†	*p* value	Major harm†	*p* value
I feel an obligation to tell the facts necessary to understand what happened						
% agreeing	72	<0.001	98	<0.001	94	<0.001
% disagreeing	28		78		67	
I feel an obligation to make it clear that what happened was a mistake						
% agreeing	76	<0.001	98	<0.001	95	<0.001
% disagreeing	41		88		79	
Disclosure is right even if it comes at a significant personal cost						
% agreeing	73	<0.001	98	<0.001	95	<0.001
% disagreeing	42		87		71	
Disclosure is important because that is how I would want to be treated						
% agreeing	74	<0.001	98	<0.001	94	<0.001
% disagreeing	33		82		82	
Disclosure would help alleviate my feelings of guilt						
% agreeing	70	0.90	98	0.15	93	0.88
% disagreeing	69		95		92	
Disclosure strengthens my patient's trust in me						
% agreeing	75	0.009	98	0.09	95	0.008
% disagreeing	61		94		87	
My decision to be disclose depends on whether I think the information will help or harm the patient						
% agreeing	52	<0.001	96	0.6	86	0.001
% disagreeing	80		97		96	
When I make a medical mistake, I am own worst critic						
% agreeing	68	0.31	96	0.98	92	0.43
% disagreeing	78		96		96	
Forgiveness is an important part of my spiritual or religious belief system						
% agreeing	70	0.54	98	0.01	93	0.55
% disagreeing	66		91		91	
Gender						
Male	70	0.93	97	0.59	91	0.34
Female	69		96		94	
Training level						
Faculty	80	<0.001	99	0.08	97	0.009
Residents	63		95		90	
Specialty						
Pediatrics	80	0.01	98	0.36	97	0.04
Family medicine	73		97		88	
Internal medicine	63		95		90	
Have provided medical testimony in a legal deposition that was not related to a malpractice case						
Yes	82	0.04	96	0.50	98	0.11
No	68		98		92	
Have provided medical testimony in a legal deposition that was related to a malpractice case						
Yes	82	0.01	97	0.60	95	0.39
No	67		96		92	
Have been named as a defendant in a malpractice case						
Yes	77	0.34	100	0.30	100	0.10
No	69		96		92	

p values were calculated using the 2-tailed Fisher's exact test or the chi square statistic.
**See Table 4 for verbatim statements of questions.*
†*See Appendix for details of the hypothetical vignette and its 3 outcomes.*

the 2 factors and were excluded; the remaining 10 variables accounted for 50% of the variance. The facilitators factor consisted of 4 variables: obligation to tell the facts necessary to understand what happened, obligation to make it clear that what happened was a mistake, believing disclosure is right even if it comes at a significant cost, and believing disclosure is important because that is how I would want to be treated. The impediments factor consisted of 6 variables: negative patient/family reaction, malpractice litigation, professional discipline, loss of reputation from colleagues, blame from colleagues, and negative publicity. Each factor was formed into a scale, and the standardized Cronbach's alpha was 0.82 for the facilitators scale and 0.79 for the impediments scale. Table 7 presents the results of multivariate analyses of these 2 factors and other variables that remained significant (alpha=0.05) in the final model for each actual and hypothetical disclosure.

DISCUSSION

The results of this study add to a growing literature about physicians' attitudes and practices regarding the disclosure of

Table 7. Variables Associated with Actual and Hypothetical Error Disclosure in Multivariate Analyses among Faculty and Resident Physicians

Variable	Actual error disclosure*		Hypothetical error disclosure†		
	Minor harm	Major harm	No harm	Minor harm	Major harm
Facilitators scale			OR 1.4 (1.3–1.6)	OR 1.6 (1.3–1.9)	OR 1.4 (1.2–1.6)
Impediments scale	OR 0.94 (0.88–1.00)			OR 0.7 (0.5–0.8)	
Forgiveness is an important part of my spiritual or religious belief system		OR 0.32 (0.11–0.94)			
Faculty (vs residents)	OR 2.11 (1.2–3.7)	OR 3.9 (1.3–11.3)	OR 1.8 (1.1–3.2)		
Have been named as a defendant in a malpractice case	OR 5.3 (1.4–20)				

Multivariate analyses were conducted using backwards stepwise regression on the following variables: facilitators scale, impediments scale, belief in forgiveness, training level, gender, specialty, having given nonmalpractice-related legal testimony, having given malpractice-related legal testimony, and having been named as a defendant in a malpractice case. Only variables significant at the alpha=0.05 level were retained in the final multivariate model for each of the outcomes.

OR = odds ratio, with 95% confidence interval in parentheses.

**An actual error resulting in minor harm was defined as a mistake that prolonged treatment or caused discomfort; an actual error resulting in major harm was defined as a mistake that caused disability or death.*

†See Appendix for details of the hypothetical vignette and its 3 outcomes

medical errors to patients. Our data contribute new information pertaining to differences between hypothetical attitudes and actual practices, the potential influence of exposure to malpractice litigation on attitudes, differences based on level of training, and a range of relevant attitudes and beliefs. Most notable among our findings is the observation that, although more than 90% of our respondents reported that they would likely disclose a hypothetical error resulting in minor or major harm to a patient, only 41% of faculty and resident physicians had ever disclosed an actual minor error and only 5% had ever disclosed an actual major error. Furthermore, 19% of faculty and resident physicians reported not disclosing an actual minor error and 4% reported not disclosing an actual major error. These results suggest there is a gap between physicians' hypothetical attitudes and their actual practices regarding disclosure.

One of the possible causes of such a gap is the much-discussed fear of malpractice. Some commentators claim that error disclosure does not increase the risk of litigation[16] and can actually decrease liability costs,[18,29] and there are survey data suggesting disclosure would not increase the risk of negative consequences for physicians.[30,31] However, others question whether routine disclosure of errors will generally result in fewer lawsuits,[25,26] and there are survey data to suggest disclosure may increase the risk of a malpractice claim because of the substantial number of persons who believe error-committing physicians should be sued or punished.[27,32] In light of such discussions, it is noteworthy that our study found that physicians who had been exposed to malpractice litigation (either as a defendant or a witness) did not appear to be less inclined to disclose errors. Moreover, some of our data suggest the possibility that experience with litigation may have the potential to increase the inclination to disclose errors, paradoxical as that may seem.

We found significant differences based on training level. Physicians with more experience were more willing to disclose hypothetical errors and more likely to believe that disclosure increases patients' trust, and they were less concerned about possible negative consequences of disclosure and less likely to believe that the decision to disclose depends on the physician's assessment of whether disclosure will help or harm the patient. This implies that, with experience, physicians become more comfortable with error disclosure. It also suggests that if trainees can observe the practice of error disclosure, the learning environment might accelerate the recognition that errors will accompany even the best clinical efforts and that disclosure of errors is a component of respectful patient care.

Our results support the conclusion that a physician's willingness to disclose an error to a patient is related to a complex variety of attitudinal variables, both positive and negative. Several attitudes toward disclosure were associated with a greater likelihood of disclosure. These attitudes represent a mixture of personal and professional attitudes that draw attention to factors that facilitate disclosure such as straightforwardness,[4] courage,[17,33] and the need for a patient-centered view of the value of error information rather than a physician-centered view that unilaterally decides when error information will benefit the patient.

Advocates of patient safety have rightly called for the removal of blame and shame from the discussion of medical errors.[34,35] Healthcare institutions heeding this call face the challenge of sustaining a rigorous sense of professional accountability without adding blame to the profound emotional burdens already borne by error-involved physicians. In the effort to avoid casting blame, institutions need to recognize that feelings of guilt after an error may be very real for physicians, even in the absence of external criticism. Two thirds of our respondents believed that disclosing a mistake to their patient would help alleviate their feelings of guilt, consistent with the observation by Gallagher et al. that 74% of physicians and surgeons who had ever disclosed a serious error experienced relief after disclosure.[36] The origins of guilt feelings after errors are no doubt psychologically complex and may be related to a compulsive mindset among physicians which automatically views bad outcomes as failures.[37] Whatever the source of guilt feelings, their possibility emphasizes the need for empathy and reassurance at a time when physicians may be overwhelmed by self-doubt.[38]

In a similar vein, our results suggest that there may be connections between physicians' beliefs about forgiveness and their willingness to disclose errors. Respondents who agreed that forgiveness is an important part of their spiritual or religious belief system were more likely to disclose a hypothetical error resulting in minor harm, and these respondents were also less likely to have reported withholding disclosure of an actual error resulting in major harm. Some authors have

recommended the pursuit of forgiveness to facilitate constructive approaches to the emotionally burdened aftermath of an error[39] and to encourage healing in the patient–physician relationship when apologies are made.[21,40–42] Our results encourage consideration of such recommendations, depending on the beliefs, needs, and preferences of the clinicians and patients involved in a given situation.

To our knowledge, only 1 other survey study has queried physicians about their actual experiences with error disclosure or about attitudinal differences toward errors with outcomes of variable severity. Gallagher and colleagues found that 58% of a large sample of physicians and surgeons had ever disclosed a serious error, and when asked about generic categories of errors associated with different degrees of harm, 35% believed errors should be disclosed when there is no harm ("near miss"), 78% when there is minor harm, and 98% when there is serious harm.[36] When given a variety of hypothetical vignettes involving a serious error that was followed by full recovery, 94% reported they would definitely or probably disclose the error (although only 42% would use the word "error" in their disclosure).[15] These results appear consistent with our data and support the generalizability of our findings.

Our study had limitations. Although the survey was anonymous, social desirability bias may have led some respondents to give answers that were perceived to be more socially acceptable. The study design was cross-sectional, not longitudinal, so training level differences may have been influenced by differences in unmeasured variables between distinct participant populations. Lastly, our faculty and resident physicians were based in teaching hospitals and represented internal medicine, family medicine, and pediatrics, so our results may not be generalizable to physicians in other specialties or in other practice settings.

Ongoing efforts to promote error disclosure to patients by lessening its real and perceived risks are important,[25,26,43–45] and our data emphasize that malpractice fears are not the sole source of anxiety when disclosure is contemplated—a point supported by the finding of little difference in attitudes toward disclosure between U.S. and Canadian physicians despite differences in malpractice environments.[36] Other concerns – such as negative patient reactions, professional discipline, loss of reputation, and blame from colleagues – remain common and need to be addressed. Healthcare institutions and training programs should take deliberate steps to reduce the professional repercussions that may be associated with disclosure, and risk management approaches to error disclosure should include administrative support for professionals who may feel isolated and vulnerable as they attempt to navigate the psychological demands of the disclosure process and its aftermath. Under the right circumstances, physicians should be able to act with courage and compassion to communicate clearly with patients and families about errors. Creating such circumstances requires concerted efforts to build a culture of learning and healing that supports the physician's self-identity as a healer, at a time when it may be threatened, and promotes the dignity and wellbeing of the patient after he or she has been harmed.

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APPENDIX

A hypothetical clinical vignette with outcomes of varying severity [the vignette was modified for pediatric faculty and residents (see text)].

A 67-year-old man is admitted at night to your hospital service for treatment of pneumonia. He has an allergy to cephalosporin antibiotics, which is noted in his medical record. At the time of the interview and examination, you forget to ask him about allergies, and in your efforts to expedite the start of his treatment you do not notice the antibiotic allergy documented in his medical record. You write an order for a cephalosporin antibiotic and a nurse gives the drug to the patient, intravenously.

Outcome #1 (no harm):

The next morning on rounds, you notice his cephalosporin allergy in the medical record. You are relieved to find that the patient has no new complaints and there is no evidence of an allergic reaction. You discontinue the cephalosporin and order an alternative antibiotic. The patient gives no indication that he is aware of any problems in his care. In this scenario, how likely is it that you would tell the patient that you mistakenly ordered, and he received, an antibiotic to which he was known to be allergic?

Outcome #2 (minor harm):

The next morning on rounds, the patient is moderately uncomfortable due to diffuse itching and has a rash all over his body. You discontinue the cephalosporin, order an alternative antibiotic, and the patient recovers fully from the drug reaction over the next 3 days. In this scenario, how likely is it that you would tell the patient that you mistakenly ordered, and he received, an antibiotic to which he was known to be allergic?

Outcome #3 (major harm):

Two hours after you admit the patient to the hospital, you receive a call from the ward nurse. The nurse explains that half an hour after the cephalosporin was administered, the patient was found to be in respiratory distress and then anaphylactic shock. Cardiopulmonary resuscitation was administered and the patient was transferred to the intensive care unit. Subsequent cardiac testing shows that a moderate myocardial infarct has occurred. The patient's condition stabilizes and he is transferred out of the intensive care unit after 3 days. In this scenario, how likely is it that you would tell the patient (when stable) that you mistakenly ordered, and he received, an antibiotic to which he was known to be allergic and which caused his anaphylactic shock?

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