Special Article

PATIENT SAFETY

VIEWS OF PRACTICING PHYSICIANS AND THE PUBLIC ON MEDICAL ERRORS

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ABSTRACT

Background In response to the report by the Institute of Medicine on medical errors, national groups have recommended actions to reduce the occurrence of preventable medical errors. What is not known is the level of support for these proposed changes among practicing physicians and the public.

Methods We conducted parallel national surveys of 831 practicing physicians, who responded to mailed questionnaires, and 1207 members of the public, who were interviewed by telephone after selection with the use of random-digit dialing. Respondents were asked about the causes of and solutions to the problem of preventable medical errors and, on the basis of a clinical vignette, were asked what the consequences of an error should be.

Results Many physicians (35 percent) and members of the public (42 percent) reported errors in their own or a family member's care, but neither group viewed medical errors as one of the most important problems in health care today. A majority of both groups believed that the number of in-hospital deaths due to preventable errors is lower than that reported by the Institute of Medicine. Physicians and the public disagreed on many of the underlying causes of errors and on effective strategies for reducing errors. Neither group believed that moving patients to high-volume centers would be a very effective strategy. The public and many physicians supported the use of sanctions against individual health professionals perceived as responsible for serious errors.

Conclusions Though substantial proportions of the public and practicing physicians report that they have had personal experience with medical errors, neither group has the sense of urgency expressed by many national organizations. To advance their agenda, national groups need to convince physicians, in particular, that the current proposals for reducing errors will be very effective. (N Engl J Med 2002;347:1933-40.)

THE prevention of serious errors in medical care has long been of concern to health professionals, as well as courts and legislatures.[1] However, the recent report by the Institute of Medicine (IOM), *To Err Is Human*, focused attention on the problem, particularly its conclusion that, each year, more Americans die as a result of medical errors made in hospitals than as a result of injuries from automobile accidents.[2,3] At the time the report was released, a survey showed that half the American public followed the media coverage of it.[4] Since then, there have been many new efforts to reduce the incidence of medical errors.[5-10] However, there are those who disagree with the report's conclusions, arguing that the report overstated the magnitude of the problem.[11-14]

Still not known are the views of practicing physicians and the public with regard to both the number of deaths due to errors and the recommendations of national groups for reducing these errors. Many of the recommendations would change the daily practice of individual physicians and hospitals, so the support of practicing physicians may be crucial. New legislation and changes in public policy may require the backing of both physicians and the public.[15-18]

We conducted parallel surveys of physicians and the public to learn their views on medical errors. We posed the following questions: Have you had a personal experience with medical errors made in your care or that of a family member? How frequent and how serious is the problem of medical errors as compared with other problems in health care? What are the most important causes of medical errors? What actions should be taken to prevent medical errors? What should be the consequences for a health professional or institution involved in a medical error?

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METHODS

Study Design

A team of researchers from the Harvard School of Public Health and the Kaiser Family Foundation designed and analyzed both surveys. They were conducted in the United States.

Physicians

The fieldwork for the survey of physicians was conducted by Harris Interactive. The sample was randomly selected from the national list of physicians provided by Medical Marketing Service. This list, which includes both physicians who are members of the American Medical Association and nonmembers, is updated weekly. A questionnaire was mailed to 1332 physicians along with a check for $100 as an incentive for completing it. The survey was conducted between April 24 and July 22, 2002. A total of 831 physicians either completed the questionnaire on paper and returned it by mail (777) or completed and submitted it online (54). The response rate was 62 percent.[19] The margin of error was ±3.5 percentage points.

The General Public

A total of 1803 members of the public were contacted and deemed eligible for the national telephone survey, performed with random-digit dialing; 1207 adults (18 years of age or older) completed the survey. It was conducted in Spanish and English by International Communications Research between April 11 and June 11, 2002. Respondents were not given a financial incentive to participate. The response rate was 67 percent.[19] The margin of error was ±2.6 percentage points.

The Survey Questionnaire

To conduct parallel surveys, a single questionnaire was developed and modified to be appropriate for each group of respondents. The questionnaire was reviewed by physicians and experts in medical errors and was then pretested for length and comprehensibility. Both surveys were revised on the basis of the results of these tests. Twenty-nine questions were included in the survey of physicians and 38 in the survey of the public; 8 questions in each instrument had multiple parts. The questions focused on inpatient errors, since the majority of proposals address such errors.

The questionnaire asked whether an error had ever been made in the respondent's own care or that of a family member and, if so, what the health consequences of that error had been. Respondents were asked to state in their own words what they considered to be the two most important problems with health care and medicine. The responses were grouped in categories, one of which was medical errors. No respondents in the survey of the public and few in the survey of physicians used the term "medical error" when answering the question. Most respondents used terms such as "incompetent doctors" and "mistakes."

After answering the open-ended question, respondents in both surveys were given the following statement defining "medical error" to ensure that they had a common understanding of the term: "Sometimes when people are ill and receive medical care, mistakes are made that result in serious harm, such as death, disability, or additional or prolonged treatment. These are called medical errors. Some of these errors are preventable, whereas others may not be."

Respondents were asked how many in-hospital deaths they thought resulted from preventable medical errors each year. They were given a choice of five numbers from 500 to 500,000 or more. Among the choices were the IOM's higher estimate of 98,000 (rounded to 100,000), the IOM's lower estimate of 44,000 (rounded to 50,000), and the estimate of 4500 (rounded to 5000) made by another team of researchers using a different set of assumptions.[12] We also asked respondents to rate the importance of 11 factors that might contribute to medical errors and the effectiveness of 16 possible solutions.

We asked the following question about high-volume centers: "Suppose a patient needs a specialized medical procedure. This person can choose either a hospital that does a large number of these procedures or a hospital that does not do as many. At which hospital do you think this patient would be more likely to have a preventable medical error made in his or her care, or wouldn't it make a difference?"

The questionnaires included the following vignette, developed by physicians[20]: "A 67-year-old man goes to the hospital for surgery. He has an allergy to antibiotic drugs, which is noted on his medical record. The surgeon does not notice the information about the allergy and orders an antibiotic to be given at the end of the surgery. A hospital nurse gives the patient the antibiotic." To examine the hypothesis that respondents' views on the appropriate consequences for the health professionals would vary according to the severity of the error's outcome, we randomly varied the health consequences for the patient. Half of each group of respondents were told that the patient was harmed: "The patient wakes up with a rash all over his body and is gasping for air. The mistake is noticed, and the antibiotic is stopped, but the patient stops breathing. Despite every effort, the patient dies." The other half were told that the patient was not harmed: "The patient wakes up with a rash all over his body. The mistake is noticed, the antibiotic is stopped, and the patient fully recovers." The physicians were told that the language of the vignette had been simplified so that laypeople would understand it.

Statistical Analysis

We compared responses by testing differences between proportions, using Fisher's exact test. The statistical program that we used took into account the design effects for each of the surveys by calculating the effective sample size. Because previous research has shown that the salience of an issue is an important factor in the level of support for change, we limited analyses of graded responses to the proportion of respondents who said that a cause of errors was "very important" or that a solution would be "very effective."[21] All reported P values are based on two-sided tests.

To adjust for sampling biases due to sociodemographic differences in nonresponse rates and to ensure that the sample was representative, survey responses were weighted by computer with the use of a predetermined weighting scheme. The data in the survey of the public were weighted on the basis of the latest U.S. Census numbers for sex, age, race or ethnic group, level of education, number of people in the household, and number of land telephone lines. The data in the survey of physicians were weighted for region, specialty, training (foreign vs. U.S.), and number of years since graduation from medical school. There were no qualitative differences between unweighted and weighted results.

RESULTS

Experiences with Medical Errors

Thirty-five percent of physicians and 42 percent of the public reported that they had experienced an error in their own care or that of a family member (Table 1). Eighteen percent of physicians and 24 percent of the public reported an error that had had serious health consequences, including death (reported by 7 percent of physicians and 10 percent of the public), long-term disability (6 percent and 11 percent, respectively), and severe pain (11 percent and 16 percent, respectively). About a third of the respondents in both groups who reported experience with an error said that the health professionals involved in the error had told them about it or apologized to them.

Seventy percent or more of both groups of re-

TABLE 1. RESPONDENTS' PERSONAL EXPERIENCE WITH PREVENTABLE MEDICAL ERRORS.

RESPONSE	PHYSICIANS (N=831)	PUBLIC (N=1207)	P VALUE
	percent		
All respondents			
Error made in own or family member's care	35	42	<0.001
Health consequences			
Serious	18	24	<0.001
Minor	10	13	0.03
None	7	5	0.06
Serious consequences			
Severe pain	11	16	<0.001
Substantial loss of time at work or school, or in other important activities	12	17	<0.001
Temporary disability	8	12	0.009
Long-term disability	6	11	0.003
Death	7	10	0.01
Respondents reporting an error*			
Parties who had "a lot" of responsibility for the error			
Doctors	70	81	<0.001
Nurses	25	25	0.15
Other health professionals	15	26	<0.001
The institution (e.g., a hospital, clinic, or nursing home facility)	22	43	<0.001
Health professional involved			
Told respondent that an error had been made	31	30	0.19
Apologized to respondent or family member	34	33	0.14
Respondent or family member sued health professional	2	6	<0.001

*A total of 290 physicians and 507 members of the public reported an error in their own care or that of a family member.

spondents who reported experience with an error assigned "a lot" of responsibility to the physicians involved (Table 1). The public was significantly more likely than physicians to attribute the error to the institution involved. Malpractice lawsuits after an error were reported infrequently (by 2 percent of physicians and 6 percent of the public). However, 48 percent of physicians reported that they had been named in a malpractice lawsuit at some time in their career.

Twenty-nine percent of physicians reported having seen an error in the previous year in their capacity as physicians. Among these physicians, 60 percent believed that a similar error was very or somewhat likely to occur at the same institution during the next year.

Views of Medical Errors

Neither physicians nor the public named medical errors as one of the largest problems in health care today. The problems cited most frequently by physicians were the costs of malpractice insurance and lawsuits (cited by 29 percent of the respondents), the cost of health care (27 percent), and problems with insurance companies and health plans (22 percent). In the survey of the public, the issues cited most frequently were the cost of health care (cited by 38 percent of the respondents) and the cost of prescription drugs (31 percent). Only 5 percent of physicians and 6 percent of the public identified medical errors as one of the most serious problems.

Before being given the definition of the term "medical error," 68 percent of the respondents in the survey of the public reported that they did not know what the term meant. After being given the definition, approximately half the respondents thought these errors are made very often or somewhat often when people seek help from health professionals, as compared with only one fifth of physicians (Table 2).

The majority of both physicians and the public believed that 5000 or fewer deaths in hospitals each year are due to preventable medical errors — a much lower number than either the high or low IOM estimate. A majority of respondents in both surveys thought that one half or fewer of these deaths could have been prevented.

Causes of Medical Errors

Of the 11 items listed as possible causes of medical errors, only 2 were thought by at least half the physicians to be very important causes: understaffing of nurses in hospitals (53 percent) and overwork, stress, or fatigue on the part of health professionals (50 percent) (Table 3). In the survey of the public, at least half

TABLE 2. BELIEFS ABOUT THE FREQUENCY OF MEDICAL ERRORS AND PREVENTABLE DEATHS.*

QUESTION AND RESPONSE	PHYSICIANS (N=831)	PUBLIC (N=1207)	P VALUE
	percent		
How often are preventable medical errors made?			
Very often	1	10	<0.001
Somewhat often	19	39	<0.001
Not very often	59	37	<0.001
Not often at all	21	8	<0.001
No response	0	6	
How many Americans die in hospitals each year because of preventable medical errors?			
500	17	24	<0.001
5000	46	36	<0.001
50,000	25	20	0.002
100,000	9	7	0.12
≥500,000	1	4	<0.001
No response	1	9	
What proportion of these deaths could realistically have been prevented?			
All of them	8	11	0.04
Three quarters of them	27	29	0.48
Half of them	41	42	0.71
One quarter of them	21	13	<0.001
None of them	2	1	0.05
No response	1	3	

*Percentages may not always sum to 100 because of rounding.

the respondents considered seven of the causes very important. The top four causes considered to be very important were physicians' not having enough time with patients (72 percent); overwork, stress, or fatigue on the part of health professionals (70 percent); failure of health professionals to work together or communicate as a team (67 percent); and understaffing of nurses in hospitals (65 percent).

When asked whether mistakes made by health professionals or those made by health care institutions were a more important cause of medical errors, a majority of respondents in both groups chose mistakes made by health professionals as the more important cause (55 percent of physicians and 55 percent of the public). In addition, a majority of both groups thought that patients were very often or somewhat often at least partially responsible for errors made in their care.

Proposed Solutions

Of the 16 proposed solutions, a majority of physicians thought that 2 would be very effective at reducing the number of medical errors: requiring hospitals to develop systems for preventing medical errors (55 percent) and increasing the number of nurses in hospitals (51 percent) (Table 4). A majority of the respondents in the survey of the public rated eight items as very effective. The top four items were giving physicians more time to spend with their patients (78 percent), requiring hospitals to develop systems for preventing errors (74 percent), providing better training of health professionals (73 percent), and using only physicians trained in intensive care medicine on intensive care units (73 percent).

There were important areas of divergence in the views of the two groups. For instance, only 3 percent of physicians but 50 percent of the public viewed suspension of the licenses of health professionals as a very effective way to reduce medical errors ($P<0.001$) — a difference of 47 percentage points — and only 23 percent of physicians but 71 percent of the public viewed a requirement that hospitals report errors to a state agency as very effective ($P<0.001$) — a difference of 48 percentage points. Only 21 percent of physicians, but 62 percent of the public, thought that encouraging voluntary reporting of serious medical errors to a state agency would be very effective. Eighty-six percent of physicians believed that hospital reports of errors should be kept confidential, whereas 62 percent of the public believed that reports should be made public ($P<0.001$).

High-Volume Centers

Seventy-one percent of physicians thought that an error would be more likely at a hospital that performs a low volume of procedures than at a high-volume center. The public was divided on this issue; about half the respondents thought that an error would be more likely at a low-volume center (49 percent), and the other half thought either that an error would be more likely at a high-volume center (23 percent) or that volume would make no difference (26 percent) (Table 4). In neither group did a majority of respondents think that limiting certain high-risk procedures to high-volume centers would be a very effective way to reduce medical errors (Table 3).

Consequences for Health Professionals Who Make Errors

The attribution of responsibility for an error in the vignette did not appear to be influenced by whether or not the error was associated with harm to the patient. Most respondents in both groups said that the surgeon had "a lot" of responsibility; a smaller proportion held the hospital responsible (Table 5). Physicians were more likely than the public to hold the nurse responsible for the error, regardless of the outcome.

In general, the public was more likely than physicians to believe that the surgeon should be sued for malpractice and fined and that the surgeon's license should be suspended, as well as to support sanctions against the hospital. Support for various consequences for those involved in the medical error differed sub-

TABLE 3. CAUSES OF PREVENTABLE MEDICAL ERRORS.

RESPONSE	PHYSICIANS (N=831)	PUBLIC (N=1207)	P VALUE
	percent		
Very important causes			
Understaffing of nurses in hospitals	53	65	<0.001
Overwork, stress, or fatigue on the part of health professionals	50	70	<0.001
Failure of health professionals to work together or communicate as a team	39	67	<0.001
Influence of HMOs and other managed-care plans on treatment decisions*	39	48	<0.001
Complexity of medical care	38	62	<0.001
Insufficient time spent by doctors with patients	37	72	<0.001
Poor training of health professionals	28	54	<0.001
Poor handwriting by health professionals	21	48	<0.001
Poor supervision of health professionals	16	50	<0.001
Uncaring health professionals	15	47	<0.001
Lack of computerized medical records	13	35	<0.001
The more important reason for errors			
Mistakes made by individual health professionals	55	55	0.72
Mistakes made by institutions	43	38	0.009
No response	2	7	
Volume of procedures†			
An error is more likely at a high-volume hospital	4	23	<0.001
An error is more likely at a low-volume hospital	71	49	<0.001
Volume does not make a difference	24	26	0.23
No response	1	3	
Patients are at least partially responsible for errors made in their own care			
Very often	10	11	0.51
Somewhat often	48	48	0.89
Not very often	41	35	0.002
Never	1	5	<0.001
No response	0	1	

*HMOs denotes health maintenance organizations.

†Percentages for the public do not always sum to 100 because of rounding.

stantially according to the outcome of the vignette. If the patient was harmed, physicians were significantly more likely to support malpractice lawsuits against the surgeon, the nurse, and the hospital, and the public was substantially more likely to support lawsuits and suspension of the surgeon's license.

DISCUSSION

Our results have a number of implications for national efforts to reduce medical errors. First, major efforts to change hospital and medical practice are likely to face some important challenges. Even though significant percentages of practicing physicians and the public reported personal experience with medical errors that had serious consequences and despite the media's interest in the problem, medical errors are not viewed by either group as one of the most important problems in health care. The costs of malpractice insurance, lawsuits, and health care costs were considered more important. The public and physicians are concerned about individual cases of medical errors, and when the patient is seriously harmed, both groups want some action to be taken. However, both groups believe that the number of in-hospital deaths resulting from errors is much lower than that suggested by the IOM and also believe that a substantial proportion of these deaths are not preventable.

Second, physicians and the public differ in their beliefs about measures that would be very effective in reducing the incidence of errors. The public appears to believe that a range of proposals aimed at reducing medical errors would be very effective. However, the majority of practicing physicians view only two proposals as very effective: requiring hospitals to develop systems for preventing medical errors and increasing the number of nurses in hospitals.

In particular, although the physicians surveyed believe that high-volume medical centers have fewer medical errors — a view espoused by several authors[22-25] — only a minority believed that moving patients to high-volume centers would be a very effective way to reduce medical errors. This may be due to the belief that errors occur infrequently and that changing medical practice would therefore have a limited effect. Half

TABLE 4. POSSIBLE SOLUTIONS TO THE PROBLEM OF MEDICAL ERRORS.*

SOLUTION	PHYSICIANS (N=831)	PUBLIC (N=1207)	P VALUE
	percent		
Very effective			
Requiring hospitals to develop systems for preventing medical errors	55	74	<0.001
Increasing the number of nurses in hospitals	51	69	<0.001
Giving physicians more time to spend with patients	46	78	<0.001
Limiting certain high-risk procedures to hospitals that perform many of these procedures	40	45	0.03
Improving the training of health professionals	36	73	<0.001
Using only physicians trained in intensive care medicine on intensive care units	34	73	<0.001
Reducing the work hours of physicians in training to prevent fatigue	33	66	<0.001
Increasing the use of computers to order drugs and medical tests	23	45	<0.001
Requiring hospitals to report all serious medical errors to a state agency	23	71	<0.001
Encouraging hospitals to report serious medical errors voluntarily to a state agency	21	62	<0.001
Including a pharmacist on hospital rounds when physicians review the care of patients	20	40	<0.001
Increasing the use of computerized medical records	19	46	<0.001
Having hospitalized patients taken care of by hospital physicians rather than by their regular physicians	6	16	<0.001
Suspending the licenses of health professionals who make medical errors	3	50	<0.001
Increasing lawsuits for malpractice	1	23	<0.001
Having a government agency fine health professionals who make medical errors	2	40	<0.001
Physicians should be required to tell patients when errors are made in their care			
Yes	77	89	<0.001
No	22	9	
No response	1	3	
Hospital reports of serious medical errors			
Should be confidential (used only to learn how to prevent future mistakes)	86	34	<0.001
Should be released to the public	14	62	<0.001
No response	0	4	

*Percentages for the public do not always sum to 100 because of rounding.

the respondents in the survey of the public did not see an advantage of high-volume centers, suggesting a need for education of physicians and the public if a strategy based on the volume of procedures is pursued.

Our results point to a substantial difference between the views of physicians and those of the public on the reporting of medical errors to state agencies, a recommendation embraced by a number of national groups. The public sees reporting as a very effective way of reducing errors and wants these reports to be publicly available. Physicians are more skeptical about this proposal and would prefer that reports be kept confidential.

Finally, the results point to a gap between the views of the public and proposed approaches to preventing medical errors. One of the central statements in the IOM report is that errors should be viewed as due primarily to failures of institutional systems rather than failures of individuals. This is not a premise that the public embraces. The public believes that persons responsible for errors with serious consequences should be sued, fined, and subject to suspension of their professional licenses. Nor do physicians seem to believe that individual health professionals are blameless. A majority of physicians believe that individual health professionals are more likely to be responsible for preventable medical errors than are institutions. Moreover, although few physicians believe that an increase in malpractice suits would be effective in preventing individual errors, many believe that health professionals who make errors with serious consequences should be subject to lawsuits. The results of our surveys show

TABLE 5. RESPONSES TO THE VIGNETTE.*

RESPONSE	OUTCOME WITHOUT HARM			OUTCOME WITH HARM			P VALUE FOR DIFFERENCE IN OUTCOME	
	PHYSICIANS (N=404)	PUBLIC (N=603)	P VALUE	PHYSICIANS (N=427)	PUBLIC (N=604)	P VALUE	PHYSICIANS	PUBLIC
	percent			percent				
Party with "a lot" of responsibility for the error								
Surgeon	90	89	0.67	95	92	0.04	0.006	0.04
Nurse	81	52	<0.001	82	48	<0.001	0.86	0.19
Hospital	42	55	<0.001	48	57	0.01	0.09	0.64
Should be sued for malpractice								
Surgeon	4	30	<0.001	55	69	<0.001	<0.001	<0.001
Nurse	3	12	<0.001	44	21	<0.001	<0.001	<0.001
Hospital	2	22	<0.001	33	44	<0.001	<0.001	<0.001
Should be fined by a government agency								
Surgeon	5	51	0.001	21	65	<0.001	<0.001	<0.001
Nurse	6	26	0.001	18	29	<0.001	<0.001	0.27
Hospital	9	39	0.001	21	50	<0.001	<0.001	<0.001
Should have license suspended								
Surgeon	0	23	<0.001	8	50	<0.001	<0.001	<0.001
Nurse	1	11	<0.001	8	25	<0.001	<0.001	<0.001
Hospital should lose its accreditation	1	11	<0.001	1	15	<0.001	0.73	0.03
Should be required to report the error to the patient or family								
Surgeon	85	95	<0.001	90	95	0.003	0.05	0.60
Nurse	74	67	0.02	70	57	<0.001	0.12	<0.001
Hospital	60	78	<0.001	71	84	<0.001	<0.001	0.005
Should be required to undergo training in the prevention of the type of error that was made								
Surgeon	66	80	<0.001	78	80	0.53	<0.001	0.89
Nurse	71	67	0.17	81	72	<0.001	<0.001	0.05
The hospital should be required to develop systems for preventing similar errors	74	79	0.09	84	84	0.86	<0.001	0.01

*The following vignette was used: "A 67-year-old man goes to the hospital for surgery. He has an allergy to antibiotic drugs, which is noted on his medical record. The surgeon does not notice the information about the allergy and orders an antibiotic to be given at the end of the surgery. A hospital nurse gives the patient the antibiotic." The respondents who received the version that did not involve harm were told, "The patient wakes up with a rash all over his body. The mistake is noticed, the antibiotic is stopped, and the patient fully recovers." The respondents who received the version that did involve harm were told, "The patient wakes up with a rash all over his body and is gasping for air. The mistake is noticed, and the antibiotic is stopped, but the patient stops breathing. Despite every effort, the patient dies."

that the public and, to a lesser extent, physicians hold individual health professionals personally responsible for errors. Although they do support a requirement that hospitals develop systems to prevent future errors, the public is unlikely to support the substitution of a system in which individuals are not subject to sanctions.

The momentum for instituting changes to reduce medical errors is sustained primarily by a range of groups and by the media's interest in the problem — not by practicing physicians or the public. Our findings highlight the issues and potential barriers that national groups such as the IOM, the Leapfrog Group (a consortium of purchasers of health insurance), and the American Medical Association must address if they are to succeed in their efforts to reduce medical errors. Perhaps the most critical issue will be to provide skeptical physicians with scientific proof that the proposed strategies will, in fact, reduce preventable medical errors and the harm they cause.

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