

Washington University School of Medicine Digital Commons@Becker

ICTS Faculty Publications

Institute of Clinical and Translational Sciences

2008

Lost opportunities: How physicians communicate about medical errors

Jane M. Garbutt

Washington University School of Medicine in St. Louis

Amy D. Waterman

Washington University School of Medicine in St. Louis

Julie M. Kapp

University of Missouri - Columbia

William Claiborne Dunagan

BJC Healthcare-St. Louis

Wendy Levinson

University of Toronto

See next page for additional authors

Follow this and additional works at: http://digitalcommons.wustl.edu/icts_facpubs

 Part of the [Medicine and Health Sciences Commons](#)

Recommended Citation

Garbutt, Jane M.; Waterman, Amy D.; Kapp, Julie M.; Dunagan, William Claiborne; Levinson, Wendy; Fraser, Victoria J.; and Gallagher, Thomas H., "Lost opportunities: How physicians communicate about medical errors". *Health Affairs (Millwood)*, 27, 1, 246-255. 2008. Paper 7.

http://digitalcommons.wustl.edu/icts_facpubs/7

This Article is brought to you for free and open access by the Institute of Clinical and Translational Sciences at Digital Commons@Becker. It has been accepted for inclusion in ICTS Faculty Publications by an authorized administrator of Digital Commons@Becker. For more information, please contact engeszer@wustl.edu.

Authors

Jane M. Garbutt, Amy D. Waterman, Julie M. Kapp, William Claiborne Dunagan, Wendy Levinson, Victoria J. Fraser, and Thomas H. Gallagher

Lost Opportunities: How Physicians Communicate About Medical Errors

Physicians' dissatisfaction with existing error-reporting systems could lead them to share such information with their colleagues but not with their hospital.

by Jane Garbutt, Amy D. Waterman, Julie M. Kapp, William Claiborne Dunagan, Wendy Levinson, Victoria Fraser, and Thomas H. Gallagher

ABSTRACT: Although physicians have been described as “reluctant partners” in reporting medical errors, this survey of 1,082 U.S. physicians found that most were willing to share their knowledge about harmful errors and near misses with their institutions and wanted to hear about innovations to prevent common errors. However, physicians found current systems to report and disseminate this information inadequate and relied on informal discussions with colleagues. Thus, much important information remains invisible to institutions and the health care system. Efforts to promote error reporting might not reach their potential unless physicians become more effectively engaged in reporting errors at their institutions. [*Health Affairs* 27, no. 1 (2008): 246–255; 10.1377/hlthaff.27.1.246]

ERRORS ARE AN INEVITABLE AND UNFORTUNATE REALITY of medical practice.¹ To establish effective systems to ameliorate and prevent medical errors, health care organizations must learn about actual and potential errors, and new methods to improve safety must be disseminated to health care workers and implemented.² Interest is also increasing in encouraging health care organizations to report these events to central entities such as patient safety organizations to improve patient safety throughout the system.³ Current efforts to improve patient safety focus on system problems rather than individual culpability and promote a blame-free culture with voluntary reporting of adverse events and near misses by health care workers.⁴ However, underreporting of errors is common, undermining the health care system's ability to prevent future errors.⁵

Jane Garbutt (jgarbutt@im.wustl.edu) and Amy Waterman are assistant professors of medicine at Washington University in St. Louis, Missouri. Julie Kapp is a research assistant professor, Health Management and Informatics, at the University of Missouri in Columbia. William Dunagan is director of health care quality and effectiveness at BJC HealthCare in St. Louis. Wendy Levinson is a professor of medicine at the University of Toronto, in Ontario, Canada. Victoria Fraser is a professor of medicine at Washington University. Thomas Gallagher is an associate professor of general internal medicine at the University of Washington in Seattle.

As front-line health care workers, physicians are frequently involved in medical errors and have the potential to identify preventable events. However, few physicians are actively engaged in patient safety efforts, and physicians have been described as “reluctant partners” in reporting errors to the hospitals in which they practice.⁶ Previously described barriers to physicians’ using hospital-based error reporting systems include not knowing what or how to report and fear of negative consequences such as disciplinary action, malpractice litigation, or loss of hospital privileges.⁷ The culture of perfectionism in medicine is another powerful disincentive.⁸ Despite the critical role physicians can play in improving patient safety, physicians’ attitudes and experiences regarding sharing information about errors have not been described, and most studies exploring barriers to reporting have included fewer than 100 physicians.

Study Data And Methods

To fill some of this research gap, we incorporated questions into a large survey of physicians to elicit their attitudes regarding patient safety: to (1) determine physicians’ willingness to share information about errors with their hospital and colleagues, (2) describe how physicians communicate about errors, and (3) learn how communication of information about errors and error prevention between physicians and their hospital could be improved.

■ **Physician sample.** The broader survey included physicians from the United States and Canada.⁹ To focus on the policy implications of our findings for the United States, we restricted our analyses to clinically active attending physicians in U.S. medicine and surgery. Surveys were mailed to physicians at Washington University/BJC HealthCare, a system of thirteen academic and community hospitals in Missouri; two academic hospitals and multiple community-based settings affiliated with the University of Washington in Seattle; and Group Health Permanente, a large multispecialty group practice in Seattle. These settings were chosen to provide geographic diversity and to include physicians from academic and private practice as well as from urban and rural settings. At the time of the survey, reporting of errors by physicians was not mandatory in any of these settings. All attending physicians active in general medicine and medical subspecialties (n = 1,365), family medicine (n = 209), and general surgery and surgical subspecialties (n = 594) were invited to participate. Of the initial sample of 2,168 physicians, 173 were ineligible to participate (39 were not clinically active, 89 could not be located, and 45 were ineligible for other reasons), leaving a sample of 1,955 eligible physicians. The survey response rate was 62 percent. Respondents and nonrespondents did not differ by specialty or sex. Excluded from the analysis were 151 respondents who did not care for hospitalized patients, leaving a study population of 1,082 physicians (Exhibit 1).

■ **Survey content.** The questionnaire contained sixty-eight items and took approximately fifteen minutes to complete. Definitions for key terms (*adverse event*, *medical error*, *serious* and *minor error*, and *near miss*) were based on the Institute of Medi-

EXHIBIT 1
Characteristics Of Respondents, Survey Of Physicians' Error Reporting Behavior

Characteristic	Number or mean	Percent
Specialty		
Medicine	742	70.6
Surgery	309	29.4
Sex		
Male	816	77.1
Female	242	22.9
Practice setting		
Academic	391	38.7
Private	480	47.5
Other	139	13.8
Time spent in clinical practice		
1-25%	101	10.0
26-50%	105	10.4
51-75%	193	19.1
76-100%	612	60.5
Time spent with hospitalized patients		
1-25%	639	63.7
26-50%	174	17.4
51-75%	108	10.8
76-100%	82	8.2
Mean age (years)	47.8 (SD 8.9)	
Mean years in practice	15.4 (SD 9.3)	

SOURCE: Authors' analysis of data from 1,082 survey respondents.

NOTE: SD is standard deviation.

cine (IOM) definitions and were provided at the beginning of the questionnaire and at the bottom of each page (Exhibit 2).¹⁰

Physicians used a four-point Likert scale (strongly agree, agree, disagree, strongly disagree) to respond to attitudinal questions. Respondents were asked if an error reporting system to improve patient safety was available at their hospital and what methods they had used to report errors, and were asked to indicate features of a reporting system that would increase their willingness to report. We categorized reporting to risk management or a patient safety program or completing an incident report (by themselves or asking someone else to do so) as formal reporting mechanisms and telling a supervisor, hospital executive, physician chief, or departmental chair about an error as informal reporting mechanisms. Physicians also were asked how they currently received information about errors and what error information they would like to receive.

■ **Survey implementation.** The survey was conducted between July 2003 and March 2004. Respondents were given the choice of completing an anonymous paper- or Web-based survey. Multiple reminders were sent to participants by mail, e-mail, fax, and telephone, and token financial incentives were used to encourage par-

EXHIBIT 2
Study Definitions, Survey Of Physicians' Error Reporting Behavior

Type of error	Definitions
Adverse event ^a	An injury that was caused by medical management rather than the patient's underlying disease
Medical error ^a	The failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim; medical errors include serious errors, minor errors, and near misses
Serious error	An error that causes permanent injury or transient but potentially life-threatening harm
Minor error	An error that causes harm that is neither permanent nor potentially life threatening
Near miss ^a	An error that could have caused harm but did not, either by chance or because of timely intervention

SOURCE: Authors' analysis.

^aThese definitions are from L.T. Kohn, J.M. Corrigan, and M.S. Donaldson, eds., *To Err Is Human: Building a Safer Health System* (Washington: National Academies Press, 1999).

ticipation.¹¹ The survey was approved by the participating institutional review boards (IRBs), and informed consent was implied by returning the survey.

■ **Statistical analysis.** Variations in physicians' attitudes and behavior regarding error communication by specialty were examined using chi-square analyses. Questions that used a four-point Likert response scale were dichotomized at the midpoint (agree versus disagree). We defined *clinical significance* as an absolute difference of at least five percentage points and *statistical significance* as $p < 0.05$. All analyses were performed using SAS (Version 8.2).

Study Results

Most of the physician respondents reported that they had been involved in an error: 56 percent reported prior involvement with a serious error, 74 percent with a minor error, and 66 percent with a near miss. About half (54 percent) agreed that “medical errors are usually caused by failures of care delivery systems, not failures of individuals.”

■ **Attitudes toward reporting errors.** The majority of physicians agreed that to improve patient safety, they should report errors to their hospital or health care organization (92 percent, serious errors; 77 percent, minor errors; and 73 percent, near misses). Physicians were also very interested in learning about errors. Ninety-five percent agreed that to improve patient safety, they needed to know about errors that occurred in their hospital or health care organization, and 89 percent agreed that they should discuss errors with their colleagues.

■ **Types of communication about errors.** The majority of physicians (83 percent) had used at least one formal reporting mechanism—most commonly, reporting an error to risk management or completing an incident report (Exhibit 3). Few physicians believed that they had access to a reporting system that was designed to

EXHIBIT 3
Error Reporting Behavior By U.S. Physicians In Sample

Type of reporting	Number	Percent
Formal reporting		
Incident report	642	60
Risk management	723	68
Patient safety program	146	14
Informal reporting		
Supervisor or manager	435	41
Physician chief or department chairman	411	39
Executive of hospital or health care organization	195	18

SOURCE: Authors' analysis of survey data. Percentages add to more than 100, as respondents could select multiple responses.

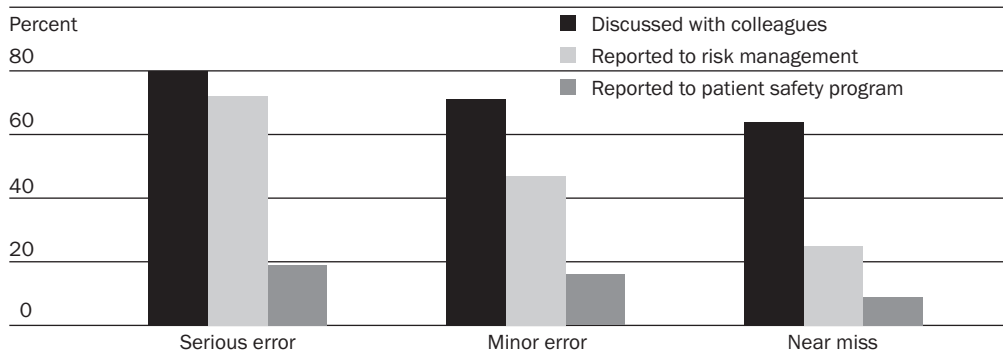
NOTE: N = 1,064 (data were missing for eighteen respondents).

improve patient safety. Although 36 percent of respondents reported access and 19 percent reported no access to such a system, 45 percent did not know if one existed at their hospital or health care organization.

Most physicians (61 percent) had used at least one informal mechanism to report an error to their hospital or health care organization, most commonly telling a supervisor or manager or a physician chief or departmental chair (Exhibit 3), and 6 percent of respondents had used an informal mechanism exclusively to communicate information about errors. Physicians were more likely to discuss serious errors, minor errors, and near misses with their colleagues than to report them to risk management or to a patient safety program (Exhibit 4).

Few respondents (27 percent) received error information from their hospital, health care organization, or a patient safety program (data not shown). Physicians received information about errors informally from physician colleagues (68 per-

EXHIBIT 4
Physicians' Error Communication Behavior, By Error Type



SOURCE: Authors' analysis of survey data.

NOTES: Analysis limited to physicians who reported that they had been involved in each error type. The sample comprised 607 physicians for serious error, 800 physicians for minor error, and 713 physicians for near miss.

“Only 19 percent of respondents agreed that current systems to disseminate error information to physicians were adequate.”

cent) or from medical meetings, conferences, or rounds (50 percent); medical literature (50 percent); and, less commonly, from pharmacists (27 percent) and patient safety Web sites (3 percent).

■ **Physicians’ suggestions to improve error communication.** Only 30 percent of respondents agreed that current systems for physicians to report patient safety problems to their hospital or health care organization were adequate. When asked what would increase their willingness to formally report error information, physicians most wanted the information to be kept confidential and nondiscoverable (88 percent), evidence that the information would be used for system improvements (85 percent), the system to be nonpunitive (84 percent), and the error reporting process to take less than two minutes (66 percent) and to be local to their unit or department (53 percent).

Only 19 percent of respondents agreed that current systems to disseminate error information to physicians were adequate. When asked what error information they would like to receive, physicians most wanted information about how to prevent commonly occurring errors (serious error, 81 percent; minor error, 71 percent; near miss, 67 percent).

■ **Variation between surgeons and nonsurgeon specialists.** Surgeons were less likely than other specialists to agree that errors were attributable to failure of systems rather than individuals (41 percent versus 59 percent) and that they should report a serious error (89 percent versus 94 percent) and a near miss (67 percent versus 75 percent). (Unless otherwise indicated, *p* values for the differences in this paragraph are less than or equal to 0.01.) Surgeons were more likely than their nonsurgeon colleagues to have discussed serious errors (66 percent versus 58 percent), minor errors (72 percent versus 62 percent) and near misses (59 percent versus 52 percent, *p* = 0.0362) with colleagues and to learn about errors from colleagues at medical meetings, conferences, or rounds (61 percent versus 46 percent). Surgeons were less likely than other specialists to learn about errors from pharmacists (15 percent versus 32 percent) or from the hospital (18 percent versus 31 percent).

Discussion

Our survey of a large sample of physicians from medicine and surgery counters the conventional wisdom that physicians are “reluctant partners” in reporting errors. Rather, these physicians were willing to report errors but found current systems for communicating such information between physicians and institutions inadequate. Consequently, physicians were more likely to communicate their knowledge of errors by word of mouth to colleagues, creating lost opportunities to implement effective system-level solutions to prevent future errors.

■ **State and federal patient safety efforts.** This breakdown in physician-level reporting has broad policy implications. Increasingly, hospitals and health care organizations are required to report serious adverse events and errors to state regulators and to the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). At the national level, a new initiative is being launched to create patient safety organizations—entities that will encourage health care institutions to report adverse events and errors so that analyses can be conducted on large numbers of reported events and prevention plans can be formulated and disseminated across institutions.¹² Even if error reporting were mandatory, the success of state and national patient safety efforts hinges on the quality of data that institutions report to them, which in turn depends on engaging physicians more fully in the reporting process.

■ **Overcoming barriers to reporting.** Many of the barriers to error reporting identified in earlier physician surveys were also noted in this study, which suggests that these barriers persist. Physicians were concerned about the confidentiality and legal discoverability of the error information they report. These concerns are understandable, given the malpractice system's focus on identifying provider fault and the limited availability of affordable malpractice insurance.¹³ Communication strategies are needed to make physicians aware that information shared with hospitals' event reporting systems is generally protected from legal discovery under quality assurance statutes. Furthermore, the guarantee of confidentiality for reporting to the new patient safety organizations must be clearly articulated and widely disseminated to all users. Although physicians in this study were concerned about potential malpractice litigation, physicians have been shown to underreport errors where a no-fault system for error compensation exists.¹⁴ This suggests that in addition to concern about malpractice litigation, policies to increase error reporting by physicians need to address other barriers to reporting identified in this and other studies.

■ **Developing new health care cultures.** Our results also highlight the importance of developing health care cultures that encourage physicians to report medical errors for quality improvement. A key driver of physicians' willingness to report was their confidence that reported information would be used to make improvements. If physicians have little confidence that this will happen, they are unlikely to seek out opportunities to formally report errors.¹⁵ This may explain many physicians' lack of awareness of the availability of a patient safety reporting system at their institution. Few physicians received information about errors or error prevention from their institution, likely reinforcing their perception that reported information was not used. Physicians might not understand logistical problems inherent to some current reporting systems such as inadequate analytic resources to process all reports. Institutions and health care organizations must educate their physicians about how they respond to different types of error reports and communicate back to all physicians about lessons learned. Also, if physicians do not agree that system failures are important latent causes of error, they are more likely to implement local remedies to prevent future errors and share information informally than they are to regard an

“A key driver of willingness to report was physicians’ confidence that reported information would be used to make improvements.”

.....

error as an opportunity for system improvement.

■ **Need for redesigned reporting systems.** Physicians’ dissatisfaction with existing systems to report and disseminate information about errors and error prevention could contribute to their preference for sharing this information informally with colleagues. Reporting systems may need to be redesigned to collect relevant data directly from physicians. For example, institutions and policymakers could seek ways to formally capture error information from informal reporting activities, increasing the completeness and accuracy of collected data. Linking mortality and morbidity conferences to the hospital’s quality improvement program would increase institutional reporting of surgical errors, minimize the reporting burden for physicians, and provide legal protection for cases discussed. Policymakers should also encourage physicians to report near misses (such as potential adverse drug events), which occur more often than adverse events do and have similar latent causes, are less threatening to report, and avoid malpractice litigation.¹⁶ In other hazardous industries, reporting of near misses has provided useful information to prevent errors.¹⁷ Education of medical students and physicians about the role of latent factors in the etiology of errors might increase their acceptance of reporting near misses.

Medical and surgical specialists in this study took different approaches to communicating about errors. These differences likely reflect the contrasting culture and communication patterns among surgeons and medical specialists.¹⁸ Indeed, surgeons were less likely to agree that errors are usually due to system rather than individual failures, which suggests that surgical culture may place a greater emphasis on individual accountability for error than medical culture does. Policymakers must address these differences in attitudes and behavior among physician groups when designing and implementing error reporting systems for physicians to use. Some physicians might prefer multi-institutional, specialty-specific error reporting systems over institutionally based systems if they perceive collective learning with specialist colleagues to be more personally relevant. For example, when neonatal intensivists from many institutions agreed to use a Web-based reporting system, rare errors were identified, and dissemination of findings through an e-mail discussion list and annual meetings prompted many patient safety improvement projects at participating institutions.¹⁹ Further research is needed to evaluate physicians’ preferences for specialty-specific or institutionally based systems to collect and disseminate information about errors and error prevention. In addition, the effectiveness of these different approaches in reducing latent errors and improving patient safety must be assessed.

■ **Study limitations.** Our study has several limitations. We included U.S. physi-

cians from only two states, which potentially limits generalizability. However, the issues associated with error communication are probably not regional, and our high response rate and large sample size from various specialties contribute to the generalizability of the study findings. Although the survey was anonymous, we relied on self-reported data, and respondents' answers might have been influenced by social desirability bias, leading us to overestimate positive attitudes and perceived desired behavior. In addition, we did not ask respondents to limit their responses to communication of their own errors, and attitudes and behavior might vary depending on the respondent's level of involvement with an error. Finally, although we provided definitions for key terms, we cannot confirm that the events that physicians participated in or reported were in fact errors. However, we believe that to understand and prevent medical errors, it is important to gather comprehensive information about all errors and near misses, real or perceived.

OUR WORK HAS IDENTIFIED SEVERAL IMPORTANT policy and research questions that require further investigation. How can the culture in which physicians work be transformed to emphasize reporting of errors to support quality improvement? How should systems to report errors be redesigned to most effectively capture physician's unique knowledge about errors? Can information about errors that is readily shared among physician colleagues be captured by formal reporting systems? Finally, are specialty-specific systems for gathering and disseminating information about errors and error prevention more effective than other approaches to engage physicians in initiatives to improve patient safety? The answers to these questions will guide the development of communication systems that increase physicians' participation in ongoing local, state, and national efforts to improve the quality and safety of patient care.

.....
Funding for this study was provided by Agency for Healthcare Research and Quality (AHRQ) Grant nos. 1U18HS11890 and 1K08HS0140201. Thomas Gallagher was also supported by the Greenwall Foundation Faculty Scholars in Bioethics Program. The authors thank Alison Ebers and Kerry Bommarito for their assistance in preparing the Web-based survey instrument, physician recruitment, and data entry; Melissa Krauss for helping with data analysis; and Eric Larson and Hugh Straley for their support of the project.

NOTES

1. L.L. Leape and D.M. Berwick, "Five Years after *To Err Is Human*: What Have We Learned?" *Journal of the American Medical Association* 293, no. 19 (2005): 2384–2390.
2. P. Barach and S.D. Small, "Reporting and Preventing Medical Mishaps: Lessons from Non-Medical Near Miss Reporting Systems," *British Medical Journal* 320, no. 7237 (2000): 759–763; R.L. Helmreich, "On Error Management: Lessons from Aviation," *British Medical Journal* 320, no. 7237 (2000): 781–785; and B.A. Liang, "Error in Medicine: Legal Impediments to U.S. Reform," *Journal of Health Politics, Policy and Law* 24, no. 1 (1999): 27–58.
3. *Patient Safety and Quality Improvement Act of 2005*, P.L. 109-41, 109th Congress, approved 29 July 2005.
4. L.T. Kohn, J.M. Corrigan, and M.S. Donaldson, eds., *To Err Is Human: Building a Safer Health System* (Washington: National Academies Press, 1999).
5. D.J. Cullen et al., "The Incident Reporting System Does Not Detect Adverse Drug Events: A Problem for Quality Improvement," *Joint Commission Journal on Quality Improvement* 21, no. 10 (1995): 541–548; C. Hobgood

- et al., "Error Identification, Disclosure, and Reporting: Practice Patterns of Three Emergency Medicine Provider Types," *Academic Emergency Medicine* 11, no. 2 (2004): 196–199; L.L. Leape, "Error in Medicine," *Journal of the American Medical Association* 272, no. 23 (1994): 1851–1857; and S.N. Weingart et al., "A Physician-Based Voluntary Reporting System for Adverse Events and Medical Errors," *Journal of General Internal Medicine* 16, no. 12 (2001): 809–814.
6. M.L. Millenson, "The Silence," *Health Affairs* 22, no. 2 (2003): 103–112; J.A. Taylor et al., "Use of Incident Reports by Physicians and Nurses to Document Medical Errors in Pediatric Patients," *Pediatrics* 114, no. 3 (2004): 729–735; and L.L. Leape, "Reporting of Adverse Events," *New England Journal of Medicine* 347, no. 20 (2002): 1633–1638.
 7. See, for example, R. Lawton and D. Parker, "Barriers to Incident Reporting in a Healthcare System," *Quality and Safety in Health Care* 11, no. 1 (2002): 15–18; W.K. Mariner, "Medical Error Reporting: Professional Tensions between Confidentiality and Liability," Issue Brief no. 13 (Boston: Massachusetts Health Policy Forum, November 2001), 1–35; and A. Hevia and C. Hobgood, "Medical Error during Residency: To Tell or Not to Tell," *Annals of Emergency Medicine* 42, no. 4 (2003): 565–570.
 8. D.C. Classen and P.M. Kilbridge, "The Roles and Responsibility of Physicians to Improve Patient Safety within Health Care Delivery Systems," *Academic Medicine* 77, no. 10 (2002): 963–972; and Leape et al., "Five Years after *To Err Is Human*."
 9. T.H. Gallagher et al., "U.S. and Canadian Physicians' Attitudes and Experiences regarding Disclosing Errors to Patients," *Archives of Internal Medicine* 166, no. 15 (2006): 1605–1611; and T.H. Gallagher et al., "Choosing Your Words Carefully: How Physicians Would Disclose Harmful Medical Errors to Patients," *Archives of Internal Medicine* 166, no. 15 (2006): 1585–1593.
 10. Kohn et al., eds., *To Err Is Human*.
 11. Gallagher et al., "U.S. and Canadian Physicians' Attitudes."
 12. H.R. Clinton and B. Obama, "Making Patient Safety the Centerpiece of Medical Liability Reform," *New England Journal of Medicine* 354, no. 21 (2006): 2205–2208.
 13. D.M. Studdert, M.M. Mello, and T.A. Brennan, "Medical Malpractice," *New England Journal of Medicine* 350, no. 3 (2004): 283–292.
 14. Mariner, "Medical Error Reporting"; and Gallagher et al., "U.S. and Canadian Physicians' Attitudes."
 15. D.B. Jeffe et al., "Using Focus Groups to Understand Physicians' and Nurses' Perspectives on Error Reporting in Hospitals," *Joint Commission Journal on Quality and Safety* 30, no. 9 (2004): 471–479.
 16. D.W. Bates et al., "Incidence of Adverse Drug Events and Potential Adverse Drug Events: Implications for Prevention," *Journal of the American Medical Association* 274, no. 1 (1995): 29–34; Barach et al., "Reporting and Preventing Medical Mishaps"; and Weingart et al., "A Physician-Based Voluntary Reporting System."
 17. L.L. Leape et al., "Promoting Patient Safety by Preventing Medical Error," *Journal of the American Medical Association* 280, no. 16 (1998): 1444–1447; Barach et al., "Reporting and Preventing Medical Mishaps"; and Helmreich, "On Error Management."
 18. E. Pierluissi et al., "Discussion of Medical Errors in Morbidity and Mortality Conferences," *Journal of the American Medical Association* 290, no. 21 (2003): 2838–2842; and Gallagher et al., "U.S. and Canadian Physicians' Attitudes."
 19. G. Suresh et al., "Voluntary Anonymous Reporting of Medical Errors for Neonatal Intensive Care," *Pediatrics* 113, no. 6 (2004): 1609–1618.