

## Resident Education in Medical Errors

Heather B. Huffman-Dracht\*, William M. McDonnell and Elisabeth Guenther

*Division of Pediatric Emergency Medicine, Department of Pediatrics, University of Utah, USA*

**Abstract:** *Background:* A 2001 policy statement from the American College of Emergency Physicians encouraged “an effective and standardized system of medical error reporting for the purpose of aiding practitioners and institutions in efforts to improve safety.”

*Study objective:* To evaluate current curricula of U.S. medical residency programs regarding medical errors.

*Methods:* A 41-item questionnaire was e-mailed to chief residents and residency directors of Accreditation Council for Graduate Medical Education (ACGME)-approved U.S. residency programs. Data were collected regarding demographics and residency training in medical error. Emergency medicine (EM) and non-EM residency programs were compared.

*Results:* 808 educators from 44 states responded; 13% were from EM residency programs. When comparing EM and non-EM residency curricula, there was no significant difference in mean number of lectures on medical error (4 vs. 5,  $p=0.24$ ); however, more EM respondents reported providing instruction on risk communication (99 vs. 85%,  $p<0.05$ ), medical liability insurance (53 vs. 18%,  $p<0.05$ ), malpractice litigation (55 vs. 18%,  $p<0.05$ ), medical record documentation (61 vs. 25%,  $p<0.05$ ), risk management (49 vs. 19%,  $p<0.05$ ), expert witness testimony (60 vs. 11%,  $p<0.05$ ), and malpractice crisis (58 vs. 17%,  $p<0.05$ ). Also, more EM respondents reported that they knew whether there was a mandatory medical error reporting statute (48 vs. 31%,  $p<0.05$ ) or an apology statute in their state (31 vs. 16%,  $p<0.05$ ).

*Conclusion:* ACGME-approved residency program curricula include variable components of education in medical errors; significant differences between EM and non-EM residency programs exist.

**Keywords:** residency education, medical errors, residency curriculum, emergency medicine, patient safety, risk management.

### INTRODUCTION

As defined by the Institute of Medicine (IOM), error is “...the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim,” whether or not there is a resultant preventable adverse outcome [1]. Wu *et al.* similarly defined medical error as “...a commission or an omission with potentially negative consequences for the patient that would have been judged wrong by skilled and knowledgeable peers at the time it occurred”, independent of whether there were any negative consequences [2].

In the last decade, the general public has become increasingly aware of the high prevalence of medical errors and subsequent adverse patient outcomes in the U.S. medical system. The IOM’s 1999 document “To Err Is Human: Building a Safer Health System,” in citing the finding that “...at least 44,000 Americans die in hospitals each year as a result of medical errors,” called for a systematic overhaul of the American healthcare system to improve the level of safety, and, thus, quality of healthcare [1]. The American College of Emergency Physicians (ACEP) issued a policy statement in 2001 to encourage “an effective and standardized system of medical error reporting for the purpose of aiding practitioners and institutions in efforts to improve safety [3].” The majority of patients desire full disclosure of

any medical error, even if there was no associated adverse outcome [4-5].

Although less-experienced clinicians may be more likely to provide care consistent with prevailing practice standards, they also may be more likely to make medical errors than more experienced physicians [6-8]. Resident physicians are at high risk of making errors and suffering detrimental short- and long-term effects in both personal and professional realms [9]. Emergency medicine (EM) residents work in a particularly error-prone, sometimes chaotic environment treating multiple ill, previously unknown patients simultaneously and often passing on care to another clinician at shift change. Despite the unpredictable, high-risk environment, EM residents have the benefit of 24 hour attending supervision, thus, reducing the possibility of an adverse event and providing the potential for effective, constructive intervention should a medical error occur—*via* feedback and disclosure in a non-judgmental, timely manner [10].

The Accreditation Council of Graduate Medical Education’s (ACGME) guidelines mandate that all residents be trained to identify and analyze system error; for EM residents *via* “formal regular clinical discussions, rounds, and conferences that provide critical review of patient care...” but the content of an ideal medical errors curriculum is not specifically delineated [11]. Christmas and Ziegelstein argue that the identification and subsequent disclosure of medical error is a unique and vital skill that requires a novel approach, and should be considered the seventh competency of medical resident education [12]. In the past, most American

\*Address correspondence to this author at the Division of Pediatric Emergency Medicine, Department of Pediatrics, University of Utah, USA; Tel: 801-879-1570; Fax: 801-587-7455; E-mail: hbhuff@gmail.com

medical residencies lacked formal curricula related to medical errors other than Morbidity and Mortality conference. In its traditional format, this experience has been shown to stigmatize individuals and have a negative effect on resident learning [13]. Specifically, Hevia *et al.* found that residents exposed to the negative analysis of a medical error are less interested in patient safety measures, less likely to disclose similar events in the future, and more likely to apply self-blame and ignore possible systemic causes [10]. In contrast, third year medical students highly rate didactic sessions dedicated to appropriate medical error disclosure in a blame-free, empathetic setting as effective and helpful for their future careers [14]. The appropriate management of medical errors appears to be a vital component of not only patient safety, but also physician personal and professional well-being.

There is little objective data regarding the impact of the IOM report on medical error education. The purpose of this survey was to gain insight as to the current curricula of U.S. medical residency programs regarding the recognition and management of medical errors and to specifically compare EM and non-EM residency program curricula. We hope that by gathering and presenting data on the current state of resident education regarding the recognition and management of medical errors, we enable residency administrators to effectively alter their curricula to enhance patient safety.

## MATERIALS AND METHODOLOGY

After a review of the literature, we developed a survey that was pilot tested to twenty academic physicians in our institution. We incorporated the feedback from the pilot study to develop the final survey, a 41-item Internet-based questionnaire (Appendix 1). We then sent a link to the survey by electronic mail to residency directors and chief residents of ACGME-approved U.S. residency programs January-March 2008.

### Participants

Chief residents and residency directors of ACGME-approved U.S. residency programs in the fields of anesthesiology, emergency medicine, family medicine, general surgery, internal medicine, obstetrics and gynecology, and pediatrics were eligible for participation in this study. The ACGME estimates that these subspecialties encompass 57.5% of U.S. medical allopathic trainees (62,031 residents in anesthesiology, emergency medicine, family medicine, general surgery, internal medicine, obstetrics and gynecology, and pediatrics of 107,851 total residents in 2007-2008) [15].

We selected chief residents and residency directors because both groups work in academic institutions in the area of medical resident education. They are thus best qualified to answer questions regarding residency medical error curriculum. In addition, we were able to obtain contact information for these two groups from the ACGME website [15].

### Design and Setting

We invited potential respondents *via* e-mail to complete a brief, on-line, anonymous survey (Appendix 1) coordinated by a University of Utah-based survey service. Responding to the survey implied respondent consent to participate in the

study. As per published response rates to electronic surveys for medical research, our anticipated response rates were between 8.7% and 30%, though e-mail surveys incorporating multimode approaches have been reported to yield response rates as high as 70% [16-17]. Our institution's Institutional Review Board considered this study exempt.

### Main Outcome Measures

Our primary outcome measures of interest were the specific components in the EM and non-EM residency training curricula regarding the identification and management of medical errors. We also explored several secondary outcome measures, including: respondent knowledge of medical error definitions, awareness of relevant medical error statutes, the effect of malpractice liability concerns on career decisions, hypothetical responses to the following vignettes of non-harm and harmful medical error, and actual past responses to non-harm and harmful medical error:

### Vignettes and Queries

For each of the below vignettes and queries, respondents could select "yes" or "no" to one or more of the following: "my superior(s)," "my patient," "my hospital's quality improvement or risk management department," "a colleague," and "no one."

### Hypothetical Vignettes and Responses

#### *Hypothetical Non-Harm Medical Error Vignette*

"If a patient received too much mucomyst based on my incorrect order and no harm resulted to my patient, I would report the error to which of the following person(s) the majority (>50%) of the time?"

#### *Hypothetical Harmful Medical Error Vignette*

"If I made a medical error that does result in harm to my patient (e.g. missing a scaphoid fracture on an x-ray and NOT immobilizing the patient prior to discharge home, thus delaying definitive management and increasing the risk of avascular necrosis), I would report the error to which of the following person(s) the majority (>50%) of the time?"

### Queries and Actual Responses

#### *Actual Non-Harm Medical Error Query*

"When I made a medical error that did not cause harm to my patient, I reported the error to which of the following people the majority (>50%) of the time?"

#### *Actual Harmful Medical Error Query*

"When I made a medical error that did cause harm to my patient, I reported the error to which of the following people the majority (>50%) of the time?"

### Data Collection

Through the survey instrument, we collected demographic data, including respondent age, gender, medical subspecialty, and year of training completion. We also gathered information on the following specific components of the residency training curricula of respondents and respondents' trainees: (1) Morbidity and Mortality conference, (2) number of medical error-related lectures per year, and (3) educational discussions of medical malpractice litigation, risk communi-

cation, medical liability, medical record documentation, risk management, vaccine injury, expert witness testimony, and informed consent. We queried respondents regarding their own knowledge of the definition of medical error, awareness of state statutes related to medical error, and experiences with medical error. For the purpose of this study, we utilized an IOM report-derived definition of medical error: “physician error carried out in patient care—regardless of patient morbidity or mortality.”

### Statistical Analysis

We analyzed respondent demographic data using descriptive statistics. In addition, we used a linear regression model to compare respondent training characteristics and the likelihood that a respondent was exposed to medical error education during his/her training. We utilized chi-square analysis where indicated and set the alpha level for comparison at 0.05 for all comparisons. We used Microsoft Access® (Microsoft Office 2000) and SAS® (version 8.0) software for all statistical manipulations.

## RESULTS

### Demographics

808 individuals completed the survey, comprising 388 (47%) residency directors and 433 (53%) chief residents from 44 states. 108 (13.4%) of respondents were from EM programs. A higher percentage of respondents from EM programs were male (71.7 vs. 57.6%,  $p=0.01$ ) than from non-EM programs. No significant difference was noted in comparing EM vs. non-EM respondents with regards to percentage of residency directors (48.2 vs. 47.6%,  $p=0.92$ ), completion of residency training prior to 2000 (54.6 vs. 55.5%,  $p=0.92$ ), and mean number of trainees (12.1 vs. 12.4,  $p=0.81$ ).

Due to the methodology implemented to assure anonymous responses, the exact survey response rate is impossible to obtain, but lies between 44%, assuming one reply per program, and 21% if only the program directors can be assumed to have responded from unique programs.

### Current EM vs. non-EM Trainee Experience

Roughly half of today’s EM and non-EM residency Morbidity and Mortality conferences discuss both the definition of a medical error and when to apologize for a medical error (53.8 vs. 48.5%,  $p=0.53$ ). Although the total number of error-related lectures each year is similar for EM and non-EM residency programs (3.8 vs. 4.9,  $p=0.24$ ), EM trainees may have fewer non-Morbidity and Mortality error-related lectures (2.9 vs. 4.4,  $p=0.06$ ). Exclusive of Morbidity and Mortality, the main mechanism of medical error education is the combination of lecture/seminar, informal teaching, and personal experience for EM to a greater extent than non-EM trainees (68.9 vs. 58.6%,  $p=0.008$ ).

More EM residents than non-EM residents receive instruction in the following medical error-related topics: medicolegal issues (53.3 vs. 19.2%,  $p<0.0001$ ), risk communication (98.9 vs. 84.8%,  $p<0.0001$ ), medical liability insurance (52.8 vs. 18.2%,  $p<0.0001$ ), malpractice litigation (54.8 vs. 17.9%,  $p<0.0001$ ), medical record documentation (60.9 vs. 24.7%,  $p<0.0001$ ), risk management, 49.0 vs. 19.1%,  $p<0.0001$ ), informed consent (38.5 vs. 16.1%,  $p<0.0001$ ),

expert witness testimony (60.4 vs. 10.7%,  $p<0.0001$ ), vaccine liability (72.2 vs. 8.2%,  $p<0.0001$ ), and malpractice crisis (57.6 vs. 16.6%,  $p<0.0001$ ).

### Response to Hypothetical and Actual Errors

The respondents were presented with a scenario in which a non-harm medical error was made—“patient receiving too much mucomyst based on my incorrect order.” More EM respondents would report such an incident to their hospital’s quality improvement or risk management department (68.0 vs. 48.9%,  $p=0.0003$ ) while more non-EM respondents would confide in their superior (75.9 vs. 63.2%,  $p=0.008$ ) or a colleague (61.4 vs. 46.8%,  $p=0.004$ ). In both groups roughly 10% would report a non-harm error to no one (EM 10.1% vs. non-EM 10.8%,  $p=0.84$ ) and about 70% would tell the patient (EM 71.1 vs. non-EM 69.6%,  $p=0.82$ ). In recalling their actual prior non-harm errors, more EM respondents did report to the patient (74.5 vs. 64.3%,  $p=0.044$ ) and hospital quality improvement or risk management department (54.2 vs. 35.5%,  $p=0.0006$ ) while more non-EM respondents reported to their superior (76.1 vs. 66.7%,  $p=0.06$ ). The groups equally reported to a colleague (EM 62.0 vs. non-EM 64.7,  $p=0.64$ ) or no one (4.1 vs. 9.8%,  $p=0.13$ ).

Next the respondents were presented with a scenario in which a potentially harmful medical error was made—“missing a scaphoid fracture on an X-ray and NOT immobilizing my patient prior to discharge home, thus delaying definitive management and increasing the risk of avascular necrosis.” In this situation, EM respondents were more likely to report to hospital quality improvement or risk management department (88.6 vs. 80.3%,  $p=0.04$ ) or a colleague (66.0 vs. 56.4%,  $p=0.08$ ) while non-EM respondents would more often report to superiors (94.3 vs. 84.0%,  $p=0.001$ ). There was no difference in EM and non-EM respondents in likelihood to report such an error to the patient (96.1 vs. 97.5%,  $p=0.51$ ) or to no one (1.4 vs. 2.3%,  $p=1.0$ ). In recalling their actual prior harmful errors, more EM respondents reported to quality improvement or risk management department (91.5 vs. 72.5%,  $p<0.0001$ ) while more non-EM respondents reported to their superior (95.3 vs. 83.9%,  $p=0.0004$ ). No difference was noted in reporting to the patient (EM 93.6 vs. non-EM 93.6%,  $p=1.0$ ), a colleague (EM 61.7 vs. non-EM 71.7%,  $p=0.09$ ), or no one (EM 3.0 vs. non-EM 1.5%,  $p=0.71$ ).

### Respondents’ Error-Related Knowledge

In response to personal knowledge questions, fewer EM respondents marked “I don’t know” to questions regarding whether medical error reporting is mandatory in their state (52.4 vs. 69.2%,  $p<0.001$ ) and if there is an apology statute in their state (68.9 vs. 83.6%,  $p=0.001$ ). More EM respondents affirmed that they had made a harmful or non-harm medical error in the course of their career (99.1 vs. 93.5%,  $p=0.02$ ) but more non-EM respondents admitted that malpractice concerns influenced their career decisions (47 vs. 36%,  $p=0.04$ ).

Roughly one-third of EM and non-EM respondents disagreed with the incorrect definition of a medical error—“patient morbidity and mortality while under a physician’s care” (38.3 vs. 30.9%,  $p=0.43$ ) and roughly half of each group agreed with the correct definition of a medical error—

“physician error carried out in patient care—regardless of patient morbidity and mortality” (57 vs. 43.4%,  $p=0.11$ ).

## DISCUSSION

The 1999 IOM report recognized the widespread occurrence of medical errors in the United States and highlighted the importance of medical error prevention and recognition.<sup>1</sup> Many medical organizations, including those focused on emergency medicine, subsequently encouraged organized training of medical residents in the area of medical errors. We observed a number of features related to physician education and knowledge of issues pertaining to medical errors in resident education programs now a decade after the 1999 IOM report.

First, emergency medicine residents are overwhelmingly trained in important aspects of medical error education, including medical malpractice litigation, risk communication, medical liability, medical record documentation, risk management, and informed consent in comparison to other subspecialties. Although the ACGME has not specified particular areas of focus in residency training in medical errors, increased education in these pertinent topics is a noteworthy improvement. Morbidity and Mortality conference remains a common means of medical error education but the number of non-Morbidity and Mortality medical error lectures has markedly increased based on data from prior studies [9].

Professed chief resident and residency director knowledge remains inadequate on a number of important topics, including familiarity about relevant statutes and the definition of medical error. The majority of U.S. states have enacted apology statutes (35 states and the District of Columbia), yet most respondents claimed to be unaware of relevant apology statutes in their own states [18]. This survey instrument did not examine the extent of the respondents' knowledge of their own states' apology statutes. In addition, although chief residents and residency directors have considerably improved their understanding of the correct definition of a medical error from that noted in a 2004 survey of chief residents, almost half of the chief residents and residency directors surveyed remain unaware that a medical error may have occurred even in the absence of patient harm [9].

Finally, we found a discrepancy between what physicians are doing and what patients feel should be done. In prior studies, patients have clearly stated a desire for full disclosure of both non-harm and harmful errors [19-20]. However, physicians in our study report disclosing non-harm errors to the patient less than 75% of the time, a finding that may be related to chief residents' and residency directors' failure to recognize non-harm errors as important, erroneous events. The percentage of physicians in our study willing to disclose medical errors to superiors and patients were considerably higher than those reported in a 1991 survey of internal medi-

cine residents, perhaps indicating a trend toward increased disclosure after publication of the IOM report [21]. In addition, comparison of EM and non-EM chief residents and residency directors showed substantial differences in error disclosure practices. EM physicians are more likely to report errors to hospital quality improvement or risk management while non-EM physicians are more likely to disclose errors to a superior. The significance of this finding is unknown and may be related to differences in error reporting policy in different departments.

In the wake of the 1999 IOM report, our data show that graduate medical education programs now contain substantial medical error disclosure and related medical legal issues components. However, substantial gaps in resident educator knowledge regarding medical error, related medical legal issues, and appropriate disclosure still exist. In addition, the effects of changes in residencies' medical error curricula on physicians' knowledge and behavior remain unclear, and warrant further study. Finally, further research is needed to explore whether increased medical error awareness and behavior changes by physicians will result in improved quality of care and reduced medical errors. Such studies may help establish specific, effective guidelines for medical error education.

## Limitations

There are several limitations to this study. First, there are the limitations inherent to survey studies. These include possible selection bias as well as concerns for anonymity, which may have resulted in under-reporting of medical errors and recall bias. Second, in an attempt to reach as many respondents as possible, we asked recipients of our initial e-mail to forward our survey's website to the appropriate individuals within their residency programs. The subsequent large number of chief residents and residency directors responding to this survey enabled us to amass data and draw important conclusions regarding the current state of resident education in the area of medical error. Our recruiting tactic, however, left us unable to calculate a definitive response rate. Finally, the findings of our study may have limited generalizability due to the academic affiliation of the respondents and the geographic distribution of the respondents.

## CONCLUSION

ACGME-approved residency program curricula include variable components of education in medical errors; significant differences between EM and non-EM residency programs exist. Future studies should evaluate the effect of clinician experience on medical errors, as well as the effect of negative analysis of a medical error on resident trainees.

## TRIAL REGISTRATION

Current Controlled Trials ISRCTN73824458.

## APPENDIX

Internet-based survey of resident educators to assess the current state of residency education in medical errors.

## APPENDIX

1. What is your position within your current residency program?

(a) Residency director

- (b) Chief resident

**BRANCH POINT-----**

**RESIDENCY DIRECTOR'S SURVEY**

2. What is your gender?

- (a) Female
- (b) Male

3. In what year did you (or will you) complete residency training?

4. In what specialty did you (or will you) complete residency training?

(Make between 1 and 8 selections)

- (a) Anesthesiology
- (b) Emergency Medicine
- (c) Family Practice
- (d) General Surgery
- (e) Internal Medicine
- (f) Obstetrics and Gynecology
- (g) Pediatrics
- (h) Other (please specify):

5. I primarily train residents in the field of:

- (a) Anesthesiology
- (b) Emergency Medicine
- (c) Family Practice
- (d) General Surgery
- (e) Internal Medicine
- (f) Obstetrics and Gynecology
- (g) Pediatrics

6. Please enter the number of trainees your program matched this year:

7. Was Morbidity and Mortality conference part of your own residency curriculum?

- (a) Yes
- (b) No

8. # of lectures per year devoted to the recognition and management of medical errors in your own residency training, exclusive of Morbidity and Mortality conference:

9. As part of my trainees' Morbidity and Mortality conference, we discuss:

- (a) What defines a medical error
- (b) When to apologize for a medical error
- (c) Both (a) & (b)
- (d) Neither (a) nor (b)
- (e) NA (Not applicable; my program does not have M&M)

10. # of lectures per year devoted to the recognition and management of medical errors in the curriculum of the residents you train, exclusive of Morbidity and Mortality conference:

11. What is the primary mechanism of teaching about the recognition and management of medical errors in your current residency program, exclusive of Morbidity and Mortality conference?

- (a) Lecture/seminar
- (b) Informal teaching and personal experience
- (c) Both (a) & (b)

- (d) Neither (a) nor (b)
- (e) Other

12. Did you or do the residents you currently work with receive instruction on the following medicolegal issues during residency?

(Make between 0 and 2 selections per row)

I did My residents do

- (a) Risk communication
- (b) Medical liability insurance
- (c) Medical malpractice litigation
- (d) Medical record documentation
- (e) Risk management
- (f) Informed consent and minors
- (g) Expert witness testimony
- (h) Vaccine injury liability
- (i) Malpractice crisis

13. I would define a medical error as:

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

- (a) Patient morbidity or mortality while under a physician's care.
- (b) Physician error carried out in patient care--regardless of patient morbidity or mortality.

14. If I made a medical error that does not result in harm to my patient (e.g. a patient receiving too much mucomyst based on my incorrect order) I would report the error to which of the following person(s) the majority (>50%) of the time?

Yes No

- (a) My superior(s)?
- (b) My patient?
- (c) My hospital's quality improvement or risk management department?
- (d) A colleague?
- (e) No one?

15. If I made a medical error that does result in harm to my patient (e.g. missing a scaphoid fracture on an x-ray and NOT immobilizing the patient prior to discharge home, thus delaying definitive management and increasing the risk of avascular necrosis) I would report the error to which of the following person(s) the majority (>50%) of the time?

Yes No

- (a) My superior(s)?
- (b) My patient?
- (c) My hospital's quality improvement or risk management department?
- (d) A colleague?
- (e) No one?

16. Have personal concerns about malpractice influenced your career decisions?

- (a) Yes
- (b) No

17. Please list the two-letter abbreviation of the state in which you currently practice medicine:

18. Is the reporting of medical errors mandatory in the state in which you currently practice?

- (a) Yes
- (b) No
- (c) I don't know

19. Is there an apology statute in the state in which you currently practice?
- (a) Yes
  - (b) No
  - (c) I don't know
20. During the course of my career, I have made a medical error--**whether or not** it resulted in an adverse outcome for my patient.
- (a) True
  - (b) False
21. When I made a medical error that **did not** cause harm to my patient, I reported the error to which of the following people the majority (>50%) of the time?
- Yes No
- (a) My superior(s)?
  - (b) My patient?
  - (c) My hospital's quality improvement or risk management department?
  - (d) A colleague?
  - (e) No one?
22. When I made a medical error that **did** cause harm to my patient, I reported the error to which of the following people the majority (>50%) of the time?
- Yes No
- (a) My superior(s)?
  - (b) My patient?
  - (c) My hospital's quality improvement or risk management department?
  - (d) A colleague?
  - (e) No one?

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### CHIEF RESIDENT SURVEY

- 23. Same as #2 in Residency Director survey
- 24. Same as #3 in Residency Director survey
- 25. Same as #4 in Residency Director survey
- 26. Same as #6 in Residency Director survey
- 27. Same as #7 in Residency Director survey
- 28. Same as #8 in Residency Director survey
- 29. Same as #9 in Residency Director survey
- 30. Same as #11 in Residency Director survey
- 31. Same as #12 in Residency Director survey
- 32. Same as #13 in Residency Director survey
- 33. Same as #14 in Residency Director survey
- 34. Same as #15 in Residency Director survey
- 35. Same as #16 in Residency Director survey
- 36. Same as #17 in Residency Director survey
- 37. Same as #18 in Residency Director survey
- 38. Same as #19 in Residency Director survey
- 39. Same as #20 in Residency Director survey
- 40. Same as #21 in Residency Director survey
- 41. Same as #22 in Residency Director Survey

## REFERENCES

- [1] Kohn LT, Corrigan JM, Donaldson MS, Eds. Committee on Quality of Healthcare in America, Institute of Medicine. To err is human: building a safer health system. Washington DC: National Academy Press 1999.
- [2] Wu AW, Cavanaugh TA, McPhee SJ, *et al.* To tell the truth: ethical and practical issues in disclosing medical mistakes to patients. *J Gen Intern Med* 1997; 12: 770-5.
- [3] American College of Emergency Physicians. Reporting of medical errors. ACEP policy statement. Approved September 2001, Revised 2008. Available from: <http://www.acep.org/practres.aspx?id=29668>
- [4] Hobgood C, Peck CR, Gilbert B, *et al.* Medical errors—what and when: what do patients want to know? *Acad Emerg Med* 2002; 9: 96-101.
- [5] Witman AB, Parc DM, Hardin SB. How do patients want physicians to handle mistakes? A survey of internal medicine patients in an academic setting. *Arch Intern Med* 1996; 156: 2565-9.
- [6] Zerr DM, Del Beccaro MA, Cummings P. Predictors of physician compliance with a published guideline on management of febrile infants. *Pediatr Infect Dis J* 1999; 18: 232-8.
- [7] Ayanian JZ, Hauptman PJ, Gaudagnoli E, Antman EM, Pashos CL, McNeil BJ. Knowledge and practices of generalist and specialist physicians regarding drug therapy for acute myocardial infarction. *N Engl J Med* 1994; 331: 1136-42.
- [8] Berk WA, Welch RD, Levy PD, *et al.* The effect of clinical experience on the error rate of emergency physicians. *Ann Emerg Med* 2008; 52: 597-601.
- [9] Walsh KE, Miller MR, Vinci RJ, Bauchner H. Pediatric resident education about medical errors. *Ambul Pediatr* 2004; 4: 514-7.
- [10] Hevia A, Hobgood C. Medical error during residency: to tell or not to tell. *Ann Emerg Med* 2003; 42: 565-70.
- [11] Accreditation Council for Graduate Medical Education. ACGME program requirements for graduate medical education in emergency medicine. Effective July 1, 2007. Available for download from: [http://www.acgme.org/acWebsite/navPages/nav\\_110.asp](http://www.acgme.org/acWebsite/navPages/nav_110.asp)
- [12] Christmas C, Ziegelstein RC. The seventh competency. *Teach Learn Med* 2009; 21: 159-62.
- [13] Vohra PD, Johnson JK, Daugherty CK, Wen M, Barach P. Housestaff and medical student attitudes toward medical errors and adverse events. *Jt Comm J Qual Patient Saf* 2007; 33: 493-501.
- [14] Keller DR, Bell CL, Dottl SK. An effective curriculum for teaching third-year medical students about medical errors and disclosure. *Wis Med J* 2009; 108: 27-9.
- [15] Accreditation Council for Graduate Medical Education. List of ACGME accredited programs and sponsoring institutions. Available from: <http://www.acgme.org/adspublic/>
- [16] Aitken C, Power R, Dwyer R. A very low response rate in an online survey of medical practitioners. *Aust N Z J Public Health* 2008; 32: 288-9.
- [17] Yun GW, Trumbo CW. Comparative response to a survey executed by post, email, & web form. *J Compu-Mediated Com* 2000; 6(1): Available from: <http://jcmc.indiana.edu/vol6/issue1/yun.html>
- [18] McDonnell WM, Guenther E. Do state laws make it easier to say "I'm sorry?" *Ann Int Med* 2008; 149: 811-6.
- [19] Hobgood C, Peck CR, Gilbert B, *et al.* Medical errors—what and when: what do patients want to know? *Acad Emerg Med* 2002; 9: 96-101.
- [20] Witman AB, Parc DM, Hardin SB. How do patients want physicians to handle mistakes? A survey of internal medicine patients in an academic setting. *Arch Intern Med* 1996; 156: 2565-9.
- [21] Wu AW, Folkman S, McPhee SJ, Lo B. Do house officers learn from their mistakes? *JAMA* 1991; 265: 2089-94.

Received: May 20, 2010

Revised: August 05, 2010

Accepted: September 22, 2010

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