

Impact of Patient Safety Mandates on Medical Education in the United States

Jason M. Kane, MD, Melissa Brannen, MD, and Emily Kern

Purpose: To determine the impact of the Institute of Medicine recommendations regarding patient safety on medical education resources in the United States.

Methods: Medical textbooks representing major disciplines of medicine in the United States were surveyed for patient safety–related keywords, and content presented was quantified. Allopathic medical school curricula in the United States were reviewed for required or elective patient safety coursework using an on-line database, and specific curricula details were described. The Accreditation Council for Graduate Medical Education Residency Review Committee program requirements for accreditation were reviewed, and patient safety content was quantified.

Results: Fifteen (54%) of the most recently published textbook editions reviewed contained patient safety information, and 11 of those (73%) specifically cited the Institute of Medicine report. Of the latest edition textbooks with safety keywords present, 67% dedicated entire chapters to patient safety or quality improvement. In 2007 and 2008, 10.4% of the 125 U.S. medical schools reported patient safety content in elective or required courses. All of the Accreditation Council for Graduate Medical Education Residency Review Committee program requirements contained patient safety content confined to systems-based practice and work-hour restrictions.

Conclusions: Popular medical textbook content and core medical school and graduate medical education curricula do not adequately reflect the directive to increase patient safety education and reduce medical error.

Key Words: patient safety, medical education, medical error

(*J Patient Saf* 2008;4:93–97)

In November 1999, the Institute of Medicine (IOM) reported that in the United States, avoidable medical error accounts for between 44,000 and 98,000 patient deaths annually.¹ As a result, public initiatives and medical institutions have focused on reducing medical error by improving patient safety.² It is unclear, however, whether the emphasis on patient safety has permeated into undergraduate and graduate medical education.

If there is to be a reduction in patient harm from medical errors, medical trainees must be schooled in patient safety practices. As such, residents and medical students need to be in-

formed regarding medical errors and patient safety. In February 1999, the Accreditation Council for Graduate Medical Education (ACGME) introduced 6 general competencies for residents to emphasize educational outcome assessment in residency programs and in the accreditation process; however, at that time, there was no required patient safety content.³ Although a limited number of patient safety curricula for medical students and residents have been reported at individual teaching centers, it is unclear whether academic institutions have universally incorporated patient safety into training programs.^{4,5}

The purpose of this study was to determine the impact of the IOM recommendations regarding patient safety on medical education in the United States. Specifically, we sought to assess whether there has been an increase in patient safety content in core medical textbooks and required curricula of U.S. undergraduate and graduate medical education programs since the publication of the IOM report.

METHODS

Medical textbooks representing major disciplines of medicine in the United States were surveyed. A sample of core textbooks was chosen from the following specialties: anesthesia, internal medicine, pediatrics, surgery, family medicine, emergency medicine, obstetrics and gynecology, neurology, and critical care medicine. Textbook titles were chosen for review after consultation with a reference librarian and an informal survey of course directors and medical professionals in their respective fields. At least 2 different textbook titles from the same specialty were evaluated. The table of contents and the subject indices of the latest available edition published in English were reviewed. Patient safety–related keywords, including “patient safety, safety, error, medical error, medication error, and quality improvement,” were targeted. If any keywords were identified, the information provided was quantified. When patient safety keywords were found in the most recent edition of a specific textbook, the prior edition, if available, was reviewed to assess whether there was a change in patient safety–related content.

The IOM’s definition of patient safety, “freedom from accidental injury due to medical care,” was used for qualitative analysis. Safety-related topics that covered intentional harm or negligence or complications because of lack of training were not included in this analysis.

Allopathic medical school curricula in the United States were reviewed. The American Association of Medical Colleges (AAMC) Curriculum Management and Information Tool (CurrMIT) was used to identify curriculum-specific subject matter and content.⁶ This password-protected database maintained by the AAMC offers support services designed to help

From the Department of Pediatrics, Section of Pediatric Critical Care, Children’s Memorial Hospital, Feinberg School of Medicine, Northwestern University, Chicago, Illinois.

Correspondence: Jason M. Kane, MD, Assistant Professor of Pediatrics, Children’s Memorial Hospital, 2300 Children’s Plaza, Box 73, Chicago, IL 60614 (e-mail: jkane@childrensmemorial.org).

Copyright © 2008 by Lippincott Williams & Wilkins

Textbooks Containing Patient Safety Content	Textbooks Without Patient Safety Content
<ul style="list-style-type: none"> • Miller's Anesthesia • Clinical Anesthesia • Nelson Textbook of Pediatrics • Harrison's Principles of Internal Medicine • Kelley's Textbook of Internal Medicine • Textbook of Family Medicine • Family Medicine: Principle and Practice • Schwartz's Principles of Surgery • Emergency Medicine: A Comprehensive Study Guide • Rosen's Emergency Medicine: Concepts and Clinical Practice • Harwood-Nuss' Clinical Practice of Emergency Medicine • Berek & Novak's Gynecology • Textbook of Critical Care • Irwin and Rippe's Intensive Care Medicine • Pediatric Critical Care 	<ul style="list-style-type: none"> • Rudolph's Pediatrics • Oski's Pediatrics: Principles and Practice • Cecil Textbook of Medicine • Primary Care Medicine: Office Evaluation and Management of the Adult Patient • Sabiston Textbook of Surgery • Greenfield's Surgery: Scientific Principles And Practice • Williams Obstetrics • Comprehensive Gynecology • TeLinde's Operative Gynecology • Adams and Victor's Principles of Neurology • Merritt's Neurology • Textbook of Clinical Neurology • Pediatric Critical Care Medicine

FIGURE 1. Latest edition textbook titles and patient safety content.

medical schools manage and report on medical student curriculum. Curriculum Management and Information Tool can be used to obtain detailed comparisons of curricula among U.S. and Canadian medical schools. Curriculum Management and Information Tool was searched in reverse chronologic order starting with the graduation year of 2008 using the keyword “patient safety” until no results were obtained. Additional searches were performed using safety-related keywords, including “medication error,” “human error,” and “adverse event” to capture additional classification schemata.

To examine the impact of the IOM report on graduate medical education in the United States, the ACGME Residency Review Committee (RRC) program requirements as of July 1, 2007 for anesthesia, internal medicine, pediatrics, surgery, family medicine, emergency medicine, obstetrics and gynecology, and neurology were reviewed.⁷ The presence or absence of patient safety as a required topic within the published accreditation criteria was noted. In addition, keywords related to patient

safety such as systems errors, medical error, medication error, or other qualitative topics related to the assessment and prevention of medical error were noted.

RESULTS

Medical Textbooks

A total of 28 separate medical textbook titles were reviewed.⁸⁻³⁵ Based on the contents of the latest editions, a previous edition was obtained for 12 textbooks.³⁶⁻⁴⁸ Forty-one individual textbooks were reviewed. The latest edition publication dates ranged from 2003 to 2007.

Fifteen (54%) of the most recently published editions reviewed contained any of the selected keywords (Fig. 1). Of these 15 books, 10 (67%) listed “patient safety” specifically. Actual safety content varied by topic (Fig. 2). Ten (67%) dedicated entire chapters to patient safety or quality improvement, with chapter length ranging from 3 to 41 pages. The IOM report *To Err is Human* was cited within the referenced material in 11 (73%) of the 15 textbooks. Twelve (80%) latest edition textbooks containing patient safety keywords had earlier editions available for review. Patient safety information was found in 50% of the earlier published editions of the same title. All of the latest edition anesthesia and emergency medicine textbooks reviewed contained patient safety information, whereas none of the neurology textbooks reviewed contained patient safety information. One anesthesia textbook had both a chapter dedicated to patient safety and a separate chapter related to health care quality.⁸

Undergraduate Medical Education

No patient safety curriculum content was listed in CurrMIT before graduation year 2004. For the graduation years of 2007 and 2008, 10.4% of the 125 U.S. medical schools reported patient safety content in elective or required courses.

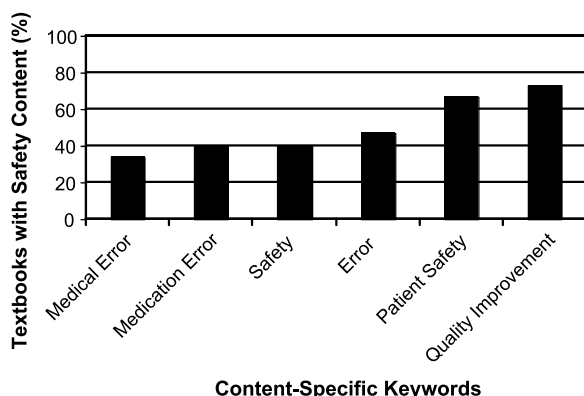


FIGURE 2. Patient safety content in textbooks containing any patient safety information.

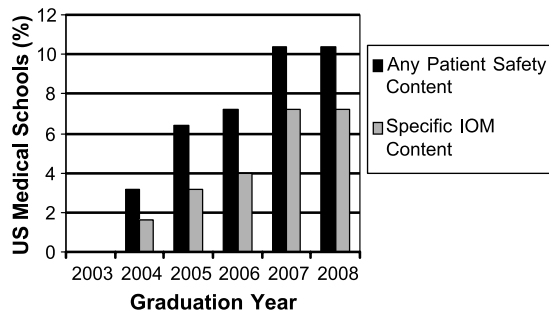


FIGURE 3. Result of CurrMIT query of 125 U.S. medical schools with any patient safety material identified compared with those with specific IOM-defined patient safety content.

Since 2004, there has been an annual increase in the number of U.S. medical schools reporting patient safety topics within their required or elective courses (Fig. 3). A more detailed examination of these courses revealed that many medical school courses did not actually contain specific patient safety content as defined by the IOM. Searches containing other patient safety–related keywords did not result in any additional medical schools identified.

Graduate Medical Education

All of the ACGME RRC program requirements contained patient safety content. The context in which patient safety was listed was identical across all disciplines. Specifically, patient safety was mentioned in 2 distinct areas required for accreditation: system-based practice and work-hour restrictions. Under the core competency of system-based practice, the ACGME requires that residents must “work in interprofessional teams to enhance patient safety and improve patient care quality...” With respect to work-hour restrictions and the learning environment, the ACGME mandates that residency programs “must be committed to and be responsible for promoting patient safety and resident well-being...” In addition to the previously discussed findings, patient safety also appeared in the RRC program requirements for obstetrics and gynecology under guidelines for supervision of residents where “supervision of residents in obstetrics and gynecology is required to ensure proper quality of care, education, patient safety...”

DISCUSSION

This descriptive study aimed to assess the impact of the 1999 IOM recommendations regarding patient safety initiatives on medical education in the United States by quantifying patient safety content in popular medical textbooks and undergraduate and graduate medical education curricula. Despite the increased attention to patient safety after the publication of the IOM report, only half of the most recent editions of core medical textbooks reviewed contained any patient safety–related content. However, the significance of the IOM report was reflected in the fact that 75% of the textbooks with patient safety–related content specifically referenced the original IOM report as motivation for including patient safety topics in the text.

In contrast to textbooks that were published around the time of the IOM report, there has been a notable increase in the number of recent editions that have incorporated patient safety material. There remains substantial variability in the quantity of information presented, however, with some books dedicating a few sentences and others devoting entire chapters to the topic of safety. On the whole, textbook editors have not adequately emphasized patient safety as a core topic. Textbooks covering high-risk medical fields such as surgery, obstetrics, and critical care medicine inconsistently presented patient safety material.

Overall, undergraduate medical education has failed to adequately incorporate patient safety into the current required or elective curricula. The fact that only 10.4% of all U.S. medical schools formally offer any specific courses covering patient safety highlights the discrepancy between knowledge required of practicing physicians and medical trainees. It is an unrealistic expectation for medical school graduates to incorporate patient safety practices into their professional careers without receiving adequate exposure during their undergraduate or graduate medical training. To create a true climate of safety, exposure to patient safety must be emphasized at all levels of training.

Although most medical schools have not incorporated patient safety into their undergraduate curricula, some institutions have started small patient safety training initiatives. Pilot programs have been implemented to reduce prescribing errors, enhance medical event reporting, and improve hand-off procedures.^{49–51} It is promising that there has been a steady increase in the number of medical schools providing patient safety content to their graduates; however, the rate of incorporation into curricula is lagging behind the demand for proficiency in professional patient safety practice. Medical schools must drastically increase the attention given to patient safety to maintain pace with other health care institutions.

The accreditation activities of the ACGME contribute to promoting patient safety by requiring residency programs to address patient safety within the competency of system-based practices and by mandating compliance with the resident work-hour limits. The ACGME now requires patient safety education to meet 1 of the core competencies, which represents a significant change from the original 6 competency requirements where no patient safety content was mandated. However, the ACGME does not provide specific content requirements for patient safety, instead relying on the individual residency program to define the scope of patient safety education required to meet the competency.

The AAMC suggested that the ACGME rubric fails to specifically address patient safety and identified methods to adopt patient safety education to fulfill the ACGME requirements.⁵² Special topics, including analysis and discussion of near-misses, patient hand-offs, and the impact of errors and adverse events on trainees, all need to be incorporated into residency training to adequately address the ACGME requirements. Furthermore, the importance of patient safety training in residency programs was emphasized by the American Board of Medical Specialties’ recommendation to introduce questions related to patient safety into medical specialty board certification examinations.⁵³

There are a number of limitations to this study. Although the textbook list was compiled after consultation with research librarians and practicing physicians, it is possible that some widely used titles were overlooked. As such, replication of this study may be challenging. In addition, some textbooks may have contained patient safety content that was not referenced in either the index or the table of contents. Editors may have intentionally omitted patient safety as a topic, instead deferring to books and journals dedicated specifically to patient safety. The fact that more than half of the most recent textbook editions surveyed did include patient safety content supports the notion that patient safety can be addressed in general medical textbooks. The curricula provided to the AAMC by medical schools may have been abbreviated, and the CurrMIT search may not have captured all of the medical schools who offer coursework in patient safety. Although multiple patient safety–related keyword searches were performed, it is possible that an individual institution’s categorization of the topic limited the results. Curriculum Management and Information Tool also reflects the coursework required of a graduating class, and results may not reflect ongoing changes in current medical school coursework.

CONCLUSIONS

Knowledge of patient safety is a critical element to providing quality health care in the United States. The current medical education resources and undergraduate medical curricula do not adequately reflect the directive to increase patient safety and reduce medical error. Patient safety education is now required for residency program accreditation, yet the scope and breadth of requisite material remain undefined by the ACGME and is highly variable among different residency programs. Medical editors have not fully incorporated patient safety material into core textbook content, highlighting the discrepancy between physician training and mandates placed on practicing physicians. Additional emphasis on patient safety in all areas of medical education is necessary before the IOM recommendations regarding patient safety can be fully realized.

REFERENCES

- Kohn LT, Corrigan JM, Donaldson MS, eds. *To Err Is Human: Building a Safer Health System*. Washington, DC: National Academy Press; 2000.
- Committee on Quality of Healthcare in America, Institute of Medicine. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, DC: National Academy Press; 2001.
- ACGME Outcome Project. Accreditation Council for Graduate Medical Education. Available at: <http://www.acgme.org/outcome/comp/compfull.asp>. Accessed August 20, 2007.
- Sachdeva AK, Philibert I, Leach DC, et al. Patient safety curriculum for surgical residency programs: results of a national consensus conference. *Surgery*. 2007;141:427–441.
- Halbach JL, Sullivan LL. Teaching medical students about medical errors and patient safety: evaluation of a required curriculum. *Acad Med*. 2005;80:600–606.
- Association of American Medical Colleges Curriculum Management and Evaluation. AAMC Management and Information Tool (CurrMIT) [database on-line]. Available at: <http://www.aamc.org/meded/curric.start.htm>. Accessed August 15, 2007.
- ACGME Residency Review Committee Program Requirements. Accreditation Council for Graduate Medical Education. Available at: http://www.acgme.org/acWebsite/navPages/nav_comPR.asp. Accessed August 21, 2007.
- Miller RD, ed. *Miller’s Anesthesia*. 6th ed. Philadelphia, PA: Elsevier Churchill Livingstone; 2005.
- Barash PG, Cullen BF, Stoelting RK, eds. *Clinical Anesthesia*. 5th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2006.
- Kliegman RM, Behrman RE, Jenson HB, et al, eds. *Nelson Textbook of Pediatrics*. 18th ed. Philadelphia, PA: Saunders Elsevier; 2007.
- Rudolph CD, Rudolph AM, Hestetter MK, et al, eds. *Rudolph’s Pediatrics*. 21st ed. New York, NY: McGraw-Hill; 2003.
- McMillan JA, Feigin RD, DeAngelis C, et al, eds. *Oski’s Pediatrics: Principles & Practice*. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2006.
- Kasper DL, Braunwald E, Fauci AS, et al, eds. *Harrison’s Principles of Internal Medicine*. 16th ed. New York, NY: McGraw-Hill; 2005.
- Humes HD, DuPont HL, Gardner LB, et al, eds. *Kelley’s Textbook of Internal Medicine*. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2000.
- Goldman L, Ausiello D, eds. *Cecil Textbook of Medicine*. 22nd ed. Philadelphia, PA: Saunders Elsevier; 2004.
- Rakel RE, ed. *Textbook of Family Medicine*. 7th ed. Philadelphia, PA: Saunders Elsevier; 2007.
- Taylor RB, David AK, Fields SA, et al, eds. *Family Medicine: Principles and Practice*. 6th ed. New York, NY: Springer-Verlag; 2003.
- Goroll AH, Mulley AG, eds. *Primary Care Medicine: Office Evaluation and Management of the Adult Patient*. 5th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2006.
- Townsend CM, Beauchamp RD, Evers BM, et al, eds. *Sabiston Textbook of Surgery: The Biological Basis of Modern Surgical Practice*. 17th ed. Philadelphia, PA: Elsevier Saunders; 2004.
- Brunicaardi FC, Andersen DK, Billiar TR, et al, eds. *Schwartz’s Principles of Surgery*. 8th ed. New York, NY: McGraw-Hill; 2005.
- Mulholland MW, Lillemoe KD, Doherty GM, et al, eds. *Greenfield’s Surgery: Scientific Principles and Practice*. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2006.
- Tintinalli JE, Kelen GD, Stapczynski JS, eds. *Emergency Medicine: A Comprehensive Study Guide*. 6th ed. New York, NY: McGraw-Hill; 2004.
- Marx JA, Hockberger RS, Walls RM, eds. *Rosen’s Emergency Medicine: Concepts and Clinical Practice*. 6th ed. Philadelphia, PA: Mosby Elsevier; 2006.
- Wolfson AB, Hendey GW, Hendry PL, et al, eds. *Harwood-Nuss’ Clinical Practice of Emergency Medicine*. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2005.
- Cunningham FG, Leveno KJ, Bloom SL, et al, eds. *Williams Obstetrics*. 22nd ed. New York, NY: McGraw-Hill; 2005.
- Berek JS, ed. *Berek & Novak’s Gynecology*. 14th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2007.
- Katz VL, Lentz GM, Lobo RA, et al, eds. *Comprehensive Gynecology*. 5th ed. Philadelphia, PA: Mosby Elsevier; 2007.
- Rock JA, Jones III HW, eds. *Te Linde’s Operative Gynecology*. 9th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2003.
- Ropper AH, Brown RH, eds. *Adams and Victor’s Principles of Neurology*. 8th ed. New York, NY: McGraw-Hill; 2005.
- Rowland LP, ed. *Merritt’s Neurology*. 11th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2005.
- Goetz CG, ed. *Textbook of Clinical Neurology*. 2nd ed. Philadelphia, PA: Saunders Elsevier; 2003.
- Fink MP, Abraham E, Vincent JL, et al, eds. *Textbook of Critical Care*. 5th ed. Philadelphia, PA: Elsevier Saunders; 2005.
- Irwin RS, Rippe JM, eds. *Irwin and Rippe’s Intensive Care Medicine*. 5th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2003.
- Fuhrman BP, Zimmerman JJ, eds. *Pediatric Critical Care*. 3rd ed. Philadelphia, PA: Mosby Elsevier; 2006.
- Slonim AD, Pollack MM, eds. *Pediatric Critical Care Medicine*. Philadelphia, PA: Lippincott Williams & Wilkins; 2006.
- Miller RD, ed. *Anesthesia*. 5th ed. Philadelphia, PA: Churchill Livingstone; 2000.
- Barash PG, Cullen BF, Stoelting RK, eds. *Clinical Anesthesia*. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2001.

38. Behrman RE, Kliegman RM, Jenson HB, eds. *Nelson Textbook of Pediatrics*. 17th ed. Philadelphia, PA: Saunders Elsevier; 2004.
39. Braunwald E, Fauci AS, Kasper DL, et al, eds. *Harrison's Principles of Internal Medicine*. 15th ed. New York, NY: McGraw-Hill; 2001.
40. Kelley WN, DuPont HL, Glick JH, et al, eds. *Textbook of Internal Medicine*. 3rd ed. Philadelphia, PA: Lippincott-Raven; 1997.
41. Rakel RE, ed. *Textbook of Family Practice*. 6th ed. Philadelphia, PA: W.B. Saunders; 2002.
42. Taylor RB, David AK, Johnson Jr TA, eds. *Family Medicine: Principles and Practice*. 5th ed. New York, NY: Springer-Verlag; 1998.
43. Schwartz SI, Shires GT, Spencer FC, et al, eds. *Principles of Surgery*. 7th ed. New York, NY: McGraw-Hill; 1999.
44. Marx JA, Hockberger RS, Walls RM, eds. *Rosen's Emergency Medicine: Concepts and Clinical Practice*. 5th ed. St. Louis, MO: Mosby; 2002.
45. Berek JS, Adashi EY, Hillard PA, eds. *Novak's Gynecology*. 13th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2002.
46. Berek JS, Adashi EY, Hillard PA, eds. *Novak's Gynecology*. 12th ed. Baltimore, MD: Williams & Wilkins; 1996.
47. Grenvik A, Ayres SM, Holbrook PR, et al, eds. *Textbook of Critical Care*. 4th ed. Philadelphia, PA: W.B. Saunders; 2000.
48. Fuhrman BP, Zimmerman JJ, eds. *Pediatric Critical Care*. 2nd ed. St. Louis, MO: Mosby; 1998.
49. Nelson LS, Gordon PE, Simmons MD, et al. The benefit of houseofficer education on proper medication dose calculation and ordering. *Acad Emerg Med*. 2000;7:1311-1316.
50. Coyle YM, Mercer SQ, Murphy-Cullen CL, et al. Effectiveness of a graduate medical education program for improving medical event reporting attitude and behavior. *Qual Saf Health Care*. 2005; 14:383-388.
51. Arora V, Johnson J, Lovinger D, et al. Communication failures in patient sign-out and suggestions for improvement: a critical incident analysis. *Qual Saf Health Care*. 2005;14:401-407.
52. AAMC. Patient Safety and Graduate Medical Education: A Report and Annotated Bibliography by the Joint Committee of the Group on Resident Affairs and Organization of Resident Representatives of the AAMC. Washington, DC; AAMC; 2003.
53. Kachalia A, Johnson JK, Miller S, et al. The incorporation of patient safety into board certification examinations. *Acad Med*. 2006;81: 317-325.