



Contents lists available at ScienceDirect

The American Journal of Surgery

journal homepage: www.americanjournalofsurgery.com

Malpractice allegations: A reality check for resident physicians

Beiqun Zhao*, Luis C. Cajas-Monson, Sonia Ramamoorthy

Department of Surgery, University of California San Diego, 9300 Campus Point Drive, #7220, La Jolla, CA, 92037, USA



ARTICLE INFO

Article history:

Received 10 May 2018

Received in revised form

18 July 2018

Accepted 3 August 2018

ABSTRACT

Background: Medical malpractice is a source of stress and cost to physicians. Little is known about how it impacts resident physicians.

Methods: We analyzed data from the Comparative Benchmarking System between 2007 and 2016. We also surveyed surgery residents at our institution regarding malpractice in training.

Results: 4% of cases identified a resident physician and 32% involved a surgical specialty. Common allegations were “improper performance of surgery” and “improper management of surgical patient”. 1 case attributed supervision as the major allegation but supervision was a contributing factor in 26% of cases. 18% of cases named a resident as a defendant. Most residents correctly answered that they can be defendants, agreed that a medico-legal curriculum is at least “moderately important”, but had “poor” to “terrible” malpractice knowledge.

Conclusions: A significant number of medical malpractice claims involve resident physicians as a responsible party. Though universally recognized as important, medico-legal training in surgical residency is often lacking.

© 2018 Elsevier Inc. All rights reserved.

Introduction

Medical malpractice occupies a significant portion of healthcare costs, up to \$55.6 billion by some estimates.¹ Among all specialties, surgery makes up the majority of claims and indemnity paid.^{2–4} The risk of litigation is so prevalent in high-risk specialties such as surgery, that it has been suggested the risk of facing a malpractice claim by age 65 is 99% in these fields.² More importantly, medical malpractice has been shown to be a significant contributor to physician burnout, depression, and suicidal thoughts among surgeons.⁵

While there is a relative paucity in studies exploring the true cost of medical malpractice claims to surgeons, there is even less research concerning litigation risk to surgical trainees. Previous studies have suggested that residents tend to have poor knowledge regarding medical malpractice⁶ despite the fact that numerous court cases have indicated resident physicians can be held liable in medical malpractice cases.^{7,8} Whereas previous studies have relied on legal research databases to explore the issue of resident malpractice,^{8–10} these databases only include a small minority of nationwide medicolegal litigation against residents.

Using a nationwide malpractice claims database, we analyzed data in which surgical resident physicians were involved in malpractice cases between 2007 and 2016. In addition, we surveyed general surgery residents at a single academic training institution regarding medical malpractice from trainees' perspective.

Methods

Malpractice Data

Medical malpractice data can be captured at multiple points. Legal research databases, such as WestLaw or LexisNexis, typically include very granular data and allows for analysis on a case-by-case basis. However, legal research databases are typically written by lawyers and judges, and concentrate on legal arguments and details. In addition, legal databases rely on voluntary publication of cases, with the majority being court proceedings that are of special interest. Lastly, a growing number of hospitals are also employing arbitration to settle lawsuits. These cases are likely not captured in legal research databases, leading to an underestimation in the data. Therefore, cases found in legal research databases are analogous to case reports published in medical journals, which are not ideal sources from which to draw large-scale conclusions. An alternative nationwide medicolegal database is the National Practitioner Data

* Corresponding author.

E-mail address: bez013@ucsd.edu (B. Zhao).

Bank (NPDB), which contain mandatorily-reported claims information nationwide from medical malpractice insurers, licensing boards, professional societies, and healthcare organizations. The NPDB was originally created in order to prevent the possibility of clinicians moving from one state to another without disclosing adverse actions or medical malpractice history. To that end, it is an imperfect measure of nationwide medical malpractice burden as it concentrates on individual physicians. This is highlighted by the fact that medical malpractice payments made by non-individuals (i.e. group practices, hospitals, clinics, or corporations) are not mandatorily-reported to the NPDB.¹¹ Lastly, the NPDB lacks the level of granularity necessary for our study.

As an alternative to legal research databases and the NPDB, we obtained nationwide medical malpractice data from the Comparative Benchmarking System (CBS) database. The CBS database is owned and maintained by the Controlled Risk Insurance Company, a large nationwide medical liability insurer. The CBS is a robust repository which contains approximately 30% of all medical malpractice cases in the United States. Currently, the repository contains approximately 400,000 malpractice cases from 400 hospitals. Data is obtained from a variety of sources, including academic medical centers, large community hospitals, and other insurance groups. All participants who have access to the CBS database must also contribute to the database by providing all of their malpractice cases to the CBS. All filed cases are included, including cases that are dropped, dismissed, or settled. Therefore, it represents a much more inclusive cohort of cases as it includes settlements, which would otherwise not be captured by legal research databases, and dropped cases where no indemnity is paid, which would otherwise not be captured by NPDB. Malpractice data is most commonly reported to the CBS by the legal departments of participants. Analysts at CBS, who are all registered nurses with at least ten years' of clinical experience, then scrutinize all data to ensure completeness and accuracy. Analysts also code each case for a variety of characteristics to produce granular data points. Therefore, the CBS database provided us with a large aggregated database that contains the level of granularity that we required for this study.

One of the characteristics that is coded in each case is whether a resident was directly involved, either as a defendant or identified as a team-member, in the litigation. In the case that a resident was dropped prior to resolution of the case, this was also included if the resident's action or inaction contributed to the litigated outcome, as determined by CBS analysts. We obtained data from CBS for all medical malpractice cases in which a resident physician was involved between 2007 and 2016. We analyzed the database by responsible service as defined by the specialty of the primary defendant. We then performed a sub-analysis consisting only cases in which a surgical service was involved. We also examined the major allegations and contributing factors for this cohort of cases. As per CBS coding protocol, each case can only have one major allegation, but may have multiple contributing factors. Lastly, we examined the type of defendants involved in the litigation.

Because this database does not contain data on individual cases and no identifiable information, this portion of the study was exempt from Institutional Review Board (IRB) oversight.

Survey

Prior to initiation of the survey portion of this study, IRB approval was obtained. A survey analysis of surgical trainees at a single institution was performed. The survey was anonymous and distributed to residents of all post-graduate levels. A total of 50 residents were included in the cohort. The majority of the trainees were general surgery residents, but post-graduate level 1 trainees also included preliminary residents from other surgical specialties

such as orthopedics, neurosurgery, otolaryngology, plastic surgery, and urology. The survey was created to assess baseline malpractice knowledge and the trainees' opinions regarding medical malpractice during training. The survey was distributed by email via a secure server (Qualtrics, Provo, UT). A common link was provided to all residents, so responses were anonymous. Results were collected, analyzed, and presented using RStudio version 1.0.153 (R Studio Inc, Boston, MA).

Results

Malpractice Results

A total of 57,744 cases were identified from the CBS database between 2007 and 2016. Of the total cases, 2353 (4%) cases identified a resident physician. These cases incurred a total of \$831.7 million indemnity paid (11% of \$7.5 billion total). Looking only at cases involving residents, 750 cases (32%) were filed against a surgical specialty, resulting in \$259 million indemnity paid. Of the surgical services, general surgery had the most number of cases at 188 cases. [Table 1](#) shows the breakdown of all surgical specialties.

Each case was coded to have one major allegation. Of the 750 total cases, there were 554 cases (74%) in which the major allegation was surgery-related. Specifically, the most common major allegation was for "improper performance of surgery", followed by "improper management of surgical patient". Though "improper performance of surgery" outnumbered "improper management of surgical patient", the latter's indemnity paid per case was much higher than the former's (\$525,871 versus \$275,044 per case). The allegation with the highest indemnity paid per case was "delay in surgery" (\$1,231,845 per case). [Table 2](#) shows a detailed breakdown of all major allegations within surgical services only. Of note, "resident/fellow supervision" was a major allegation in only 1 case, with \$0 indemnity paid.

Though each case only had one major allegation, they can have multiple contributing factors. The most common contributing factor was "clinical judgement", followed closely by "technical skill". Though only 1 case had house-staff supervision as a major allegation, 195 cases (26%) had house-staff supervision as a contributing factor. [Table 3](#) shows a detailed breakdown of all contributing factors.

The most common defendant was the hospital organization, which accounted for 85% of the 750 cases. However, each case can have multiple defendants. As such, staff attending defendants were involved in 59% of cases, and resident physicians were defendants in 18% of cases. There was a total of 192 resident defendants in 132 cases. For resident defendants, the total indemnity paid was \$8.5 million. The majority of these cases (149 residents, 101 cases) were dropped, denied, or dismissed. However, 35 defendants and 28 cases were settled. There were 6 defense verdicts and no plaintiff verdicts. [Table 4](#) shows a breakdown of all defendant types.

Survey Results

In our single institution, 32 residents (64%) responded to the survey. The majority of residents (68.75%) answered correctly that residents can be named as a major defendant in a medical malpractice case ([Graph 1](#)). 75% of residents were not aware of resources available to them in case of litigation ([Graph 2](#)), and 68.75% of residents judged their medico-legal knowledge as "poor" or "terrible" ([Graph 3](#)). 96.83% of residents believed the medico-legal curriculum is at least moderately important in their training ([Graph 4](#)). Lastly, when asked what the best way would be to deliver medicolegal knowledge, 33.96% of responses indicated formal lectures would be best, 26.42% indicated a boot-camp or

Table 1
Primary surgical services litigated against.

Responsible Service	Case Count	Percent Cases	Gross Indemnity Paid	Percent Gross Indemnity Paid	Indemnity Paid per Case
General Surgery	188	25%	\$56,475,272	22%	\$300,400
Orthopedic Surgery	167	22%	\$64,481,848	25%	\$386,119
Neurosurgery	86	11%	\$55,295,470	21%	\$642,971
Urologic Surgery	44	6%	\$8,722,530	3%	\$198,239
Otolaryngology	42	6%	\$15,912,121	6%	\$378,860
Vascular Surgery	34	5%	\$11,676,262	5%	\$343,419
Colorectal Surgery	28	4%	\$5,555,000	2%	\$198,393
Ophthalmology	27	4%	\$553,025	0%	\$20,482
Cardiac Surgery	23	3%	\$4,198,099	2%	\$182,526
Plastic Surgery	23	3%	\$4,471,000	2%	\$194,391
Podiatry	18	2%	\$185,000	0%	\$10,278
Thoracic Surgery	16	2%	\$6,345,000	2%	\$396,563
Transplant Surgery	14	2%	\$8,370,980	3%	\$597,927
Pediatric Surgery	12	2%	\$7,502,000	3%	\$625,167
Oncologic Surgery	7	1%	\$2,675,000	1%	\$382,143
Hand Surgery	7	1%	\$1,201,000	0%	\$171,571
Bariatric Surgery	7	1%	\$5,202,500	2%	\$743,214
Otorhinolaryngology (with Plastic Surgery)	5	1%	\$45,000	0%	\$9000
Surgery (Other)	2	0%	\$250,000	0%	\$125,000
Total	750	100%	\$259,117,107	100%	\$345,489

retreat-like activity would be best, and 16.98% indicated journal clubs would be best (Graph 5).

Discussion

In this study, we show that residents are involved with 4% of all malpractice cases. In line with previous studies, the surgical specialties entail the largest portion of these malpractice cases,^{2–4} with general surgery the most likely to be involved among the surgical specialties.⁸ The major allegation in these cases was most likely to be surgery-related, but allegations related to the perioperative care of the patient had the highest indemnity paid per case. Interestingly, resident or fellow supervision accounted for only one case out of 750 total cases and had no indemnity against it. However, 26% of cases cited supervision as a contributing factor in the litigation. Our survey analysis showed that the majority of general surgery residents at our institution believed that a medico-legal curriculum is important but rated their medico-legal knowledge as below average.

Previous studies have suggested that trainees are named as

defendants in up to 30% of medical malpractice claims.¹² In our study, we found that in surgery-related litigation with trainee involvement, residents were defendants in 18% of malpractice cases. Our analysis included all cases with any form of resident involvement, even if they were not directly named as a defendant. Like previous studies,⁸ we agree that any level of involvement of a resident in a medical malpractice proceeding likely has a profound emotional and educational impact on the trainee, and is therefore, worthwhile to examine. These types of cases also highlight the precarious situation of the other major stakeholders: attending physicians and academic hospitals. Previous studies have highlighted the fact that even if residents are not themselves held liable, their liability often extends to attending physicians and hospitals.¹³ In our analysis, however, only 1 case specifically noted house-staff supervision as the major allegation, resulting in no indemnity paid. In addition, house-staff supervision was cited as a contributing factor in 26% of cases. This may suggest that involvement of a resident in litigation is often not due to a lack of supervision, but for other reasons that may be modifiable through a robust medical malpractice curriculum aimed at trainees.

Table 2
Major allegations for surgical services.

Major Allegation	Case Count	Percent Cases	Gross Indemnity Paid	Percent Gross Indemnity Paid	Indemnity Paid per Case
Surgical Treatment	554	74%	\$208,045,780	80%	\$375,534
Improper Performance	289	39%	\$79,487,634	31%	\$275,044
Improper Management	208	28%	\$109,381,177	42%	\$525,871
Retained Foreign Body	33	4%	\$3,078,236	1%	\$93,280
Delay in Surgery	13	2%	\$16,013,980	6%	\$1,231,845
Other Surgical Allegation	10	1%	\$84,752	0%	\$8475
Unnecessary Surgery	1	0%	\$0	0%	\$0
Medical Treatment	77	10%	\$19,405,565	7%	\$252,033
Diagnosis Related	69	9%	\$19,513,791	8%	\$282,809
Medication Related	21	3%	\$9,652,471	4%	\$459,641
Safety & Security	9	1%	\$118,500	0%	\$13,167
Communication	4	1%	\$375,000	0%	\$93,750
Patient Monitoring	4	0%	\$0	0%	\$0
Anesthesia Related	4	1%	\$50,000	0%	\$12,500
Equipment Related	3	0%	\$185,000	0%	\$61,667
Resident/Fellow Supervision	1	0%	\$0	0%	\$0
Blood Products	1	0%	\$1,750,000	1%	\$1,750,000
Provider Behavior	1	0%	\$20,000	0%	\$20,000
Hospital Policy and Procedure	1	0%	\$0	0%	\$0
Obstetric Related	1	0%	\$0	0%	\$0
Total	750	100%	\$259,117,107	100%	\$345,489

Table 3
Contributing factors for surgical services.

Contributing Factor	Case Count	Percent Cases	Gross Indemnity Paid	Percent Gross Indemnity Paid	Indemnity Paid per Case
Clinical Judgement	488	65%	\$203,825,233	79%	\$417,675
Technical Skill	481	64%	\$158,678,803	61%	\$329,894
Communication	295	39%	\$106,472,349	41%	\$360,923
Documentation	207	28%	\$109,083,632	42%	\$526,975
House-Staff Supervision	195	26%	\$95,122,701	37%	\$487,809
Risk Mgmt. Issues	136	18%	\$39,054,190	15%	\$287,163
Administration	135	18%	\$59,490,920	23%	\$440,673
Behavior-Related	111	15%	\$25,318,255	10%	\$228,092
Clinical Environment	92	12%	\$52,649,596	20%	\$572,278
Clinical Systems	91	12%	\$41,289,385	16%	\$453,730
Equipment	31	4%	\$5,596,418	2%	\$180,530
Limited Information	13	2%	\$770,500	0%	\$59,269
Health Record	7	1%	\$370,000	0%	\$52,857
Insurance-Related	6	1%	\$5,807,500	2%	\$967,917
Unknown Issue	4	1%	\$250,000	0%	\$62,500
Environment	1	0%	\$0	0%	\$0

It is unsurprising that, in a cohort of surgical residents, the most likely allegations are surgery-related. However, allegations related to the management of surgical patients had larger amounts of indemnity paid than those allegations related to the performance of surgery. The “delay in surgery” allegation, which may represent perioperative decision-making or communication, had the highest indemnity paid per case. This suggests that perioperative care and decision-making is at least as important as intraoperative care, a conclusion also suggested by previous studies.⁸

Our survey results show that while residents at our institution rate their own medico-legal knowledge poorly, they do recognize the importance of such knowledge. Alarming, the majority of our residents are not aware of what resources are available to them if they are involved in a medical malpractice case. This may suggest that residents falsely believe that they are protected from litigation while in training, or at the very least, represents a deficiency in the current orientation procedures for trainees at our institution.

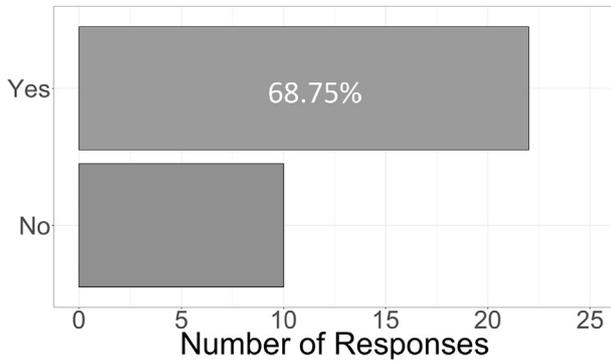
The need to decrease possible future litigation burden is especially important for surgical trainees. A large nationwide study showed that recent medical malpractice litigation is independently associated with depression and burnout, and that younger surgeons were significantly more likely to be involved in a recent malpractice litigation.⁵ Surgical trainees are an especially vulnerable population given the fact that 69% of surgical trainees already meet criteria for burnout.¹⁴ The burnout issue is not exclusive to surgery^{15,16} and the need to better prepare all trainees for possible future medical malpractice litigation exists.

Further work is needed to incorporate this nationwide malpractice data and the results of our survey into a medico-legal

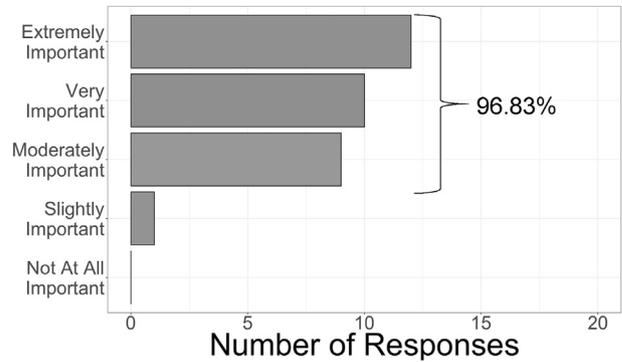
curriculum at our institution. An example of a curriculum can be found at New York University, where surgical trainees undergo an hour-long interactive professionalism seminar which consists of discussions on why malpractice claims are filed, the legal steps of a malpractice suit, how malpractice law affects residents, in-depth case reviews of specific claims, and recommendations on how to avoid litigation and what to do if residents are sued.¹⁷ The authors showed a significant improvement in residents’ understanding of the causes, process, and resolution of medical malpractice claims after undergoing this seminar.¹⁷ In addition to the topics covered in this example seminar, others have suggested the need to emphasize the importance of maintaining a strong patient-doctor relationship.¹⁸ Furthermore, some see the secretive nature of medical malpractice as detrimental to malpractice education, and have suggested that malpractice allegations be openly discussed to achieve maximal educational benefit.¹⁹ Several studies have applied simulation to medical malpractice education, most commonly with mock depositions.^{6,20,21} In order to fully immerse trainees in the medical malpractice environment, emergency medicine residents spent one week at a medical liability insurance company, reviewed multiple malpractice claims, and sat in on settlement discussions.²² Despite these studies, there is no consensus on the best method to deliver medico-legal knowledge to trainees. Somewhat surprising, our residents preferred formal lectures the most. However, a multi-modal approach to medical malpractice education may be the most effective for trainees. An ideal curriculum should combine basic medical malpractice knowledge (e.g. malpractice data, legal steps in medical malpractice) with simulation. Encouraging open discussion of medical

Table 4
Defendant types for surgical services.

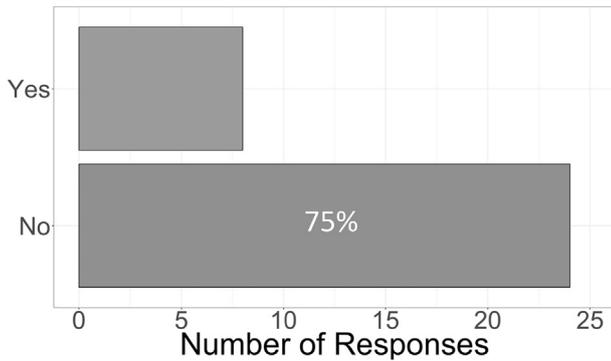
Defendant Type	Defendant Count	Percent Defendants	Case Count	Percent Cases	Gross Indemnity Paid	Percent Gross Indemnity Paid	Indemnity Paid per Case
Organization	820	40%	635	85%	\$178,938,740	69%	\$281,793
MD Staff	786	39%	444	59%	\$62,279,239	24%	\$140,269
MD Resident	192	9%	132	18%	\$8,520,379	3%	\$64,548
Dropped	149	7%	101	13%	\$0	0%	\$0
Settled	35	2%	28	4%	\$8,520,379	3%	\$304,299
Defense Verdict	8	0%	6	1%	\$0	0%	\$0
Plaintiff Verdict	0	0%	0	0%	\$0	0%	\$0
Employee	172	8%	98	13%	\$1,275,000	0%	\$13,010
MD Fellow	25	1%	22	3%	\$3,075,000	1%	\$139,773
Nurse	23	1%	15	2%	\$2,628,750	1%	\$175,250
Nurse Practitioner	8	0%	5	1%	\$1,000,000	0%	\$200,000
Physician Assistant	5	0%	5	1%	\$0	0%	\$0
Nurse Anesthetist	3	0%	3	0%	\$0	0%	\$0
Unknown	2	0%	2	0%	\$1,400,000	1%	\$700,000



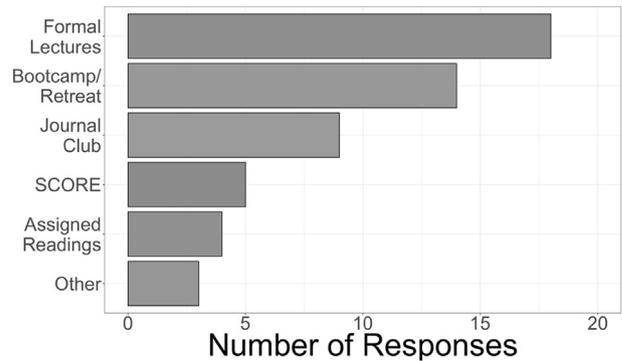
Graph 1. Survey Results – Can Residents be Major Defendants?.



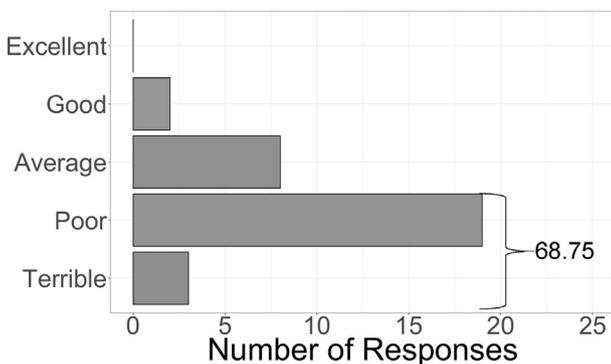
Graph 4. Survey Results – How Important is a Medico-Legal Curriculum?.



Graph 2. Survey Results – Do You Know What Resources Are Available to You in Case You are Involved in a Lawsuit?.



Graph 5. Survey Results – What is the Best Way to Establish a Medico-Legal Curriculum?.



Graph 3. Survey results – how well do you understand medico-legal ramifications?.

at large urban areas, where the medical malpractice environment may be different than rural areas. The CBS database also lacks specific details regarding each case that may be found in legal research databases. For example, the database does not include details on the specific circumstances in which house-staff supervision contributed to a litigated outcome. This limits our ability to target specific areas for curriculum development. A limitation to our survey is response bias and a low response rate of 64%. The residents who responded may already have an interest in the topic and it can be argued that residents who responded to the survey may be more knowledgeable about the topic than those who did not respond. If this is true, then even fewer residents may know that they can be a major defendant and what resources are available than what is currently shown in the survey results. This was also a single institution survey regarding a topic that may potentially have large variations across different programs and specialties. A large multi-specialty, nationwide survey would be more ideal. Though this would be very resource-intensive, it could potentially answer many questions on this important topic.

malpractice would also be beneficial and can be added to the weekly “morbidity and mortality” conferences that are common at academic institutions. However, this may require a shift in the secretive culture surrounding medical malpractice that is currently prevalent in medicine.

Conclusion

Limitations

The primary limitation of our study is that the CBS database encompasses only approximately 30% of all cases in the United States. Though the database collects data from a variety of sources, the majority of the data come from large academic medical centers and large community hospital groups. These hospitals may be more likely to have resident physicians, which can lead to an over-estimation in the data. These types of medical centers are also often

A significant number of medical malpractice claims involve resident physicians as a responsible party. The surgical specialties have the highest number of claims. While intraoperative allegations are most common, perioperative allegations have the highest indemnity paid per case. Trainees recognize medicolegal knowledge is important but currently do not have a sufficient standardized curriculum in surgical training. This represents a large knowledge gap in graduate medical training. A more comprehensive education platform is needed during residency training to

expose trainees to medical malpractice data, encourage responsible habits, provide resources in case of litigation, and hopefully, decrease the burden of litigation to the individual physician and the healthcare system in the future.

Acknowledgements

CRICO/CBS: Ellen Song, Jillian Skillings, Penny Greenberg.

Dr. Beiqun Zhao is supported by the T15 NLM/NIH Institutional Training Grants for Research Training in Biomedical Informatics and Data Science. Research reported in this publication was supported by the National Library of Medicine of the National Institutes of Health under Award Number T15LM011271. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

References

- Mello MM, Chandra A. National costs of the medical liability system. *Health Aff.* 2010;29(9):1569–1577. <https://doi.org/10.1377/hlthaff.2009.0807.National>.
- Jena AB, Seabury S, Lakdawalla D, Chandra A. Malpractice risk according to physician specialty. *N Engl J Med.* 2011;365(7):629–636. <https://doi.org/10.1056/NEJMsa1012370>.
- Deshpande SP, Deshpande SS. Factors impacting perceived threat of malpractice lawsuits by various medical specialists. *Health Care Manag (Frederick).* 2011;30(1):55–65. <https://doi.org/10.1097/HCM.0b013e3182078ba4>.
- Studdert DM, Bismark MM, Mello MM, Singh H, Spittal MJ. Prevalence and characteristics of physicians prone to malpractice claims. *Obstet Gynecol Surv.* 2016;71(5):289–290. <https://doi.org/10.1097/O1.0gx.0000482187.57102.06>.
- Balch CM, Oreskovich MR, Dyrbye LN, et al. Personal consequences of malpractice lawsuits on american surgeons. *J Am Coll Surg.* 2011;213(5):657–667. <https://doi.org/10.1016/j.jamcollsurg.2011.08.005>.
- Guerges M, Slama E, Zayadin Y, Kieninger A. Use of a mock deposition program to improve resident understanding of the importance of documentation. *Am J Surg.* 2017;213(5):885–887. <https://doi.org/10.1016/j.amjsurg.2017.03.010>.
- Schleifer KE. When are residents treated as doctors under the law? *Am Med Assoc J Ethics.* 2009;11(11):882–885. <https://doi.org/10.1001/virtualmentor.2010.12.8.medu1-1008>.
- Thiels CA, Choudhry AJ, Ray-Zack MD, et al. Medical malpractice lawsuits involving surgical residents. *JAMA Surg.* 2018;153(1):8–13. <https://doi.org/10.1001/jamasurg.2017.2979>.
- Helms LB, Helms CM. Forty years of litigation involving residents and their training: II. Malpractice issues. *Acad Med.* 1991;66(12):718–725. <https://doi.org/10.1097/00001888-199112000-00002>.
- Wegman B, Stannard JP, Bal BS. Medical liability of the physician in training. *Clin Orthop Relat Res.* 2012;470(5):1379–1385. <https://doi.org/10.1007/s11999-012-2244-4>.
- Miller LA. The national practitioner Data Bank: a primer for clinicians. *J Perinat Neonatal Nurs.* 2011;25(3):224–225. <https://doi.org/10.1097/JPN.0b013e3182257331>.
- Studdert DM, Mello MM, Gawande AA, et al. Claims, errors, and compensation payments in medical malpractice litigation. *N Engl J Med.* 2006;354(19):2024–2033. <https://doi.org/10.1056/NEJMsa054479>.
- Kachalia A, Studdert DM. Professional liability issues in graduate medical education. *JAMA.* 2004;292(9):1051–1056.
- Elmore LC, Jeffe DB, Jin L, et al. National survey of burnout among US general surgery residents. *J Am Coll Surg.* 2016;223(3):440–451. <https://doi.org/10.1016/j.jamcollsurg.2016.05.014.National>.
- Thomas NK. Resident burnout. *JAMA.* 2004;292(23):2880–2889. <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med4&NEWS=N&AN=12379080>.
- Shanafelt T, et al. Burnout and self-reported patient care in an internal medicine residency program. *Ann Intern Med.* 2002;136(5):358–367. <https://doi.org/10.7326/0003-4819-136-5-200203050-00008>.
- Hochberg MS, Seib CD, Berman RS, Kalet AL, Zabar SR, Pachter HL. Malpractice in an academic medical center: a frequently overlooked aspect of professionalism education. *Acad Med.* 2011;86(3):365–368. <https://doi.org/10.1097/ACM.0b013e3182086d72>.
- Akwari AM. More thoughts about residents' professionalism education in malpractice. *Acad Med.* 2011;86(10):1192–1193. <https://doi.org/10.1097/ACM.0b013e31822be60a>.
- Alper EJ, Wachter RM. Commentary: medical malpractice and patient safety: tear down that wall!. *Acad Med.* 2011;86(3):282–284. <https://doi.org/10.1097/ACM.0b013e3182086f14>.
- Walsh K. Simulation is the way to bring risk management and patient safety together. *Acad Med.* 2011;86(10):1193–1194. <https://doi.org/10.1097/ACM.0b013e31822be60a>.
- Schlicher NR, Ten Eyck RP. Medical malpractice: utilization of layered simulation for resident education. *Acad Emerg Med.* 2008;15(11):1175–1180. <https://doi.org/10.1111/j.1553-2712.2008.00165.x>.
- Houry D, Shockley LW. Evaluation of a residency Program's experience with a one-week emergency medicine resident rotation at a medical liability insurance company. *Acad Emerg Med.* 2001;8(7):765–767. <https://doi.org/10.1111/j.1553-2712.2001.tb00203.x>.