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Nature of Medical Malpractice Claims Against Radiation Oncologists

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Abstract

Purpose/Objective(s)—We examined characteristics of medical malpractice claims involving radiation oncologists closed during a 10-year period.

Methods and Materials—Malpractice claims filed against radiation oncologists from 2003 to 2012 collected by a nationwide liability insurance trade association were analyzed. Outcomes included the nature of claims and indemnity payments, including associated presenting diagnoses, procedures, alleged medical errors, and injury severity. We compared the likelihood of a claim resulting in payment in relation to injury severity categories (death as referent) using binomial logistic regression.

Results—There were 362 closed claims involving radiation oncology, 102 (28%) of which were paid, resulting in \$38 million in indemnity payments. The most common alleged errors included: 'improper performance' (38% of closed claims, 18% were paid; 29% [\$11 million] of total indemnity); 'errors in diagnosis' (25% of closed claims, 46% were paid; 44% [\$17 million] of total indemnity); and, 'no medical misadventure' (14% of closed claims, 8% were paid; less than 1% [\$148,000] of total indemnity). Another physician was named in 32% of claims, and consent issues/breach of contract were cited in 18%. Claims for injury resulting in death represented 39% of closed claims and 25% of total indemnity. 'Improper performance' was the primary alleged error associated with injury resulting in death. Compared to claims involving death, major

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temporary injury (OR 2.8, 95% CI 1.29–5.85, $P=0.009$), significant permanent injury (OR 3.1, 1.48–6.46, $P=0.003$) and major permanent injury (OR 5.5, 1.89–16.15, $P=0.002$) had higher likelihood of a claim resulting in indemnity payment.

Conclusions—Improper performance was the most common alleged malpractice error. Claims involving significant or major injury were more likely to be paid than those involving death. Insights into the nature of liability claims against radiation oncologists may help direct efforts to improve quality of care and minimize the risk of being sued.

Summary

This study is the first systematic analysis on the nature of medical malpractice claims against radiation oncologists. We analyzed 10 years of such claims using a nationwide data-base. We describe the nature of malpractice claims and indemnity payments, associated presenting diagnoses, procedures, alleged medical errors, and injury severity. We then discuss the implications of these claims for improving the quality of care and patient safety, and minimizing the risk of being sued.

Introduction

Being sued for medical malpractice is a serious concern for most physicians¹. Fear of malpractice can change how physicians practice medicine², and the personal toll of malpractice litigation is strongly associated with physician burnout³. A national study of more than 40,000 physicians estimated that by the age of 65 years, depending on their specialty, 75%–99% of physicians will have faced a medical malpractice claim⁴.

Radiation oncology is a field with rapidly advancing technology, which may introduce opportunity for error. A recent study of the United States Food and Drug Administration (FDA) data on device-associated adverse events in radiation oncology found that these events have increased over time, and they occur sooner after device manufacture compared to other devices⁵. Linear accelerators are the top product recalled by the FDA⁶. The field of radiation oncology has also attracted national attention in recent years due to catastrophic radiation errors and misadministrations^{7–10}. Adding to this, a recent study reported that medical error is the third most common cause of death in the United States¹¹.

Analyses of malpractice claims may provide insight for physicians and organizations interested in improving patient safety, reducing medical errors, and preventing malpractice lawsuits. An important part of reducing legal risk to physicians is to understand why people sue¹². A recent population-based study of malpractice claims involving radiation oncologists found that these claims are not common and have declined in recent years¹³. However, this study also found that indemnity payments in radiation oncology are large relative to other specialties, and the risk of being sued is relatively high compared to other nonsurgical specialties. There are no comprehensive analyses of the alleged issues raised and outcome severity in radiation oncology malpractice claims. Existing studies are limited to small descriptive reviews of malpractice claims from a single expert reviewer¹⁴ and a series of prostate brachytherapy-associated legal claims¹⁵. Another recent report¹⁶ looked only at

radiation oncology cases adjudicated in court, which represent only 8% of all filed malpractice claims¹⁷.

We therefore analyzed closed claims against radiation oncologists to determine in detail the characteristics of such events with the rate and value of indemnity payments.

Materials and Methods

We performed a retrospective analysis of medical liability claims data from the Physician Insurers Association of America (PIAA) that identified a radiation oncologist as the defendant between January 1, 2003 and December 31, 2012. The PIAA is a non-profit trade association representing medical professional liability insurance companies who insure more than two-thirds of private practice physicians in the United States^{18,19}. The PIAA Data Sharing Project (DSP) is a database containing information on over 278,000 closed medical liability claims from 25 participating companies, representing the largest independent database of medical liability claims with specialty-specific data^{18,19}.

Primary outcome variables were the number of closed claims, number of paid claims, percentage of closed claims resulting in indemnity payment to the plaintiff, and average indemnity payment. A "claim" was defined as any written demand for monetary compensation by a patient or patient's family stemming from an alleged injury during the patient's medical care by the insured clinician. Closed claims are medical liability claims that have been resolved through settlement or verdict or withdrawn, dropped, or dismissed without payment. Adjudicatory outcomes included "no indemnity" and "paid claims" to the plaintiff as a result of settlement or adjudication at varying levels of "claim severity". Percentage paid of closed claims refers to the percentage of all closed claims that were paid to the plaintiff as a result of settlement or court adjudication. Total indemnity is the sum of all indemnity payments during the period. Average indemnity is the mean amount of award for paid claims during the period.

We compared outcomes by the most prevalent nature of closed claims, including associated presenting diagnosis, associated procedure, alleged medical error, and injury severity. Diagnoses and procedures are coded according to the International Classification of Diseases, 9th revision, Clinical Modification (ICD-9)²⁰. The PIAA receives coded data from reporting companies using standardized definitions. "Alleged medical error" signifies an unexpected event triggering a claim, including errors in diagnosis, treatment, procedure performance, supervision, timeliness, and "no medical misadventure". "No medical misadventure" is: "a code used in the absence of a medical mishap. If a claim has no medical misadventure, but is felt to have legal merit, there is an appropriate associated issue designated in the database. These can be problems with records, consent issues, laboratory issues, or even assault or battery, abandonment, etc."¹⁸.

Injury severity was defined by the National Association of Insurance Commissioners (NAIC) severity scale²¹. Temporary injuries included: emotional injury only (such as fright; no physical damage); insignificant injury (lacerations, minor scars or rash; no delay in recovery); minor injury (infection, fracture set improperly or fall in the hospital; complete

but delayed recovery); and major injury (burns, surgical material left, drug side effect or brain damage; complete but delayed recovery). Permanent injuries included: minor injury (loss of fingers or loss or damage to organs; injury is not disabling); significant injury (deafness, loss of limb, loss of eye or loss of one kidney or lung); major injury (paraplegia, blindness, loss of two limbs or brain damage); grave injury (quadriplegia, severe brain damage, life-long care or fatal prognosis); and death.

Analyses included the top five to ten most prevalent characteristics in each category. We compared the likelihood of a claim resulting in payment between injury severity categories and death as the reference category using binomial logistic regression to estimate the odds ratio. All tests were performed using $\alpha=0.05$ and 95% confidence intervals. Statistical analyses were conducted using SPSS, version 23.0 (IBM Corp., Armonk, NY).

Results

Between 2003 and 2012, there were 362 closed claims involving radiation oncologists, 102 (28%) of which were paid, resulting in \$38 million in indemnity payments [Table 1]. Average and median indemnity payments were \$372,468 and \$250,000, respectively. The average indemnity payment in radiation oncology was 14% greater than the average indemnity payment for claims against all specialties.

Most claims involved radiation oncologists ages 45–54 years (49%), compared to 35% in that age group among all specialties. Fourteen percent of radiation oncologists had prior claims experience versus 29% in all specialties. Additional demographic data is available in eTable 1.

Alleged errors

The most common alleged errors included: “improper performance” (38% of closed claims); “errors in diagnosis” (25% of closed claims); and, “no medical misadventure” (14% of closed claims) [Table 2].

Only 8% of “no medical misadventure” claims were paid. Average indemnity for these claims was less than 10% of the average indemnity for claims citing improper performance or diagnostic errors, and was the lowest for all alleged errors.

Diagnosis

The largest proportions of closed claims attributable to a single diagnosis were for malignant breast, prostate, and lung cancers (6% of claims in each diagnosis). The largest proportion of closed claims by diagnosis overall was for the category “malignant neoplasms of the back, flank, or trunk, origin unspecified”, likely representing metastases (7%).

Procedures

Radiation therapy comprised the predominant procedure in 43% of closed claims (20% were paid; 34% of total indemnity). Claims involving a diagnostic interview, evaluation, or consultation comprised 5% of closed claims (22% were paid). The remaining procedures were mostly relating to diagnostic imaging.

Associated Personnel

The top 3 categories of personnel associated with closed claims were “other physician” (32%), “radiologist” (6%), and “technician” (2%), Table 3. All other categories of associated personnel represented less than 1% of closed claims each.

Associated Medical-Legal Issue

The top 3 medical-legal issues associated with closed claims were “consent issues or breach of contract” (18%), “other” (14%), and “none” (8%), Table 3. All other associated medical-legal issues represented less than 2% of closed claims each.

Alleged Errors by Procedure

“Improper performance” was most commonly associated with radiation therapy procedures (27% of closed claims). Additional procedures associated with this alleged error (each comprising 1% of closed claims) included operative procedures, injections and vaccinations, CT, and diagnostic interview or evaluation or consultation (Table 4).

Alleged Errors by Presenting Diagnoses

The most common presenting diagnosis for “error in diagnosis” was invasive lung cancer (2% of closed claims; 25% were paid) (Table 4). Alleged errors of “no medical misadventure” were most commonly associated with a diagnosis of invasive breast cancer (2% of closed claims; none were paid). Failure to supervise or monitor a case was most commonly associated with a diagnosis of prostate cancer (1% of closed claims; 67% were paid).

Injury Severity

Analysis of closed claims by injury severity (Figure 1, Table 5) show emotional injury only and insignificant injury representing a small proportion of claims (1% and 4% of closed claims; less than 1% and 0% of total indemnity, respectively). Death (40% of closed claims, 25% of total indemnity) represents the largest proportion of closed claims and total indemnity. Besides death, the injury severities with the highest proportion of closed claims were minor permanent injury (14%), significant permanent injury (12%), and major temporary injury (11%). The highest proportions of total indemnity besides death were also seen in these categories. Average indemnity payments for major permanent injury and grave injury were the highest among all injury categories (Figure 1). The proportion of claims resulting in payment for death was 19%, compared to 56% for major permanent injury, 42% for significant permanent injury, and 25% for emotional injury. The odds of a closed claim being paid were significantly higher for claims alleging major temporary injury (OR 2.8, 1.29–5.85, $P=0.009$), significant permanent injury (OR 3.1, 1.48–6.46, $P=0.003$) and major permanent injury (OR 5.5, 1.89–16.15, $P=0.002$) when compared with death (Table 5). The top five alleged medical errors by injury severity are shown in eTable 2.

Injury Severity by Presenting Diagnoses

Invasive malignancy of the female breast was the most frequent presenting diagnosis for emotional, insignificant, major temporary, and all permanent injuries (eTable 3). Emotional

and insignificant injury severities were also associated with benign neoplasms and non-cancer diagnoses, including spinal stenosis, sciatica, and keloid. Prostate cancer was the most common diagnosis for minor and significant permanent injury. Vertebral column fractures and invasive lung cancer were the most common diagnoses in grave injury. The most common diagnoses in death included invasive lung cancer and neoplasms of the back, flank or trunk, origin unspecified.

Discussion

To our knowledge, this is the first comprehensive analysis on the nature of malpractice claims against radiation oncologists in the US. The most common alleged error was improper performance, most frequently involving radiation therapy; this refers to claims where a physician's action(s) resulted in a procedure being performed incorrectly²², for example misplaced prostate brachytherapy seeds resulting in rectal toxicity¹⁵ or forgetting a spinal cord block, resulting in radiation myelitis¹⁶. Improper performance claims also carried the highest average indemnity payment among the most frequent alleged errors. Reported error rates in radiation therapy are low (fewer than 2% of treatments)^{23–29}, and studies suggest these events are decreasing over time^{30,31} along with malpractice claims against radiation oncologists¹³. When errors do occur, most relate to human error or human-software interface^{25,28,32}, especially among incidents with the potential to cause serious clinical harm³¹. Treatment planning and delivery is complex and requires coordination among multiple physicians, personnel, and systems³⁰. While advances in radiation techniques and technology can reduce radiation-related errors²⁷, increased treatment complexity can introduce new pathways for error^{5,31,33}. Errors that do result in clinical harm are typically linked to systematic flaws^{34,35}, initiating a push toward quality standards and non-punitive reporting and incident learning^{16,36–38} such as those from the American College of Radiology (ACR)³⁹, American Society for Radiation Oncology (ASTRO)'s Target Safely campaign, and the Radiation Oncology Incident Learning System (RO-ILS)³⁶. In addition to improving patient safety, these efforts may reduce malpractice risk for radiation oncologists.

Error in diagnosis was the second most common alleged malpractice error, with diagnostic imaging comprising a substantial portion of claim-associated procedures. In addition, 46% of closed claims related to diagnostic errors were paid, consistent with diagnostic error as the most common reason for paid malpractice claims in the outpatient setting⁴⁰. A single expert's review of 20 radiation oncology malpractice suits found that delayed diagnosis was the most common allegation¹⁴. Current literature implicates diagnostic error in 80,000 deaths per year⁴¹. Diagnostic errors are multifactorial, arising from multiple systematic process breakdowns and involving multiple providers⁴², which may be why another physician or radiologist was named in 38% of claims. Among diagnostic error claims in our analysis, the most common diagnosis was lung cancer. In a study of malpractice claims filed by lung cancer patients, failure to diagnose was the most common reason patients sued their physicians, often attributed to misinterpretation of imaging⁴³. Modern radiation oncology relies critically on image guidance and interpretation, which may increase the likelihood of misdiagnosis. For example, one case tried in court involved a radiation oncologist's alleged failure to recognize a sigmoid colon cancer on a simulation CT for treating prostate

cancer¹⁶. Another case involved failure to diagnose prostate cancer bone metastases¹⁶. Radiation oncologists may also be implicated in misdiagnosis claims of incidental, non-oncologic conditions (such as appendicitis and aortic aneurysm in the current series). While clinical practice of radiation oncology is generally confined to therapeutic interventions, it is critical to evaluate patients with a thorough differential diagnosis and properly triage/work-up incidental imaging findings.

Death was the most common outcome associated with radiation oncology malpractice claims, which mirrors prior studies of malpractice suits in general^{40,44}. In the current study, death-related claims had a lower average indemnity payment and lower percentage of paid claims than other injury categories. Claims involving major temporary injury, major permanent injury and significant permanent injury were significantly more likely to be paid than when patient death was the outcome. Average indemnity payment was highest for claims of major permanent or grave injury. This interesting finding may be a function of cancer's unique disease course. A successful claim for the plaintiff depends on the degree to which the patient's injury was caused by negligent care. Death seems far more likely to result from progression of the cancer itself than from a complication of treatment, and hence establishing physician culpability for this event is more difficult. The competing risk of cancer death may also reduce the likelihood that physician negligence changes the patient's outcome. It may be harder to prove sustained economic damages for patients with a shorter life expectancy⁴³. Alternatively, there is more time and evidence to prove the physical and economic burden of the medical error for a patient who sustains a major injury resulting in intensive medical care, suffering, and expensive medical bills, resulting in more claims paid and higher indemnity payments⁴³. These findings parallel those from anesthesia malpractice literature, where the largest indemnity payments are typically for major injury sustained by relatively healthy patients. This realization has driven efforts to improve safety in that cohort⁴⁵.

The largest proportion of closed claims by diagnosis was for neoplasms with unspecified origin, likely representing metastases. This is not surprising in view of estimates that approximately half of all radiotherapy is prescribed with palliative intent²⁹. What was unexpected was that none of these claims were paid. This again may reflect a tendency to discount the physician's ability to influence the outcome for patients with poor prognosis and limited life expectancy. Malignant breast, prostate, lung, and colorectal cancers were the most common identified diagnoses among malpractice claims, consistent with these diagnoses being the most common primary cancers for patients receiving radiation therapy in recent years⁴⁶. Failure to supervise or monitor a case was most commonly associated with prostate cancer, which may involve prostate brachytherapy. Failed prostate brachytherapy procedures have been well-publicized^{8,47}, and in a review of 13 prostate brachytherapy malpractice cases the allegation was typically breach of standard of care¹⁵. Claims of emotional and insignificant injury were often associated with benign diagnoses in our study, while more severe injuries were most often associated with cancer diagnoses. This may reflect the lower doses used to treat patients with benign disease (e.g., for prevention of heterotopic ossification following total hip replacement) and hence the lower physical likelihood of radiation therapy causing harm, but the reasons are not fully clear.

The most common associated medical or legal issue involved consent issues or breach of contract. As part of informed consent, the physician has a duty to disclose any “unusual dangers incident to the proposed treatment”⁴⁸. Issues with consent render the physician subject to liability for battery, and lack of informed consent has been shown to reinforce claims of medical malpractice⁴⁹. Failures of this contract to protect both the patient and physician have inspired a push for legislative reform⁵⁰. Current legal concepts of informed consent may not value the balance of patient autonomy and physician expertise⁵⁰. Some argue that adoption of shared decision-making would enable physicians and patients to both give and receive the most appropriate and effective care. This concept of patient-centered care is a common theme in the malpractice literature, which has shown that satisfied patients who engage in honest communication with their physician are less likely to sue^{12,51}.

Ultimately, having an open and trusting relationship between the physician and patient is central in protecting the physician against malpractice claims^{53,54}. This emphasis on open communication has already been incorporated into other training programs⁵², thus radiation oncology should integrate similar training along with emphasizing diagnosis issues, patient safety, and incident learning efforts.

Limitations of this study stem from the PIAA Data Sharing Project (DSP) source data. The PIAA reports information on a per claim basis, so there is lack of reliable exposure data (number of physicians at risk of being sued). Given this database represents private physicians, these findings may not be generalizable to academic practices. Also, the PIAA reports data in aggregate form to maintain physician anonymity, which limits our ability to perform complex analyses including time trends. While there may be errors inherent to the dataset that we could not account for, PIAA member companies have strict guidelines for consistency and uniformity in data collection and reporting. Furthermore, other studies have found consistency between PIAA aggregate data and available case information for malpractice litigation, suggesting that PIAA data are reliable for analyzing malpractice liability claims⁴³. The PIAA has the most detailed data available for describing the characteristics of malpractice claims specific to a single specialty as well as those claims that did not result in a payment, compared with other data-sourced references^{55,56}. Finally, given the estimate that 8 times as many patients suffer an injury from medical negligence as file a malpractice claim, the current findings are not a fully representative sample of all radiation oncology medical errors. Studies incorporating data from malpractice claims with analyses from near-misses, quality assurance and incident learning systems^{16,36–38} will give a more complete picture of potential sources of patient harm in radiation oncology and how to reduce them.

Conclusions

We found that improper performance and diagnostic error were the most common outcomes associated with malpractice claims filed against radiation oncologists. Outcomes leading to death were the most common reason for filing a claim, but injuries with greater severity resulted in the highest indemnity and were the most likely to result in payment. Claims for emotional or insignificant injuries and/or no medical misadventure were least likely to be paid. However, radiation oncologists should not underestimate the power of patient trust and satisfaction with their provider relationship in protecting against malpractice claims. These

insights into the nature of liability claims against radiation oncologists can help inform and further current nationwide efforts to improve quality of care and reduce malpractice risk.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.

Average indemnity payment in US dollars (USD) and percentage paid of radiation oncology closed claims by injury severity, 2003–2012. Vertical bars represent average indemnity payments. Small triangles show the percentage of all closed claims in that category that were paid to the plaintiff as a result of settlement or court adjudication. Injury severity was defined by the National Association of Insurance Commissioners severity scale²¹.

Table 1

Closed claims and indemnity payments by specialty, 2003–2012

Medical specialty	Closed claims [*]	Paid claims (percentage paid of closed claims, %) [†]	Total indemnity payment, USD [*]	Average indemnity payment, USD [§]	Median indemnity payment, USD	Largest indemnity payment, USD
Radiation oncology	362	102 (28)	37,991,714	372,468	250,000	2,000,000
All specialties	96,454	25,333 (26)	8,220,528,193	325,914	200,000	13,000,000

^{*} Closed claims are medical liability claims that have been resolved through settlement or verdict or withdrawn, dropped or dismissed without payment.

[†] Paid Claims are medical liability claims that resulted in indemnity payment to the plaintiff as a result of settlement or court adjudication. Percentage paid of closed claims refers to the percentage of all closed claims that were paid to the plaintiff as a result of settlement or court adjudication.

[‡] Total indemnity is the sum of all indemnity payments during the period in US Dollars (USD).

[§] Average indemnity is the mean amount of award for paid claims during the period in US Dollars (USD)

Table 2

Radiation oncology closed claims by top 10 alleged errors, presenting diagnoses, and procedures, 2003–2012

Characteristic Type	10 Most Prevalent Characteristics	Closed claims, no. (percent) [N=362]	Paid claims, no. (percent) [N=102]	Percentage paid of closed claims	Total indemnity, USD (percent) [Overall Total= \$37,991,714]	Average indemnity, USD
Alleged error	Improper performance (n=138)	138 (38)	25 (25)	18%	11,202,666 (29)	448,107
	Errors in diagnosis (n=91)	91 (25)	42 (41)	46%	16,834,455 (44)	400,820
	No medical misadventure (n=50)	50 (14)	4 (4)	8%	148,000 (<1)	37,000
	Failure to supervise or monitor care (n=15)	15 (4)	5 (5)	33%	1,282,500 (3)	256,500
	Failure to recognize a complication of treatment (n=13)	13 (4)	4 (4)	31%	1,047,155 (3)	261,789
	Failure/delay in referral or consultation (n=12)	12 (3)	6 (6)	50%	2,285,000 (6)	380,833
	Wrong patient or body part (n=8)	8 (2)	5 (5)	63%	1,335,000 (4)	267,000
	Medication errors (n=7)	7 (2)	2 (2)	29%	650,000 (2)	325,000
	Surgical foreign body left in patient after procedure (n=5)	5 (1)	3 (3)	60%	172,938 (<1)	57,646
	Improper supervision of residents/other staff (n=5)	5 (1)	1 (1)	20%	50,000 (<1)	50,000
Totals for top 10 (n=344)		344 (95)	97 (95)	28%	35,007,714 (92)	360,904
Presenting diagnosis	Malignant neoplasms of the back, flank, or trunk, origin unspecified* (n=24)	24 (7)	0 (0)	0%	0 (0)	0
	Malignant neoplasms of the female breast (n=23)	23 (6)	3 (3)	13%	445,204 (1)	148,401
	Malignant neoplasms of the prostate (n=22)	22 (6)	8 (8)	36%	4,740,000 (12)	592,500
	Malignant neoplasms of the bronchus and lung (n=21)	21 (6)	2 (2)	10%	465,000 (1)	232,500
	Malignant neoplasms of the colon and rectal region (n=17)	17 (5)	3 (3)	18%	2,350,000 (6)	783,333
	Malignant neoplasms of pancreas (n=17)	17 (5)	3 (3)	18%	811,666 (2)	270,555
	Fracture of vertebral column (n=9)	9 (2)	6 (6)	67%	3,500,000 (9)	583,333
	Aortic aneurysm (n=6)	6 (2)	1 (1)	17%	280,000 (1)	280,000
	Malignant neoplasms of the brain (n=6)	6 (2)	1 (1)	17%	599,000 (2)	599,000
	Malignant neoplasms of the cervix (n=6)	6 (2)	0 (0)	0%	0 (0)	0
Totals for top 10 (n=151):		151 (42)	27 (26)	18%	13,190,870 (35)	488,551

Characteristic Type	10 Most Prevalent Characteristics	Closed claims, no. (percent %) [N=362]	Paid claims, no. (percent %) [N=102]	Percentage paid of closed claims	Total indemnity, USD (percent %) [Overall Total= \$37,991,714]	Average indemnity, USD
Procedure						
	Radiation therapy procedures, including radioisotopes [‡] (n=156)	156 (43)	31 (30)	20%	12,813,665 (34)	413,344
	Computerized axial tomography (CAT scan) (n=30)	30 (8)	10 (10)	33%	5,396,500 (14)	539,650
	Diagnostic radiologic procedures, excluding CAT scan and contrast material (n=20)	20 (6)	10 (10)	50%	4,387,000 (12)	438,700
	Diagnostic interview or evaluation or consultation (n=18)	18 (5)	4 (4)	22%	1,772,500 (5)	443,125
	Mammography (n=17)	17 (5)	10 (10)	59%	4,272,205 (11)	427,221
	Chest x-ray (n=13)	13 (4)	5 (5)	38%	972,500 (3)	194,500
	Injectons and vaccinations (n=12)	12 (3)	1 (1)	8%	67,156 (<1)	67,156
	Magnetic resonance imaging (n=11)	11 (3)	5 (5)	45%	990,000 (3)	198,000
	Diagnostic radiologic procedures, using contrast material (n=8)	8 (2)	5 (5)	63%	993,500 (3)	198,700
	Diagnostic ultrasound (n=8)	8 (2)	2 (2)	25%	1,195,000 (3)	597,500
<i>Totals for top 10 (n=293):</i>		293 (81)	83 (81)	28%	32,860,026 (86)	395,904

* Defined by PIAA as "Malignant neoplasms of the back, flank, or trunk, point of origin unspecified"

[‡] Defined by PIAA as "Radiation therapy, nuclear medicine and radioisotopic studies"

Table 3
Radiation oncology closed claims by associated personnel and associated medical or legal issue, 2003–2012

Characteristic	Personnel/Issue	Closed claims, no. (percent %) [N=362]	Paid claims, no. (percent %) [N=102]	Percentage paid of closed claims	Total indemnity, USD (percent %) [Overall Total=\$37,991,714]	Average indemnity, USD
Associated personnel *						
	Other physician	117 (32)	11 (11)	9%	4,744,999 (12)	431,364
	Radiologist	20 (6)	3 (3)	15%	1,607,500 (4)	535,833
	Technician	7 (2)	3 (3)	43%	355,000 (1)	118,333
	Consultant	3 (1)	1 (1)	33%	360,000 (1)	360,000
	Other person or personnel	3 (1)	0 (0)	0%	0 (0)	0
	Emergency medicine physician	3 (1)	1 (1)	33%	360,000 (1)	360,000
	Other therapist	2 (1)	0 (0)	0%	0 (0)	0
	Pathologist	2 (1)	0 (0)	0%	0 (0)	0
	Physician's assistant	2 (1)	0 (0)	0%	0 (0)	0
	Nurse	2 (1)	0 (0)	0%	0 (0)	0
	Nurse practitioner	1 (<1)	1 (1)	100%	80,000 (<1)	80,000
	Manufacturer of drug or equipment	1 (<1)	0 (0)	0%	0 (0)	0
	Physical therapist	1 (<1)	1 (1)	100%	38,000 (<1)	38,000
	Other office personnel	1 (<1)	0 (0)	0%	0 (0)	0
	Nurse anesthetist	1 (<1)	0 (0)	0%	0 (0)	0
	<i>Totals:</i>	<i>166 (46)</i>	<i>21 (21)</i>	<i>13%</i>	<i>7,545,499 (20)</i>	<i>359,309</i>
Associated medical/legal issue *						
	Consent issues or breach of contract	65 (18)	3 (3)	5%	1,699,583 (4)	566,528
	Other	49 (14)	9 (9)	18%	3,253,469 (9)	361,497
	None	29 (8)	5 (5)	17%	797,999 (2)	159,600
	Vicarious liability	7 (2)	3 (3)	43%	137,500 (<1)	45,833
	Problems with a patient's history, exam, or work-up	7 (2)	1 (1)	14%	400,000 (1)	400,000
	Communication between providers	5 (1)	0 (0)	0%	0 (0)	0

Characteristic	Personnel/Issue	Closed claims, no. (percent %) [N=362]	Paid claims, no. (percent %) [N=102]	Percentage paid of closed claims	Total indemnity, USD (percent %) [Overall Total=\$37,991,714]	Average indemnity, USD
	Equipment malfunction or utilization problem	4 (1)	2 (2)	50%	663,500 (2)	331,750
	Unnecessary treatment	2 (1)	0 (0)	0%	0 (0)	0
	Res ipsa loquitur - self evident [†]	2 (1)	0 (0)	0%	0 (0)	0
	X-ray error	2 (1)	1 (1)	50%	5,000 (<1)	5,000
	Punitive damages	2 (1)	1 (1)	50%	6,250 (<1)	6,250
	Lack of adequate facilities or equipment	1 (<1)	0 (0)	0%	0 (0)	0
	Premature discharge from institution	1 (<1)	0 (0)	0%	0 (0)	0
	Breach of confidentiality	1 (<1)	0 (0)	0%	0 (0)	0
	Laboratory error	1 (<1)	0 (0)	0%	0 (0)	0
	Complementary or alternative medicine	1 (<1)	0 (0)	0%	0 (0)	0
	Abandonment	1 (<1)	0 (0)	0%	0 (0)	0
<i>Totals:</i>		180 (50)	25 (25)	14%	6,963,301 (18)	1,876,458

* Up to three associated issues can be reported for each record.

[†] In tort law, *res ipsa loquitur* refers to assuming negligence based on the very nature of the plaintiff's injury

Table 4
Radiation oncology closed claims by top five procedures or presenting medical conditions, 2003–2012

Alleged error	Top 5 procedures/presenting medical conditions	Closed claims, no. (percent) [N=362]	Paid claims, no. (percent) [N=102]	Percentage paid of closed claims	Total indemnity, USD (percent) [Overall Total= \$37,991,714]	Average indemnity, USD
Improper performance						
	Radiation therapy procedures, including radioisotopes *	97 (27)	13 (13)	13%	7,699,166 (20)	592,244
	Operative procedures involving blood vessels, excluding heart	5 (1)	2 (2)	40%	500,000 (1)	250,000
	Injections and vaccinations	4 (1)	0 (0)	0%	0 (0)	0
	Computerized axial tomography (CAT scan)	4 (1)	1 (1)	25%	987,500 (3)	987,500
	Diagnostic interview or evaluation or consultation	4 (1)	2 (2)	50%	375,000 (1)	187,500
	<i>Totals for top 5:</i>	<i>114 (31)</i>	<i>18 (18)</i>	<i>16%</i>	<i>9,561,666 (25)</i>	<i>531,204</i>
Errors in diagnosis						
	Malignant neoplasms of the bronchus and lung	8 (2)	2 (2)	25%	465,000 (1)	232,500
	Fracture of vertebral column	7 (2)	5 (5)	71%	3,250,000 (9)	650,000
	Malignant neoplasms of the female breast	4 (1)	2 (2)	50%	415,205 (1)	207,603
	Appendicitis	4 (1)	2 (2)	50%	275,000 (1)	137,500
	Malignant neoplasms of the colon and rectal region	4 (1)	1 (1)	25%	250,000 (1)	250,000
	<i>Totals for top 5:</i>	<i>27 (7)</i>	<i>12 (12)</i>	<i>44%</i>	<i>4,655,205 (12)</i>	<i>387,934</i>
No medical misadventure						
	Malignant neoplasms of the female breast	6 (2)	0 (0)	0%	0 (0)	0
	Malignant neoplasms of the prostate	5 (1)	0 (0)	0%	0 (0)	0
	Malignant neoplasms of pancreas	3 (1)	0 (0)	0%	0 (0)	0
	Malignant neoplasms of the bronchus and lung	2 (1)	0 (0)	0%	0 (0)	0
	Benign neoplasms of the cerebral meninges	2 (1)	0 (0)	0%	0 (0)	0
	<i>Totals for top 5:</i>	<i>18 (5)</i>	<i>0 (0)</i>	<i>0%</i>	<i>0 (0)</i>	<i>0</i>

Alleged error	Top 5 procedures/presenting medical conditions	Closed claims, no. (percent %) [N=362]	Paid claims, no. (percent %) [N=102]	Percentage paid of closed claims	Total indemnity, USD (percent %) [Overall Total= \$37,991,714]	Average indemnity, USD
Failure to supervise or monitor case						
	Malignant neoplasms of the prostate	3 (1)	2 (2)	67%	395,000 (1)	197,500
	Aortic aneurysm	2 (1)	0 (0)	0%	0 (0)	0
	Arteriosclerotic vascular disease	1 (<1)	1 (1)	100%	250,000 (1)	250,000
	Benign neoplasms of the cranial nerves	1 (<1)	1 (1)	100%	37,500 (<1)	37,500
	Circulatory system disorder	1 (<1)	0 (0)	0%	0 (0)	0
	<i>Totals for top 5:</i>	<i>8 (2)</i>	<i>4 (4)</i>	<i>50%</i>	<i>682,500 (2)</i>	<i>170,625</i>
Medication errors						
	Back disorders, incl. lumbago & sciatica	1 (<1)	1 (1)	100%	400,000 (1)	400,000
	Visual disorder [‡]	1 (<1)	0 (0)	0%	0 (0)	0
	Malignant neoplasms of the brain	1 (<1)	0 (0)	0%	0 (0)	0
	Malignant neoplasms of the colon and rectal region	1 (<1)	0 (0)	0%	0 (0)	0
	Malignant neoplasms of the mouth	1 (<1)	0 (0)	0%	0 (0)	0
	<i>Totals for top 5:</i>	<i>5 (1)</i>	<i>1 (1)</i>	<i>20%</i>	<i>400,000 (1)</i>	<i>400,000</i>

* Defined by PIAA as “Radiation therapy, nuclear medicine and radioisotopic studies”

[‡] Specifically recorded by PIAA as “dyschromia”

Table 5

Radiation oncology closed claims by injury severity, 2003–2012

Severity of injury [n=closed claims]	Percentage paid of closed claims [N=362]	OR *	95% CI	P value [†]	Total indemnity, USD	Average indemnity, USD
Emotional injury only [n=4]	25	1.4	(0.14, 14.3)	0.76	\$40,000	\$40,000
Insignificant injury [n=13]	0	0.0	(0.00, -)	1.00	\$0	\$0
Minor temporary injury [n=37]	30	1.8	(0.80, 4.13)	0.15	\$1,530,687	\$139,153
Major temporary injury [n=41]	39	2.8	(1.29, 5.85)	0.009	\$3,780,205	\$236,263
Minor permanent injury [n=51]	29	1.7	(0.84, 3.62)	0.14	\$6,952,000	\$463,467
Significant permanent injury [n=43]	42	3.1	(1.48, 6.46)	0.003	\$6,320,000	\$351,111
Major permanent injury [n=16]	56	5.5	(1.89, 16.15)	0.002	\$6,707,500	\$745,278
Grave injury [n=13]	38	2.7	(0.81, 8.86)	0.11	\$3,327,500	\$665,500
Death [n=143]	19	1.0	-	(reference)	\$9,333,822	\$345,697
Totals/Average:	28	-	-	-	\$37,991,714	\$372,468

* The odds ratio represents the exponent of the estimated percentage of closed claims that were paid compared to the reference group.

[†] Generalized unadjusted logistic regression model, two-sided P value.