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Medical Professional Liability Risk among U.S. Cardiologists

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Abstract

Background—MPL remains a significant burden for physicians, in general, and cardiologists, in particular, as recent research has shown that average MPL defense costs are higher in cardiology than other specialties. Knowledge of the clinical characteristics and outcomes of lawsuits against cardiologists may improve quality of care and risk management.

Methods—We analyzed closed MPL claims of 40,916 physicians and 781 cardiologists insured by a large nationwide insurer for at least one policy year between 1991 and 2005.

Results—The annual percentage of cardiologists facing a MPL claim was 8.6%, compared to 7.4% among physicians overall ($p < 0.01$). Among 530 claims, 72 (13.6%) resulted in an indemnity payment, with a median size of \$164,988. Mean defense costs for claims resulting in payment were \$83,593 (s.d. \$72,901). The time required to close MPL claims was longer for claims with indemnity payment than claims without (29.6 vs 18.9 months, $p < 0.001$). More than half of all

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claims involved a patient's death (304; 57.4%), were based on inpatient care (379; 71.5%), or a involved a primary cardiovascular condition (416; 78.4%). Acute coronary syndrome was the most frequent condition (234; 44.2%). MPL claims involving non-cardiovascular conditions were common (66, 12.5%) and included falls or mechanical injuries suffered while under a cardiologist's care and a failure to diagnose cancer.

Conclusions—Rates of malpractice lawsuits are higher among cardiologists than physicians overall. A substantial portion of claims are non-cardiovascular in nature.

INTRODUCTION

Medical professional liability (MPL) remains an area of intense concern for physicians of all specialties. It is also an area of concern for policymakers, with estimated annual direct and indirect costs from the liability system (including defensive medicine) of over \$55 billion in the U.S.¹ Despite growing evidence on how MPL risk varies according to physician specialty,²⁻¹¹ limited data are available on the liability risk faced by U.S. cardiologists,¹²⁻¹³ specialists for whom the MPL landscape may be particularly complicated. In an analysis of cardiovascular claims in a national registry maintained by the Physician Insurers Association of America (PIAA), 18% of claims closed against cardiologists resulted in indemnity payment to a patient, with an average payment of \$248,291.¹² Diagnostic error was the most common cause of claims, and aortic dissection and aneurysm, while rare clinical events, were most likely to result in payment to a patient. This highly informative study of MPL risk among U.S. cardiologists was limited, however, by its focus on aggregated data across all physicians within a specialty (rather than individual physician-level data) and by its lack of data on cardiologists who were not sued and therefore were not present in the closed claims maintained by the database.

Our own research characterizing malpractice risk among physicians has used individual-level liability data from a large nationwide liability insurer and has found that cardiologists face a significant lifetime risk of lawsuits, even though the overwhelming majority of these cases are resolved without financial penalty.⁸ In these data, the length of time required to resolve MPL claims for cardiologists is amongst the highest across specialties.¹⁴ Moreover, average defense costs for these lawsuits exceed that of any other specialty, and defense costs remain high even in cases where the defendant cardiologist ultimately prevails.¹⁵ While having the advantage of studying individual-level data, however, these analyses have not previously focused specifically on cardiologists.

The high financial and emotional costs of lawsuits create a need for understanding the MPL risks faced by U.S. cardiologists, particularly if effective risk management strategies are to be developed that improve quality of care and reduce the incidence of claims. Understandably, much of the research focus within cardiology has been on structural changes to the tort system that might reduce liability pressure.¹⁶ Although these structural changes may eventually reduce liability risk, such efforts could also be complemented by careful liability risk management by individual cardiologists. However, this requires that cardiologists understand the details of previous lawsuits against fellow cardiologists, including the clinical settings in which they are most likely to arise.

Using all MPL claims obtained from a large nationwide professional liability insurer, we identified all claims closed against cardiologists between 1991 and 2005. At the cardiologist level, we characterized the annual MPL risk among cardiologists compared to all physicians covered by the insurer, as well general internists, gastroenterologists, and cardiothoracic surgeons. At the claim level, we examined clinical data in each claim to determine common characteristics of lawsuits against cardiologists, the varying likelihood of success of these lawsuits, and the associated defense costs.

METHODS

Medical professional liability data

We abstracted clinical data from all MPL claims closed between 1991 and 2005 against all cardiologists covered by a large physician-owned professional liability insurer with coverage in every US state and the District of Columbia (N = 777 cardiologists covered during this time period amounting to 4,155 physician-years of coverage; 530 claims). Claims were defined as an allegation of liability against a cardiologist and a request for compensation by the injured patient or their attorney.

Each MPL claim included several pieces of information: whether the claim resulted in indemnity payment to a patient, and if so the size of the payment, the time required to resolve the claim (defined as the time elapsed between when a claim was filed and resolved), defense costs associated with the claim, and clinical characteristics which were abstracted from the claim as described below. Indemnity payments to patients resulted from either settlement or jury verdict. Defense costs included filling, expert-witness, and legal fees but did not include overhead costs that could be spread across all claims. We excluded claims that did not involve a defense cost as these involved claims that were preemptively reported by physicians to the insurer in anticipation of an actual patient claim, but no claim was ultimately made by a patient.^{1,2} Indemnity payments and defense costs that were associated with a claim were normalized to 2008 dollars using the Consumer Price Index (CPI). Time to resolution was studied given its importance as an additional cost of medical MPL that is often not estimated but may be substantial when there is lost practice time and non-monetary costs to physicians such as reputational damage and anxiety.^{8,14}

Clinical characteristics of claims

Each claim in our database contained a one-paragraph clinical summary of the events prompting the claim. The available clinical information was not a complete accounting of every clinical detail of the claim, but rather a summary of key clinical facts. The following information was extracted from these summaries by two physicians: 1) patient gender, 2) whether the patient died as a result of alleged MPL, 3) whether a cardiovascular procedure was performed, 4) whether the alleged MPL occurred in the inpatient or outpatient setting, and 5) whether the clinical circumstance around which negligence is alleged to have occurred involved acute coronary syndrome (ACS), congestive heart failure, arrhythmia, other cardiovascular causes, a non-cardiovascular cause, or unknown. Lawsuits involving “other cardiovascular causes” included cardiovascular abnormalities that did not clearly fit into the first three categories, such as complications from aortic dissection, valvular

abnormalities, perioperative complications, or adverse effects of medication. “Non-cardiovascular” lawsuits were defined as those in which the primary pathology was not due to disorders of the heart or vascular system. Examples included failure to diagnosis neoplasm, or injuries sustained by a fall while in clinic or in hospital.

Physician-level analysis of medical professional liability

We began by describing MPL risk among cardiologists at the physician-level. We calculated the annual percent of cardiologists against whom a MPL claim was filed in a given year, the annual percent who experienced a claim that ultimately resulted in an indemnity payment to a patient, and the annual percent who experienced a claim that resulted in an indemnity payment exceeding \$1 million (sometimes termed a ‘blockbuster award’). We compared liability risk among cardiologists to all other physicians as well as general internists, gastroenterologists, and cardiothoracic surgeons. Gastroenterology was given special attention as it, like cardiology, is an internal-medicine based sub-specialty with a large procedural component. We focused on cardiothoracic surgeons given their overlap with cardiologists in the management of common conditions such as coronary artery disease, congestive heart failure, and valvular disorders.

Claims-level analysis of medical professional liability

We examined characteristics of cardiology MPL claims. Some of the more common measures that were not directly clinical included the mean percent of claims resulting in an indemnity payment; the mean indemnity payment among claims in which a payment was made; the mean length of time required to resolve a MPL claim; and mean defense costs. These were calculated overall and according to whether an indemnity payment was made. Clinical characteristics included the percent of MPL claims involving a patient death; the percent involving a procedure performed by a cardiologist; the percent in which a surgery was performed but a cardiologist was involved in the management of the patient; the percent involving alleged liability in the inpatient setting; and the percent related to a clinical diagnosis of ACS, congestive heart failure, arrhythmia, other cardiovascular causes, a non-cardiovascular cause, or unknown. In addition to reporting mean clinical characteristics for the entire sample of claims, we estimated univariate comparisons of how the mean frequency and size of indemnity payments, defense costs, and time to resolution varied according to these clinical characteristics. STATA version 11 was used for statistical analyses.

RESULTS

When compared to other specialists, cardiologists confront a complicated medical liability landscape. Cardiologists faced slightly higher annual rates of MPL claims and indemnity payments compared to physicians as a whole and general internists, but lower rates than gastroenterologists and cardiothoracic surgeons (TABLE 1). For example, the percent of cardiologists facing a claim in a given year was 8.6%, compared to 6.6% among general internists ($p < 0.001$), 11.6% among gastroenterologists ($p < 0.001$), and 18.9% among cardiothoracic surgeons ($p < 0.001$). In all other specialties, 7.4% of physicians experienced a claim in a year on average ($p=0.016$). The likelihood of an indemnity payment was lower

among cardiologists (1.0%) compared to cardiothoracic surgeons (3.8%, $p<0.001$) and physicians in all other specialties combined (1.7%, $p<0.001$). There was no significant difference in the likelihood of an indemnity payment between cardiologists and general internists or gastroenterologists. Despite significant variation across these specialties in the rates of a claim and the rates of a payment, there was no significant difference in the rates of indemnity payments exceeding \$1 million, in large part because these payments were rare across specialties (less than 0.2% in all groups).

TABLE 2 describes several characteristics of claims against cardiologists. A minority of claims resulted in indemnity payment to a patient (72; 13.6%). More than half of all claims involved a patient death (304; 57.4%). A minority of claims described a procedure being performed by the cardiologist (204, 38.5%). Most claims were due to events that occurred in the inpatient setting (379; 71.5%). The claims mostly involved male patients (320, 60.4%).

TABLE 3 describes the clinical conditions involved in claims against cardiologists. A primary cardiovascular condition prompting a claim was identified in 368 cases (69.4%). When identified, the most common condition was ACS (234; 44.2% overall and 63.6% of cardiovascular conditions). Claims related to management of heart failure or arrhythmia were infrequent (3.2% and 5.5% of all claims, respectively). A substantial number of lawsuits involved other cardiovascular conditions (136; 25.7%). Among these, complications in the perioperative period (30, 5.7% of all claims) were the most common and primarily involved claims against cardiologists for allegedly negligent peri-operative cardiac clearance. Complications arising from medications were the next most prevalent subset (26, 4.9%); these cases ranged from alleged negligent management of anti-coagulants to failure to monitor for known side effects of medications such as renal failure. Other categories included lawsuits against multiple providers, including cardiologists, for care provided during acute resuscitative efforts (18, 3.4%), failure to diagnosis aortic dissection (13, 2.5%), failure to diagnosis pulmonary emboli (5, 0.9%), and misinterpretation of an EKG or echocardiogram (7, 1.3%). Lawsuits involving non-cardiovascular conditions were common as well (66, 12.5%). These lawsuits involved instances in which the primary pathology of the complaint did not involve a cardiac or vascular etiology. One of the largest subcategory of these lawsuits was falls or other mechanical injuries sustained while under the cardiologist's care, whether as inpatients or in clinic (12, 2.3%). Representative examples of these cases in our study included an elderly female inpatient who alleged abuse by the hospital and its staff (including the cardiologist involved in her care) during hospitalization; an elderly female who suffered a fall while undergoing an exercise stress test and alleged neck injury despite normal cervical radiographic imaging; and an elderly female alleging chronic left shoulder pain after implantation of a pacemaker, alleged due to a peri-procedural fall. Equally prevalent was the failure by the cardiologist to diagnosis neoplasms (13, 2.5%). The remaining subcategories (infection, trauma, gastrointestinal, etc.) had only a small number of cases; examples included mismanagement of sepsis, minor trauma, or pancreatitis. In general, cardiologists were involved in these cases while serving as the patient's primary care physician, not necessarily in their capacity as cardiac experts.

TABLE 4 describes the size of indemnity payment for claims in which a payment was made to a patient, as well as defense costs and time required to close. Overall, the mean indemnity

payment was \$31,750 while the median was zero, reflecting the fact that few claims resulted in a payment. When a payment was made, the mean indemnity payment was \$317,439 (s.d. \$384,862), substantially greater than the median payment of \$164,988, reflecting the skewness of the payment distribution to the right. Mean defense costs for claims resulting in indemnity payment were large (\$83,593, s.d. \$72,901). Mean defense costs for claims not resulting in indemnity payment – i.e. those that were settled, dismissed or judged in favor of the physician defendant – were much smaller but still substantial (\$14,326, s.d. \$29,624). The length of time required to close MPL claims was substantially longer for claims resulting in indemnity payment than claims which did not (29.6 months vs 18.9 months, $p < 0.001$).

TABLE 5 explores how the frequency and size of indemnity payments, defense costs, and time required to resolve MPL claims varied according to claim characteristics. The p -values for joint significance tests for the differences across categories are reported in parentheses. The frequency and size of indemnity payments and mean defense costs were similar between cases involving a death versus those that did not. The mean time required to resolve claims was longer, however, for cases involving a death (22.6 vs 15.5 months, $p < 0.001$). Claims involving a procedure by a cardiologist were similar in frequency of indemnity payments, mean defense costs, and time to resolution. Claims in which a surgery occurred had a higher frequency of indemnity payment and higher defense costs but lower mean payment sizes, though these differences were not statistically significant at conventional levels. Claims that involved male patients took significantly longer to resolve but had significantly lower average payments.

Although sample sizes were small, the most significant variation in claim outcomes occurred when examining clinical conditions. For example, claims involving ACS, though the most prevalent, were among the least likely to result in indemnity payment (6.8%) and had among the lowest average payment amounts (\$213,021). However, these claims took the longest to resolve on average. Claims involving an arrhythmia or CHF were more likely to result in a payment and had higher average payment amounts and defense costs than claims involving ACS or other cardiovascular conditions. Interestingly, claims against cardiologists involving non-cardiovascular conditions generally were most likely to result in indemnity payment (30.9%), and had among the highest average payment sizes and defense costs.

DISCUSSION

We studied the characteristics of all MPL claims closed against cardiologists covered by a large nationwide insurer between 1991 and 2005. Using limited clinical data available for each claim, we sought to determine how liability risk of cardiologists compares to other specialties and to study the common characteristics of lawsuits against cardiologists, including the varying likelihood of success of these lawsuits, and the associated defense costs.

Several insights regarding the clinical details of cardiology MPL claims can be gleaned from this database of cardiology claims. Perhaps most surprising, despite being leveled against cardiologists, a significant percentage of claims primarily involve issues that are non-

cardiovascular in nature, a finding that distinguishes it from the most complete previous study of cardiovascular claims.¹² Importantly, these claims were most likely to result in indemnity payment – almost a third resulted in payment – and had among the highest average payment sizes and defense costs. In our study, the two most common types of non-cardiovascular lawsuits were patients alleging musculoskeletal injury while under a cardiologist's care and a failure to diagnose cancer. The remaining non-cardiovascular cases involved a range of different pathologies, from septic shock to cerebrovascular accidents to gastrointestinal bleeding. It is possible that in these situations, cardiologists were included as defendants in claims against multiple physicians, on alleged medical mistakes that had only an indirect relationship to cardiovascular disease. This may happen in the initial stages of a lawsuit, when plaintiff attorneys seek to identify an expanded list of defendants while discovery and depositions are proceeding. In such cases, one might expect physicians who are only peripherally involved to eventually be dismissed from the claim. However, in our data, approximately one-third of non-cardiovascular claims resulted in indemnity payment to a patient, suggesting that many such claims against cardiologists are not dismissed. Moreover, it is also possible that failures in patient communication, which have been associated with malpractice liability more generally,¹⁷ were more common in malpractice cases that involved non-cardiovascular conditions. A final possibility is that these lawsuits were leveled against cardiologists who exceeded their traditional scope of practice into non-cardiovascular areas.

Of cases that predominantly involve a cardiovascular complaint, the data present several interesting findings. First, a large fraction involves ACS in some manner. Previous studies have shown a similar preponderance of cases involving ACS,¹² which is reflective of the high incidence of this pathology overall. Given the mortality and morbidity risks associated with ACS, it is not surprising that the disease constitutes such a significant number of lawsuits against cardiologists. Interestingly, however, despite the large prevalence of malpractice claims involving ACS, cases involving this condition are less likely to result in indemnity payment than other cardiac conditions. One possible explanation of this finding is that because of widely recognized high rates of mortality in this condition and the importance of early procedural involvement, patients are more psychologically prepared for adverse clinical outcomes that may occur and are therefore less likely to file a lawsuit in these instances.

Outside of ACS, the lawsuits in our study did not seamlessly fit into other traditional cardiovascular conditions such as congestive heart failure or arrhythmia. Rather, a significant portion of cases defied easy classification, and required deeper analysis. From this analysis, three subgroups were noted to be of particular significance. First, a relatively large percentage of lawsuits arose from poor outcomes associated with surgery or resuscitation. In many cases, the cardiologist was likely a consultant who was later named in a lawsuit against multiple providers. The second subgroup involved poor outcomes associated with medications. These included accusations of negligent management of anti-coagulation, administration of medications despite known allergies, and complications from use of fenfluramine (Fen-Phen), an anti-obesity medication which was withdrawn from the market by the Food and Drug Administration in 1997 after reports of valvular disease and pulmonary hypertension resulting from use of the medication. The final subgroup involved

lawsuits associated with aortic dissection or aneurysm; as would be expected, in virtually all of these cases the cardiologists was sued for failure to diagnosis and treat an aortic dissection. The high MPL risk associated with aortic dissection is supported by the most complete previous study of cardiovascular claims.¹²

Certain cardiology subspecialties are procedurally oriented, and it seems plausible that procedural complications might drive lawsuits against cardiologists. Our data did not have detailed descriptors of a cardiologist's subspecialty for the majority of claims. Our data also did not allow us to determine how often electrophysiologists or interventional cardiologists are sued annually as has been estimated with other broader specialties in these data.⁸ Conclusions about rates of lawsuits associated with procedures should also be interpreted with caution since our data spanned MPL cases from 1991 to 2005, a period in which interventional and electrophysiology procedures were growing overall.

The time required to resolve MPL cases against cardiologists was uniformly long, but it did vary across the different subgroups we analyzed. The length of time required to resolve claims has been argued to be an important – but typically unmeasured – non-monetary cost of MPL. Claims which take longer to resolve imply greater time away from clinical practice, added emotional burden, and are associated with higher defense costs.^{14,15} Defense costs were also substantial and have been shown in other work using these data to be the largest in cardiology compared to all other specialties.¹⁴ Defense costs were substantial in claims which ultimately did not result in payment to a patient as well as in claims that were non-cardiovascular in nature.

Our study has several limitations. As with other work,¹⁸ our study used data from a single insurer. Although the insurer is among the largest in the U.S. and has nationwide coverage, it may not be nationally representative. In our prior work with this database, MPL characteristics of physicians were demonstrated to be similar to estimates of physicians in the National Practitioner Data Bank.⁸ The sample size of claims and availability of particular types of information (e.g. other medical personnel besides the cardiologist involved with a claim) was also limited compared to an important study of aggregated cardiology MPL data from the Physician Insurers Association of America.¹² In contrast to that study, however, we were able to analyze individual MPL claims and to study cardiologist-level outcomes and compare to physicians in other specialties. Our analysis of MPL claims was also restricted to claims closed before 2005, thereby not addressing more recent trends in MPL of cardiologists.

In summary, a significant number of malpractice claims against cardiologists involve non-cardiovascular conditions. Cardiologists should not only be aware of potentially unanticipated sources of malpractice liability within the field, but should carefully consider clinical scenarios which exceed one's traditional scope of practice. Among cardiovascular issues, misdiagnosis of acute coronary syndrome creates significant liability exposure, followed by clinical situations involving resuscitation or surgery, medication mismanagement, or aortic dissection.

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TABLE 1
Annual percent of cardiologists with a medical professional liability claim compared to other physician specialties

	Cardiologists	Internists	Gastroenterologists	Cardiothoracic surgery	All other physicians
Number of Physicians	777	9,880	639	437	29,183
Number of Physician-Years	4,155	53,026	3,981	3,187	169,389
Any claim in year, % (<i>p</i> -value)	8.6%	6.6% (<i>p</i> <0.001)	11.6% (<i>p</i> <0.001)	18.9% (<i>p</i> <0.001)	7.4% (<i>p</i> =0.016)
Claim with indemnity payment in year, % (<i>p</i> -value)	1.0%	1.2% (<i>p</i> =0.173)	1.3% (<i>p</i> =0.097)	3.8% (<i>p</i> <0.001)	1.7% (<i>p</i> =0.003)
Claim with payment \$ 1 million or more in year, % (<i>p</i> -value)	0.1%	0.1% (<i>p</i> =0.702)	0.0% (<i>p</i> =0.092)	0.2% (<i>p</i> =0.170)	0.1% (<i>p</i> =0.987)

Note: The *p*-values for the differences of each value from cardiologists are reported in parentheses.

TABLE 2

Characteristics of medical professional liability claims against cardiologists

Characteristic	No. of claims	Percent
Total No. of claims	530	100.0%
Indemnity payment		
No	458	86.4
Yes	72	13.6
Severity		
Nonfatal	226	42.6
Fatal	304	57.4
Cardiology procedure involved		
No	321	60.6
Yes	204	38.5
Unknown	5	0.9
Surgery performed		
No	350	66.0
Yes	143	27.0
Unknown	37	7.0
Inpatient status		
Inpatient	379	71.5
Outpatient	149	28.1
Unknown	2	0.4
Patient sex		
Female	202	38.1
Male	320	60.4
Unknown	8	1.5

TABLE 3

Clinical conditions involved in medical professional liability claims against cardiologists

Condition	No. of claims	Percent
Total	530	100%
ACS	234	44.2
Congestive heart failure	17	3.2
Arrhythmia	29	5.5
Other cardiovascular	136	25.7
Perioperative	30	5.7
Cardiac medications	26	4.9
Resuscitation	18	3.4
Failure to diagnosis aortic dissection	13	2.5
Valvular abnormalities	11	2.1
Procedural complication	7	1.3
Misinterpretation of EKG or echocardiogram	7	1.3
Failure to diagnosis pulmonary embolism	5	0.9
Congenital or pediatric	7	1.3
Miscellaneous	12	2.3
Non-cardiovascular	66	12.5
Failure to diagnosis cancer	13	2.5
Fall or mechanical injury in hospital or clinic	12	2.3
Infection	10	1.9
Trauma	6	1.1
Gastrointestinal	7	1.3
Mental health	3	0.6
Pulmonary	4	0.8
Miscellaneous	11	2.1
Unknown	48	9.1

TABLE 4

Size of indemnity payment, defense costs, and time required to close medical professional liability claims against cardiologists

Claim type	Mean	Median	Standard deviation
All claims			
Indemnity Payment (Dollars)	31,750	0	154,018
Defense Costs (Dollars)	21,254	5,416	41,801
Time to Claim Closure (Months)	20.0	16.8	21.3
Claims without indemnity payment			
Indemnity Payment (Dollars)	-	-	-
Defense Costs (Dollars)	14,326	5,416	29,624
Time to Claim Closure (Months)	18.9	16.0	21.5
Claims with indemnity payment			
Indemnity Payment (Dollars)	317,439	164,988	384,862
Defense Costs (Dollars)	83,593	58,729	72,901
Time to Claim Closure (Months)	29.6	25.5	16.6

TABLE 5

Frequency and size of indemnity payment, defense costs, and time required to close medical professional liability claims against cardiologists, according to claim characteristics

Claim characteristic	Indemnity payment made, %	Mean payment, \$ (If payment)	Mean defense cost, \$ (All claims)	Mean time to resolution, Months
Severity				
Nonfatal	10.8%	315,860	19,919	15.5
Fatal	9.5%	318,488	22,036	22.6
	(p=0.641)	(p=0.978)	(p=0.575)	(p<0.001)
Cardiology procedure involved				
No	10.0%	341,803	21,261	20.1
Yes	9.7%	269,533	21,360	19.5
Other or Unknown	24.0%	282,550	16,105	29.4
	(p=0.633)	(p=0.764)	(p=0.969)	(p=0.631)
Surgery				
No	9.6%	359,332	20,069	21.7
Yes	12.2%	274,188	27,382	20.9
Unknown	7.1%	191,366	14,186	9.6
	(p=0.502)	(p=0.490)	(p=0.078)	(p<0.001)
Inpatient				
Inpatient	8.8%	369,813	20,690	22.0
Outpatient	13.5%	225,871	22,238	14.6
Unknown	0.0%		69,763	22.9
	(p=0.255)	(p=0.130)	(p=0.324)	(p=0.002)
Patient sex				
Female	9.0%	449,266	18,432	15.0
Male	10.8%	221,164	23,972	24.9
Unknown	21.0%	30,342	21,426	15.2
	(p=0.582)	(p=0.031)	(p=0.318)	(p<0.001)
Condition				
ACS	6.8%	213,021	16,908	24.3
Congestive heart failure	19.6%	972,208	35,293	15.9
Arrhythmia	28.2%	351,018	35,263	15.9
Other cardiovascular	6.4%	282,192	22,618	16.9
Non-cardiovascular	30.9%	471,056	50,319	19.8
Unknown	10.1%	184,856	13,689	9.9
	(p<0.001)	(p=0.030)	(p<0.001)	(p<0.001)

Note: *p*-values for the differences between categories (e.g. fatal versus non-fatal) are in parentheses.