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An Analysis of Otolaryngology Medical Malpractice Payments
from the National Practitioner Data Bank

A Thesis Submitted to the
Yale University School of Medicine
in Partial Fulfillment of the Requirements for the
Degree of Doctor of Medicine

by

Christopher Thomas Breen

2021

Abstract**AN ANALYSIS OF OTOLARYNGOLOGY MEDICAL MALPRACTICE PAYMENTS
FROM THE NATIONAL PRACTITIONER DATA BANK**

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The aims of this thesis were to describe malpractice payments made on behalf of otolaryngologists, analyze trends over time, and test the association of payment amount with severity of alleged malpractice and patient age. Through a retrospective cross-sectional study of the National Practitioner Data Bank (NPDB), we analyzed all payments made on behalf of otolaryngologists from 1991 to 2018 that were reported to the NPDB. Descriptive statistics were calculated within and across years. Trends in payments were analyzed using the Mann-Kendall test. Generalized linear regression was utilized to test for association of payment amount with severity of the alleged injury and patient age. Our results showed that from 1991 to 2018 there was a significant decrease in number of payments (272 to 81) and number of otolaryngologists on whose behalf payments were made (250 to 77). Mean and median payments increased significantly from \$248,848 to \$420,386 and from \$96,813 to \$275,000, respectively. By severity of alleged injury, mean payments ranged from \$39,755 (95% CI: \$20,957 to \$75,412) for insignificant injury to \$754,349 (95% CI: \$624,847 to \$910,692) for patients who were left quadriplegic, sustained brain damage, or required lifelong care. By patient age, mean payments for patients 60 and older were \$191,465 (95% CI: \$159,880 to \$229,292) vs. \$247,878 (95% CI: \$209,416 to \$293,402) for patients 20-39 and \$232,225 (95% CI:

\$197,691 to \$272,793) for patients 40-59. In conclusion, the annual number and total value of malpractice payments decreased, while the annual mean and median payments increased. Payment amount was associated with severity of alleged malpractice and patient age.

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Table of Contents

ABSTRACT	i
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
INTRODUCTION	1
LEGAL AND ECONOMIC THEORY OF MEDICAL MALPRACTICE	2
LITERATURE ON OTOLARYNGOLOGY MEDICAL MALPRACTICE PAYMENTS	7
STATEMENT OF PURPOSE	9
METHODS	10
DATA SOURCE	10
DESCRIPTIVE STATISTICS	11
TREND ANALYSIS	12
REGRESSION ANALYSIS.....	13
RESULTS	15
NUMBER OF PAYMENTS AND NUMBER OF OTOLARYNGOLOGISTS MAKING PAYMENTS	15
TOTAL AND AVERAGE VALUES OF MALPRACTICE PAYMENTS	16
PAYMENTS BY ALLEGATION TYPE	17
PAYMENTS BY SEVERITY OF ALLEGED MALPRACTICE INJURY	17
SETTLEMENTS VS. JUDGMENTS.....	18
AGE OF OTOLARYNGOLOGISTS	18
LEVEL OF TRAINING	19
PAYING ENTITY	19
TIME TO PAYMENT	19
PATIENT GENDER AND AGE.....	19
SETTING OF CARE	20
GENERALIZED LINEAR REGRESSION ANALYSIS OF PAYMENT AMOUNT	20
DISCUSSION	23
TRENDS IN NUMBER OF PAYMENTS, TOTAL PAYMENT VALUE, AND AVERAGE PAYMENT AMOUNT	23
ASSOCIATION OF PAYMENT AMOUNT WITH SEVERITY OF ALLEGED INJURY AND PATIENT AGE.....	24
LIMITATIONS	29
CONCLUSION	31
REFERENCES	32
FIGURES	34

Introduction

It has been estimated that nearly all physicians in “high-risk” specialties, including surgical subspecialties like otolaryngology, will face a medical malpractice claim at some point in their career and that most will be required to make a malpractice payment.¹ Therefore, it is unsurprising that many physicians are fearful of malpractice claims and have adjusted their behavior in hopes of avoiding malpractice claims. Studies show that physicians who are more fearful of malpractice litigation order more testing for their patients, a practice commonly referred to as defensive medicine, and that physician fear of malpractice claims is associated with increased healthcare spending on their Medicare patients.^{2,3} All told, the annual cost of the medical liability system, including the practice of defensive medicine, has been valued at over 50 billion USD.⁴

Given the impact that malpractice fears appear to have on the practice of medicine, it is important for otolaryngologists both to understand the legal underpinnings of the medical malpractice system and to have reliable information about malpractice payments in otolaryngology. Among all that has been written about medical malpractice, there are two sets of literature that are particularly relevant to these aims and to this thesis: (1) literature from the fields of law and economics that elaborate the theory and motivations for the medical malpractice system, and (2) literature from medical journals that have sought to characterize and quantify trends and patterns in malpractice awards over time, especially payments made on behalf of otolaryngologists. Therefore, we begin with a review of both sets of literature in order to ground our analysis from both a theoretical and empirical perspective.

Legal and Economic Theory of Medical Malpractice

The law of medical malpractice falls within the scope of tort and personal injury law. This means that medical malpractice claims that are brought against physicians are civil cases, as opposed to criminal ones. That is, the claim made by the plaintiff in the case is not that a physician has violated a law but rather that the physician has violated a duty that he or she had to the patient bringing the case as a plaintiff. Claims of medical malpractice are adjudicated in state court. For malpractice to have occurred, there are certain conditions that must be met, which have been stated well by Kessler et al.: “(1) the patient actually suffered an adverse event; (2) the provider caused the event due to action or inaction; and (3) the provider was negligent, which essentially entails showing that the provider took less care than that which is customarily practiced by the average member of profession in good standing, given the circumstances of the doctor and the patient.”⁵ At one point the standard for negligence was the standard of care of the average provider practicing in the defendant’s community, yet the standard is now more national, without consideration for the particular geography in which the defendant practices medicine. This change in standard facilitates the delivery of relevant expert testimony, as local providers were often unwilling to testify that a member of their community had practiced substandard medicine.⁶

Studdert et al. contend that “there are three social goals of malpractice litigation: to deter unsafe practices, to compensate persons injured through negligence, and to exact corrective justice.”⁷ Regarding this first goal of deterring unsafe practices, Danzon posits that, from an economic theory perspective, the threat of a malpractice lawsuit should serve as a deterrent against medical negligence and incentivize efficient care, thereby

leading to the absence of any cases of negligence or malpractice claims. Of course, in practice this is not the case, and she points out that cases of negligent injury have been estimated at roughly 1 out of every 100 hospital admissions.⁸ Others have suggested that medical malpractice insurance insulates physicians from the cost of medical negligence to the extent that any deterrent effect of the medical malpractice system is, in effect, nullified. Key to this assessment is the idea that physicians do not bear the expense associated with malpractice insurance premiums, as they are likely able to pass the costs of malpractice insurance through to patients and payors due to the relatively price-inelastic nature of the demand for medical services.⁹ However, malpractice insurance may not completely shield physicians from any consequences of having a claim filed against them, as there have been cases reported of insurers declining to renew insurance policies for any physician with at least one malpractice claim against him or her.⁷ Also regarding the deterrent goal of medical malpractice, it bears highlight the interesting norm of punitive damages generally not being awarded in medical malpractice cases.⁶ In the context of tort law, punitive damages are often thought to serve both as retribution for wrongdoing and as a deterrent against either the defendant engaging in similar behavior again or others committing a similar act.^{10,11}

The second social goal of medical malpractice is to compensate those injured by negligence. The idea of compensation may seem self-explanatory, as it means to repay the injured party in the amount that he or she has been injured in the form of compensatory damages. Compensatory damages may be economic or non-economic. Patients are awarded economic damages to compensate them for financial outlays that they have been required to make or will be required to make as a result of the act of

medical negligence committed against them. For the most part, these financial outlays include a patient's medical bills and the wages that were lost as a result of not being able to work due to the injury sustained. Patients receive non-economic damages to compensate them for effects of the injury that do not readily have a monetary figured attached, generally for their past and future pain and suffering caused by the negligent act.¹²

The final social goal of medical malpractice is to exact corrective justice. At its core, the idea of corrective justice is to right the wrong committed by one party against another. This is quite similar to the idea of compensation but with more of a focus on the source of the compensation provided to the injured party. The concept of corrective justice dates back at least to Aristotle, who tied justice to equality, and injustice to inequality. To him, equality referred to the baseline relationship between two parties prior to the commission of an unjust act, so in this sense it did not necessarily mean that each party was truly equal.¹³ For example, if John starts with \$5 and Paul starts with \$15, and they have both rightfully earned the money, then this would be considered their equal state. If John were to steal \$5 from Paul so that they were each left with \$10, this would be considered an unequal state, despite both of them having the same amount of money. To serve corrective justice in this case would mean to take \$5 from John and give it to Paul in order to reestablish the baseline equality between the two. Therefore, for corrective justice to be served in the medical malpractice context, this would mean that restitution is made from the negligent physician to the injured patient in whatever amount it is determined that the injury has "taken" from the patient. This is somewhat complicated by the point made above about medical malpractice payments coming from

insurance companies rather than directly from the physician him or herself. It could be argued that, when a malpractice judgment is awarded, the defendant pays the plaintiff indirectly through the insurance company in the form of the premiums paid on the insurance policy. In many cases, it may be even more indirect, with the defendant's employer actually having paid the insurance premiums. This same logic of indirect payment through malpractice insurance premiums would suggest that all other physicians with medical malpractice insurance policies with the same insurance company pay the plaintiff indirectly. Therefore, more than a redistribution from the physician found to have committed a negligent act against the plaintiff, the malpractice payment could be considered a redistribution from the medical establishment more broadly. [citation needed] In a sense, this is in keeping with the notion of corrective justice if the plaintiff is "made whole" through the malpractice payment. Yet it is a less targeted form of justice than the traditional conception of corrective justice given that the injured party is not made whole directly by the negligent actor.

The effectiveness of the medical malpractice system can be considered on at least two fronts. For those cases of negligence that are identified by the system, there is the issue of whether these cases are dealt with appropriately and in way that is likely to achieve the three aforementioned goals enumerated by Kessler et al. But before this step, there is the issue of whether the medical practice system serves as a funnel that effectively captures cases of medical negligence. There is reason to believe that the medical malpractice system may not be especially effective at achieving this aim, as a series of hurdles must be overcome before a medical malpractice claim is filed. In order for a lawyer to agree to take a case on behalf of a plaintiff who has been allegedly injured

by medical negligence, it is not enough for there to be a sufficient likelihood that a determination will be made in favor of the plaintiff. Additionally, there must be reason to expect that the award will be large enough such that the attorney's fee is deemed sufficient to compensate for the time spent on the case. Therefore, there is a minimum threshold injury that a patient must suffer, and a corresponding minimum threshold payment anticipated, in order for a malpractice suit to be filed.⁹ It bears mentioning that focusing solely on cases of medical negligence may miss many adverse events that result in poor outcomes for patients. An analysis of the Harvard Medical Practice Study found that 28% of adverse events in New York state in 1984 were due to negligence.¹⁴ Danzon estimated that only 10% of cases of medical negligence ultimately result in a lawsuit.⁸ This suggests that the medical malpractice system may miss a sizeable majority of negligence cases. Furthermore, even if malpractice litigation is an effective approach to address the cases of negligence that do result in a lawsuit, it might not be an appropriate method of addressing the majority of adverse events that do not result from negligence. Therefore, if improving patient outcomes is the objective, medical malpractice may not be the best approach.

Although medical malpractice is the focus of this paper, the medical malpractice system is not the only means of addressing the issue of medical negligence or medical errors. An alternative approach is the one advocated by the patient safety movement. One of the central tenets of the movement is that personal blame and punishment are not effective.¹⁵ Clearly, this perspective is quite different from that of the medical malpractice system. Patient safety advocates argue that analyzing errors serves as a way to learn from mistakes and to improve systems, which are most often to blame for

errors.¹⁶ The medical malpractice system may be incompatible with this goal of the patient safety movement. Whereas the patient safety movement emphasizes transparency and the role of systems in adverse patient events, the medical malpractice system frames the problem as one of individual negligence and may discourage the transparency required to root out systemic shortcomings due to fear of litigation.⁷

Literature on Otolaryngology Medical Malpractice Payments

The existing literature on medical malpractice payments within the field of otolaryngology is outdated and has been limited to analyses of legal or insurer databases, with most studies not accounting for payments resulting from settlements prior to a case being placed on a court docket.¹⁷⁻²⁶ Given that most medical malpractice lawsuits result in settlements before being placed on a court docket, these studies likely only account for a fraction of medical malpractice payments.

This is the first study to make comprehensive use of the National Practitioner Data Bank (NPDB) to focus on medical malpractice payments made by otolaryngologists. By law, all malpractice payments made on behalf of physicians must be reported to the NPDB within thirty days, which suggests that the NPDB data should represent the vast majority of paid claims made on behalf of otolaryngologists. For context, a previous study by Hong et al using the Westlaw database identified 198 cases involving otolaryngologists from 2001 to 2011, of which 153 resulted in a settlement or a judgment against the otolaryngologist.¹⁸ For the same time period from 2001 to 2011, the NPDB contains 2,513 settlements and judgments against otolaryngologists. Therefore,

the NPDB likely provides a fuller representation of otolaryngology medical malpractice payments.

Another study has reported on malpractice payment trends across all physicians using the NPDB, including specialty-level detail for otolaryngology; however, the study did not examine factors associated with payment amount.²⁷ Additionally, one publication has examined surgery-related malpractice payments from 1990 to 2006 that were made on behalf of physicians without identifying physician specialty, finding that patient outcome was the strongest predictor of payment size, with patient age also associated with payment size.²⁸

Statement of Purpose

This study of medical malpractice payments in the field of otolaryngology has three main aims:

- (1) To describe malpractice payments made on behalf of otolaryngologists across characteristics tracked in the NPDB in order to update the existing literature with newer data and additional detail;
- (2) To analyze trends in otolaryngology malpractice payments over time in order to update and complement previous analyses; and
- (3) To test the hypothesis that otolaryngology malpractice payment amount is associated with the severity of the alleged malpractice injury and patient age.

Methods

The contributions made by the student author, Christopher T. Breen, included conception and design of the study, requesting the dataset that was analyzed, and performing all analysis of the dataset. Saral Mehra, MD provided advice on the conception and design of the study, as well as feedback on the analysis. Daniel Jacobs provided statistical advice on performing pairwise comparisons.

The authors and contributors have no conflicts of interest to report and abided by the guidelines of ethical research, including avoiding publishing any data that might facilitate the identification of individuals contained in the deidentified dataset. This study was exempt from approval by the Yale Institutional Review Board. The research conducted did not include the use of laboratory animals.

Data Source

In response to a request submitted by the authors to the NPDB team within the Health Resources and Services Administration, an agency of the U.S. Department of Health and Human Services, a dataset was provided containing medical malpractice payments made on behalf of otolaryngologists for the years 1990-2018 that resulted from legal settlements or judgments. The provided dataset contains the same fields present in the publicly available NPDB file, including year, unique practitioner identifier, practitioner type, practitioner location, practitioner age, malpractice allegation group, specific malpractice allegation, severity of alleged malpractice injury, payment amount, patient age, and patient gender. The only distinction between the provided dataset and the publicly available one is that, whereas the publicly available file contains payments made

on behalf of all providers regardless of medical specialty without indication of provider specialty, the provided dataset only contained providers that were identified as otolaryngologists.

Similar to other analyses, payments from 1990 were excluded, as this was the first year included in the NPDB and data collection began midway through the year.²⁹ The provided dataset included some payments that were made on behalf of non-physician providers; however, payments that were not made on behalf of a physician were excluded. All dollar values were adjusted for inflation using the Consumer Price Index for All Urban Consumers: All Items in U.S. City Average.³⁰ All figures are reported in 2018 dollars, as this was the most recent year included in our study. Payments in the NPDB are reported as the midpoints of payment ranges, although the NPDB states that true averages are unlikely to differ materially from averages of database figures. For example, per the NPDB: “Payments between \$5,001 and \$100,000 are coded as the midpoint of \$5,000 increments, e.g., payments between \$30,001 and \$35,000 are coded as \$32,500, etc.”

Descriptive Statistics

Descriptive statistics, including mean, median, count, percentage, and range, were generated based on the variables contained in the provided dataset. Ranges, where reported, are the smallest value observed in one or more years to the largest value observed in one or more years during the specified time period. Some variables were available for the full study period (1991-2018), including the year that alleged malpractice occurred, year that payment was made, amount of payment, practitioner’s

age, practitioner's level of training, allegation type (e.g., surgery, diagnosis, etc.), paying entity, whether the payment was the result of a settlement or a judgment. Others were available from 2004 to 2018, including patient age, patient gender, severity of the alleged malpractice injury (e.g., emotional injury, temporary injury, major permanent injury, etc.), and setting of care (i.e., inpatient, outpatient, or both).

For some variables, categories were combined for clarity of reporting. Patient age groups are reported in the NPDB by decades, but for analysis patient ages were combined into the following age groups: 0 to 19 years, 20 to 39 years, 40 to 59 years, and 60 years and older. For calculation of descriptive statistics, the nine categories for severity of the alleged malpractice injury (also referred to as Outcome in the NPDB) were combined into six categories as follows: "Emotional Injury Only" was combined with "Insignificant Injury", "Minor Temporary Injury" was combined with "Major Temporary Injury", and "Significant Permanent Injury" was combined with "Major Permanent Injury." "Minor Permanent Injury," "Quadriplegic, Brain Damage, Lifelong Care," and "Death" were left as standalone categories. The full nine categories for severity of the alleged malpractice injury were used in regression analysis.

Trend Analysis

Trend analysis for number of payments, number of otolaryngologists on whose behalf payments were made, total value of payments, and mean and median payment amount was performed using the Mann-Kendall trend test. The Mann-Kendall test is a nonparametric test used to assess for a monotonic trend (i.e., upward or downward) in a data series. Trend analysis by Mann-Kendall test was conducted over the full study

period (1991-2018) as well as over the time periods 1991-2001 and 2001-2018 so as not to obscure temporary trends during the nearly thirty-year period. The year 2001 was chosen to divide the full study period into two time periods because it served as the relative maximum for both total number of payments and total number of otolaryngologists receiving a payment and was one year before the global maximum for total payment value. The significance level used to establish a non-zero trend was 0.05 with two-sided comparisons. When a non-zero trend was detected, a 95% confidence interval for the linear rate of change was calculated by Sen's method. The Mann-Kendall trend test and the calculation of Sen's slope were both performed using the trend package in RStudio Version 1.2.1335. All figures were created using Tableau Desktop Version 2019.2.9.

Regression Analysis

Generalized linear regression with a log link function was performed to test for severity of the alleged injury and patient age as predictors of malpractice payment amount. All dependent variables and covariates included in the generalized linear model were significant ($p < 0.05$) on ANOVA. Payment amount served as the continuous dependent variable with severity of the alleged injury and patient age group as categorical predictor variables. Unlike for the descriptive statistical analysis, all categories for severity of the alleged injury were maintained as reported to the NPDB for regression analysis. The model controlled for payment year and state, which were coded as categorical variables. Least-squares means for payment amount by severity of the alleged injury and age were calculated. Pairwise contrasts of the least-squares means for payment

amount by severity of the alleged injury and age were performed with p-values adjusted by the Tukey method. The significance level for pairwise contrasts was set at $p < 0.05$ by two-sided comparisons. Regression analysis was conducted in RStudio Version 1.2.1335, with pairwise contrasts performed utilizing the lsmeans package.

Results

A total of 6,385 payments were made on behalf of 3,601 otolaryngologists from 1991 to 2018, with a median of 4 years (range: 3 to 5) between incident and payment.

Number of payments and number of otolaryngologists making payments

The annual number of medical malpractice payments involving otolaryngologists declined significantly from 272 payments in 1991 to 81 payments in 2018 (Figure 1). Trend analysis by the Mann-Kendall test over the full study period (1991-2018) showed a significant trend ($p<0.001$) with a slope of -7.1 (95% CI: -9.0 to -5.6), which represents approximately 7 fewer otolaryngologists making a payment each year, compared to the previous year, for the full 28-year period. There was no significant trend for 1991-2001 ($p=0.88$), but there was a significant trend for 2001-2018 ($p<0.001$) with a slope of -11.2 (95% CI: -14.3 to -7.3), which represents approximately 11 fewer otolaryngologists making a payment each year from 2001 to 2018 compared with the year before.

As one otolaryngologist may be responsible for multiple payments in a given year, the data was also analyzed for number of otolaryngologists making payments each year. There was a significant decrease in the annual number of otolaryngologists making malpractice payments from 250 otolaryngologists in 1991 to 77 otolaryngologists in 2018. Trend analysis over the full study period showed a significant trend ($p<0.001$) with a slope of -6.2 (95% CI: -7.4 to -5.3). There was no significant trend for the 1991-2001 time period ($p=0.70$), but there was a significant trend for 2001-2018 time period ($p<0.001$) with a slope of -8.8 (95% CI: -11.7 to -6.3).

Over the full study period (1991-2018), a majority of otolaryngologists (61%) who made at least one malpractice payment made only one payment during the study period (Table 1). Of the 1,398 otolaryngologists who made more than one payment during the study period, 1,249 (89%) made payments in at least two different years. The NPDB does not indicate whether payments are related to one another, but here we report payments made by the same otolaryngologist in different years, as these payments are more likely to be unrelated than payments made in the same calendar year.

Number of payments	Number of Otolaryngologists	Percentage of total
1	2,173	61%
2	795	22%
3	298	8%
4	149	4%
5	78	2%
6+	78	2%
	3,601	100%

Table 1. Number of malpractice payments made on behalf of otolaryngologists

Total and average values of malpractice payments

There was a significant decrease in the total annual value of malpractice payments made by otolaryngologists from \$67,686,737 in 1991 to \$34,051,250 in 2018 (Figure 2). Trend analysis over the full study period (1991-2018) showed a significant trend ($p=0.003$) with a slope of $-\$1,159,625$ (95% CI: $-\$2,027,905$ to $-\$570,272$). There were significant trends both for 1991-2001 ($p=0.04$) and for 2001-2018 ($p<0.001$). For 1991-2001 the slope was $\$2,458,859$ (95% CI: $\$38,239$ to $\$5,893,766$), and for 2001-2018 the slope was $-\$3,434,195$ (95% CI: $-\$4,839,896$ to $-\$1,379,080$).

While the total annual value of payments decreased, the annual mean and median payments both increased significantly (Figure 3). The mean increased from \$248,848 in 1991 to \$420,386 in 2018, and the median increased from \$96,813 in 1991 to \$275,000 in 2018. Trend analysis for 1991-2018 showed a significant trend in the mean payment amount ($p < 0.001$) with a slope of \$5,545 (95% CI: \$2,588 to \$7,263), as well as a significant trend in the median payment ($p < 0.001$) with a slope of \$4,493 (95% CI: \$2,502 to \$6,600). There were significant trends for 1991-2001 for both the mean ($p = 0.003$) with a slope of \$7,836 (95% CI: \$3,054 to \$12,388) and the median ($p = 0.003$) with a slope of \$9,032 (95% CI: \$4,144 to \$13,527). There was no significant trend for 2001-2018 for either the mean ($p = 0.23$) or the median ($p = 0.65$).

Payments by allegation type

Across the 28 years studied, 6,383 payments (>99%) indicated the type of allegation made against the otolaryngologist. Malpractice payments related to surgery predominated, representing 62% of the total number of payments (range: 55% to 70%). Issues with diagnosis accounted for 17% of payments (range: 12% to 23%), issues of treatment accounted for 13% (range: 5% to 16%), medication issues accounted for 3% (range: 1% to 6%), and other issues, including allegations related to patient monitoring, equipment/products, and anesthesia, accounted for 5% (range: 1% to 12%).

Payments by severity of alleged malpractice injury

From 2004 to 2018, there were 2,605 payments (99%) that listed the severity of the alleged malpractice injury. Of these, 20% of payments (range: 12% to 28%) were for

the most severe patient injuries, including death, being rendered quadriplegic, sustaining brain damage, or requiring lifelong care; 31% of payments (range: 22% to 35%) were for significant or major permanent injury; 23% of payments (range: 17% to 43%) were for minor permanent injury; 23% of payments (range: 14% to 29%) were for temporary injury; and 4% of payments (range: 1% to 7%) were for insignificant injury or emotional injury.

Settlements vs. judgments

A total of 5,927 payments (93%) reported whether the payment came as a result of a settlement or a judgment. Of these, 96% (range: 93% to 100%) came as part of a settlement and 4% (range: 0% to 7%) were a result of a judgment.

Age of otolaryngologists

During the 1991-2018 time period, 6,369 payments (>99%) indicated the age of the otolaryngologist making the malpractice payment. Of these, otolaryngologists under the age of 40 accounted for 20% (range: 7% to 30%) of payments, otolaryngologists aged 40 to 49 accounted for 33% (range: 22% to 41%), otolaryngologists aged 50 to 59 accounted for 31% (range: 19% to 38%), otolaryngologists aged 60 to 69 accounted for 13% (range: 4% to 30%), and otolaryngologists aged 70 and older accounted for 3% (range: 0.4% to 12%).

Level of training

All payments in the study indicated the otolaryngologist's level of training. More than 99% of malpractice payments (range: 97% to 100%) were made as a result of cases involving attending otolaryngologists, while less than 1% of payments (range: 0% to 3%) were made on behalf of otolaryngology residents.

Paying entity

During the 1991-2018 time period, all payments indicated the paying entity, with 87% of payments (range: 77% to 93%) being made by an insurance company, whereas 13% of payments (range: 7% to 23%) were made by a party other than an insurance company, such as a state medical malpractice payment fund.

Time to payment

The elapsed time between the year of the alleged malpractice and the year of payment was able to be calculated for 6,381 payments (>99%) during the 1991-2018 time period. There was a mean of 4.4 years (range: 3.9 to 5.9) between the time of the alleged incident and the resulting malpractice payment. Similarly, across the full time period there was a median of 4 years (range: 3 to 5) between the alleged incident and the payment.

Patient gender and age

From 2004 to 2018, there were 2,621 payments (>99%) that listed the gender and age of the patient involved in the alleged malpractice. Of these, 50% of malpractice

payments were made on behalf of male patients (range: 35% to 63%). As for the age of patients involved, 15% of payments (range: 10% to 21%) were made on behalf of patients who were younger than age 20 at the time of the alleged malpractice, 22% were for patients aged 20 to 39 (range: 17% to 30%), 45% were for patients aged 40 to 59 (range: 33% to 54%), 17% were for patients aged 60 to 79 (range: 10% to 26%), and 1% were for patients aged 80 and over (range: 1% to 2%).

Setting of care

From 2004 to 2018, there were 2,386 payments (90%) for which it was indicated whether the alleged malpractice occurred in the outpatient setting, inpatient setting, or both. Of these, allegations related to outpatient care accounted for 51% of payments (range: 38% to 61%), allegations related to inpatient care accounted for 37% of payments (range: 25% to 49%), and allegations related to both outpatient and inpatient care accounted for 12% of payments (range: 9% to 20%).

Generalized linear regression analysis of payment amount

Generalized linear regression analysis showed that both severity of the alleged injury and patient age were associated with payment amount. Table 2 shows the least-squares means of malpractice payment amount by severity of the alleged injury with p-values for pairwise comparisons between each level of injury and the injury one level lower in severity. Notably, payments for Major Temporary Injuries were significantly larger than payments for Minor Temporary Injuries ($p < 0.0001$), payments for Significant Permanent Injuries and Major Permanent Injuries were significantly larger

than payments for Minor Permanent Injuries ($p < 0.0001$) and Significant Permanent Injuries ($p < 0.0001$), respectively, and payments for Death were significantly smaller than payments for injuries that left a patient quadriplegic, with brain damage, or in need of lifelong care ($p = 0.0004$). Table 3 shows the least-squares means of malpractice payment amount by patient age group. Pairwise contrasts of least-squares means by age group showed that, compared to payments to patients age 60 and older, payment amounts were significantly larger to patients age 20 to 39 ($p = 0.0005$) and patients age 40 to 59 ($p = 0.006$). No other age group comparisons were statistically significant at $p < 0.05$.

Injury Severity	Mean (95% CI)	p-value
Emotional Injury Only	\$63,382 (\$23,931 to \$167,869)	--
Insignificant Injury	\$39,755 (\$20,957 to \$75,412)	0.9972
Minor Temporary Injury	\$96,796 (\$78,767 to \$118,951)	0.1775
Major Temporary Injury	\$221,820 (\$184,267 to \$267,023)	<0.0001
Minor Permanent Injury	\$229,606 (\$201,412 to \$261,749)	1.0000
Significant Permanent Injury	\$457,403 (\$409,745 to \$510,604)	<0.0001
Major Permanent Injury	\$645,642 (\$573,097 to \$727,370)	<0.0001
Quadriplegic, Brain Damage, Lifelong Care	\$754,349 (\$624,847 to \$910,692)	0.8119
Death	\$496,719 (\$444,502 to \$555,070)	0.0004

Table 2. Least-Squares Means of Malpractice Payments by Severity of Alleged Injury from Generalized Linear Regression Analysis

Note: Least-squares means are adjusted for payment state, payment year, and patient age. The p-values are for pairwise contrasts with the injury in the previous row (i.e., the p-value of 0.9972 is for the pairwise contrast between Insignificant Injury with Emotional Injury only).

Patient Age Group	Percentage of Payments	Mean (95% CI)
0 to 19 years	15%	\$225,165 (\$187,447 to \$270,474)
20 to 39 years	22%	\$247,878 (\$209,416 to \$293,402)
40 to 59 years	45%	\$232,225 (\$197,691 to \$272,793)
60 years and older	18%	\$191,465 (\$159,880 to \$229,292)

Table 3. Percentage of Payments by Patient Age and Least-Squares Means of

Malpractice Payments by Patient Age Group from Generalized Linear Regression

Analysis

Note: Least-squares means are adjusted for payment state, payment year, and severity of alleged injury.

Discussion

Through analysis of a custom dataset that was provided to us by the NPDB, this study updates and complements previous analyses. It also serves as the first large-scale study to examine factors associated with malpractice payment size for otolaryngology by regression analysis. The dataset yielded a number of insights that have been summarized in the results section. In our estimation, the most significant insights that warrant further explanation and discussion are as follows.

Trends in number of payments, total payment value, and average payment amount

The overall trend from 1991 to 2018 is that there was a decline in the number of payments and total payment value that was accompanied by an increase in the average payment amount. This overall trend has been shown previously for otolaryngology malpractice payments during the time period from 1992 to 2014 by Schaffer et al.²⁷ Our updated analysis through 2018 shows that the decline in number of payments and the increase in average payment have continued since 2014. Additionally, by dividing the study period into two shorter time periods – 1991 to 2001 and 2001 to 2018 – this study adds to the literature by shedding light on some more temporary trends that were not captured in previous analyses of otolaryngology payments. From 1991 to 2001 there was no significant trend in terms of number of payments, while the trends for total payment value, mean payment amount, and median payment amount were all positive. These trends ended or reversed course from 2001 to 2018, when the trend for the total yearly number of malpractice payments was negative, the trend for total payment value was negative, and there were no trends for mean or median payment amount.

The reason for these shifts in trends is not readily apparent and warrants further investigation. Others have noted a leveling off of average payment amount beginning in the early 2000s when analyzing an insurer database covering all physician specialties, which they noted is when several states enacted caps on non-economic damages.³¹

As for the decrease in the number of payments included in the NPDB over time, one possible explanation is that payments may have shifted from being made on behalf of individuals to being made on behalf of hospitals or health systems.²⁷ Only payments that were made on behalf of individuals are required by law to be reported to the NPDB, whereas payments made on behalf of a hospital or health system would be exempt from the NPDB's reporting requirements. Therefore, it is possible that the number malpractice payments related to otolaryngology has not declined in the manner suggested by the NPDB. Instead, it could be an artifact of the regulations surrounding the reporting of payments, which fail to capture payments made by institutions like hospitals and health systems.

Association of payment amount with severity of alleged injury and patient age

While the NPDB does not include the rationale that a judge or jury utilized in determining the payment amount, the results of our regression analysis suggest that, on average, the severity of the alleged injury and patient age are important factors in determining payment amount, with the severity of the alleged injury seeming particularly important. A similar association has been noted in an NPDB analysis of surgery-related malpractice payments from 1990 to 2006 by Orosco et al.²⁸ Notably, their analysis was conducted on the publicly available version of the malpractice payments database

compiled and published by the NPDB. Therefore, Orosco et al. were not able to identify all payments made by surgeons or to identify the specialty to which a surgeon belonged. Instead, they relied on the allegation type that is reported to the NPDB. Although allegations relating to surgery accounted for a majority of the payments made on behalf of otolaryngologists, we found that 38% of paid claims against otolaryngologists related to something other than surgery (e.g., diagnosis, medication issues, patient monitoring, etc.). This suggests that a meaningful portion of payments made on behalf of surgeons might have been missed by relying on the allegation type to identify malpractice payments. By analyzing all payments in the NPDB made on behalf of otolaryngologists, our study is the first to show an association between otolaryngology payment amount and alleged malpractice injury severity and patient age. It is also the first to report mean values for different injuries and patient ages.

As noted in the introduction, the total malpractice payment amount may be composed of payments for both economic and non-economic damages. In the medical malpractice context, economic damages are generally awarded to plaintiffs for lost wages and medical care, whereas non-economic damages are generally for pain and suffering. The severity of the alleged injury and a patient's age may factor into determining the payment amount for both types of damages. For economic damages, the cost of medical care or other necessary services for patients with more severe injuries is likely much higher, which may explain why payments are larger for patients with worse injuries. Interestingly, payments to patients who died were significantly smaller than for patients experiencing a severe injury requiring lifelong care, which may be due to the high expected costs of medical care for a patient who remains alive but in need of intensive

medical care for an extended period of time. Patients who are more seriously injured may be out of work for longer periods of time, thus experiencing greater lost wages.

Lost wages are presumably much smaller for patients who have already reached the age of retirement, which may partially explain why patients age 60 and older receive smaller malpractice payments than younger adults. It is also possible that judges and juries find younger patients more sympathetic, feeling that more has been taken from a person with a life expectancy of several decades and thus greater compensation should be awarded. This could be considered analogous to the use of disability adjusted life years (DALYs) in order to quantify the burden of disease. DALYs essentially represent time lost due to death or disability, which would be greater for a twenty-year-old patient who suffers the same injury as a forty-year-old patient.³² Younger patients might be compensated more because they have “lost” more time. Although we were not able to test this in our study, it would be interesting to know whether payments are also lower for patients with greater comorbidities. For instance, in a similar manner to age, might a judge or jury view an injury sustained by an ill person as less impactful and therefore deserving of less in compensatory damages than a person who was healthier at baseline before sustaining a malpractice injury?

Our finding that payment amount increases with the severity of the alleged injury up until the most severe level of injury short of death, which received somewhat lesser payment than severe injury short of death, is interesting in the context that malpractice awards are generally thought to be compensatory in nature and not punitive. As explained above, the financial costs associated with a patient rendered severely debilitated would likely be higher than a patient who died as a result of malpractice. It has been noted in the

economics literature that malpractice payments for a patient death are lower, although we have not come across this finding in the medical literature. The explanation given was that compensatory damages for pain and suffering are not awarded for death, whereas they are for patients that have been severely injured but have not died as a result of their injuries.³³ Thus, this pattern in payment amount might make sense in the context of awarding compensatory damages. However, it makes less intuitive sense when approaching medical malpractice from the perspective of its other social goals: deterrence or exacting corrective justice.

We had expected payments to be largest for patients who died as a result of their injuries because, if the goal of the malpractice system were to serve as a deterrent against future negligent behavior by both the defendant in the malpractice claim and any other physician who might be negligent in a similar manner, it would seem logical that the highest payments would be awarded to those ending in death. After all, the deterrence of patient death seems like it would be prioritized over other injuries. Our findings, therefore, are consistent with the idea that deterrence may not be the overriding goal or factor when making medical malpractice award determinations.

Nor does this pattern of payment amount align particularly well with the idea of malpractice payments being a way of exacting corrective justice. As outlined in the introduction, the idea of corrective justice is that a wrong has been done by one party to another – in the case of medical malpractice this is the medically negligent act – and directly as a result of this wrong, the equality between the two parties has been disrupted. The role of the legal system is to correct the imbalance between the parties by restoring the equality that existed before the negligent act was committed. It would seem intuitive

that the degree to which equality is disrupted would be proportional to the severity of the injury sustained. In general, our analysis bears this out in that payment amount was correlated with the severity of the alleged outcome up until the most severe injuries short of death. One might expect, though, that death would require a larger payment to correct the defendant's wrongdoing than a serious injury that falls short of causing a patient's death. As for the role played by the age of the patient who is allegedly injured by medical negligence, it could be viewed that, for any given injury caused by medical negligence, more is taken from a younger patient than from an older patient. In turn, this requires a larger corrective payment for a younger patient than for an older one. Beyond the degree of correction made necessary by the negligent act, there is also the issue of the party making the corrective payment. As discussed in the introduction, given the existence of medical malpractice insurance, the restitution to the plaintiff who suffered an injury is often made by an insurance company rather than the defendant, as was the case in 87% of the malpractice payments in this study.

For non-economic damages, the pain and suffering associated with more severe patient injury is likely to be considered greater than with less significant injury, potentially further contributing to the larger payments received by patients with worse injuries. The pain and suffering sustained by the family of a patient who died as a result of alleged malpractice would likely be more severe, although also more acute, than the suffering endured by a severely injured patient and his or her family, which would likely still be quite significant and more chronic. Although, as noted previously, damages are generally not awarded for a family's pain and suffering due to a patient's death. Regarding our finding of age as a predictor of payment size, the pain and suffering would

likely be rather similar for patients regardless of their age. The major difference that might be felt across age groups would likely be for permanent injuries. As younger patients would most likely live for longer periods of time with these injuries, they could be considered to endure more pain and suffering. This line of reasoning would not apply to temporary injuries, where age would likely have minimal impact on a patient's degree of pain and suffering.

Limitations

This study is subject to several limitations. As the NPDB only includes malpractice payments, we are unable to comment on any malpractice claims that did not result in a monetary award or on what percentage of claims that were made against otolaryngologists ultimately led to a malpractice payment. Additionally, the NPDB only includes payments made on behalf of individuals, which means that any malpractice payments made on behalf of an institution (e.g., a hospital that was found negligent rather than an individual physician) are not included. Although all payments in this dataset were related to otolaryngology, there is no information on subspecialty within otolaryngology, or on the specific procedures or diagnoses that were associated with the malpractice payments. Therefore, we are unable to comment on which particular procedures or conditions more commonly generated malpractice payments. For each malpractice claim, the NPDB provides the total malpractice payment that was paid out, but it does not report any detail on the rationale for the payment or the types of damages represented by the payment. As a result, we are able to comment on how the patterns we observed in payments appear to follow the theory of medical malpractice law, but we are not able to

confirm this with the legal reasoning included in the judgments issued for the malpractice payments contained in the NPDB. Similarly, we are unable to comment on the degree of negligence committed by the defendant, which may be an important factor in the determination of an award.

Conclusion

From 1991 to 2018, the number and total value of payments decreased significantly, while the mean and median payment amount increased significantly; however, these trends have not been constant over the time period. As noted above, this decrease may be driven by a shift toward payments being made on behalf of institutions instead of individual physicians. From 2004 to 2018, payments made to patients with more severe alleged injuries were significantly larger than payments for less significant injuries, whereas payments made to patients aged 60 or older were significantly smaller than payments to younger adults. As malpractice claims are commonly made against surgeons, it is important for otolaryngologists to remain abreast of developments in patterns and trends of payments over time. Having access to current data on payments, including factors associated with payment amount, may allow otolaryngologists to better gauge the malpractice and financial risk of their clinical practice. Awareness that many payments are to compensate patients for significant injury may serve as a reminder to remain current on quality and safety literature in order to best protect patients from harm. Additionally, our findings highlight the importance of delivering high risk care in the most appropriate setting and with the appropriate care team.

References

1. Jena AB, Seabury S, Lakdawalla D, Chandra A. Malpractice risk according to physician specialty. *The New England journal of medicine* 2011;365:629-36.
2. Carrier ER, Reschovsky JD, Katz DA, Mello MM. High physician concern about malpractice risk predicts more aggressive diagnostic testing in office-based practice. *Health Aff (Millwood)* 2013;32:1383-91.
3. Reschovsky JD, Saiontz-Martinez CB. Malpractice Claim Fears and the Costs of Treating Medicare Patients: A New Approach to Estimating the Costs of Defensive Medicine. *Health Serv Res* 2018;53:1498-516.
4. Mello MM, Chandra A, Gawande AA, Studdert DM. National costs of the medical liability system. *Health Aff (Millwood)* 2010;29:1569-77.
5. Kessler DP. Evaluating the medical malpractice system and options for reform. *J Econ Perspect* 2011;25:93-110.
6. Budetti P, Waters TM. *Medical malpractice law in the United States*: Henry J. Kaiser Family Foundation; 2005.
7. Studdert DM, Mello MM, Brennan TA. Medical malpractice. *N Engl J Med* 2004;350:283-92.
8. Danzon PM. Chapter 26 Liability for medical malpractice. *Handbook of Health Economics*: Elsevier; 2000:1339-404.
9. Bell PA. Legislative Intrusions into the Common Law of Medical Malpractice: Thoughts about the Deterrent Effect of Tort Liability. *Syracuse Law Review* 1984;35:939-94.
10. Schwartz GT. Deterrence and Punishment in the Common Law of Punitive Damages: A Comment. *S Cal L Rev* 1982;56:133.
11. Sunstein CR, Kahneman D, Schkade D. Assessing Punitive Damages (With Notes on Cognition and Valuation in Law). *The Yale Law Journal* 1998;107:2071-153.
12. Nelson III LJ, Morrissey MA, Kilgore ML. Damages Caps in Medical Malpractice Cases. *The Milbank Quarterly* 2007;85:259-86.
13. Weinrib EJ. Corrective Justice in a Nutshell. *The University of Toronto Law Journal* 2002;52:349-56.
14. Brennan TA, Leape LL, Laird NM, et al. Incidence of adverse events and negligence in hospitalized patients. Results of the Harvard Medical Practice Study I. *N Engl J Med* 1991;324:370-6.
15. Berwick DM, Leape LL. Reducing errors in medicine. It's time to take this more seriously 1999;319:136-7.
16. Institute of Medicine Committee on Quality of Health Care in A. In: Kohn LT, Corrigan JM, Donaldson MS, eds. *To Err is Human: Building a Safer Health System*. Washington (DC): National Academies Press (US) 2000. Copyright 2000 by the National Academy of Sciences. All rights reserved.; 2000.
17. Hong SS, Yheulon CG, Sniezek JC. Salivary gland surgery and medical malpractice. *Otolaryngol Head Neck Surg* 2013;148:589-94.
18. Hong SS, Yheulon CG, Wirtz ED, Sniezek JC. Otolaryngology and medical malpractice: A review of the past decade, 2001-2011. *Laryngoscope* 2014;124:896-901.

19. Lydiatt DD. Medical malpractice and cancer of the larynx. *Laryngoscope* 2002;112:445-8.
20. Lydiatt DD. Cancer of the oral cavity and medical malpractice. *Laryngoscope* 2002;112:816-9.
21. Lydiatt DD. Medical malpractice and facial nerve paralysis. *Arch Otolaryngol Head Neck Surg* 2003;129:50-3.
22. Lydiatt DD. Medical malpractice and the thyroid gland. *Head Neck* 2003;25:429-31.
23. Lydiatt DD, Sewell RK. Medical malpractice and sinonasal disease. *Otolaryngol Head Neck Surg* 2008;139:677-81.
24. Lynn-Macrae AG, Lynn-Macrae RA, Emani J, Kern RC, Conley DB. Medicolegal analysis of injury during endoscopic sinus surgery. *Laryngoscope* 2004;114:1492-5.
25. Simonsen AR, Duncavage JA, Becker SS. Malpractice in head and neck surgery: a review of cases. *Otolaryngol Head Neck Surg* 2012;147:69-73.
26. Svider PF, Husain Q, Kovalerchik O, et al. Determining legal responsibility in otolaryngology: a review of 44 trials since 2008. *Am J Otolaryngol* 2013;34:699-705.
27. Schaffer AC, Jena AB, Seabury SA, Singh H, Chalasani V, Kachalia A. Rates and Characteristics of Paid Malpractice Claims Among US Physicians by Specialty, 1992-2014. *JAMA Intern Med* 2017;177:710-8.
28. Orosco RK, Talamini J, Chang DC, Talamini MA. Surgical malpractice in the United States, 1990-2006. *J Am Coll Surg* 2012;215:480-8.
29. Chandra A, Nundy S, Seabury SA. The growth of physician medical malpractice payments: evidence from the National Practitioner Data Bank. *Health Aff (Millwood)* 2005;Suppl Web Exclusives:W5-W249.
30. U.S. Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers: All Items in U.S. City Average [CPIAUCSL], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/CPIAUCSL>.
31. Seabury SA, Helland E, Jena AB. Medical malpractice reform: noneconomic damages caps reduced payments 15 percent, with varied effects by specialty. *Health Aff (Millwood)* 2014;33:2048-56.
32. Murray CJ. Quantifying the burden of disease: the technical basis for disability-adjusted life years. *Bull World Health Organ* 1994;72:429-45.
33. Danzon PM, Lillard LA. Settlement out of Court: The Disposition of Medical Malpractice Claims. *The Journal of Legal Studies* 1983;12:345-77.

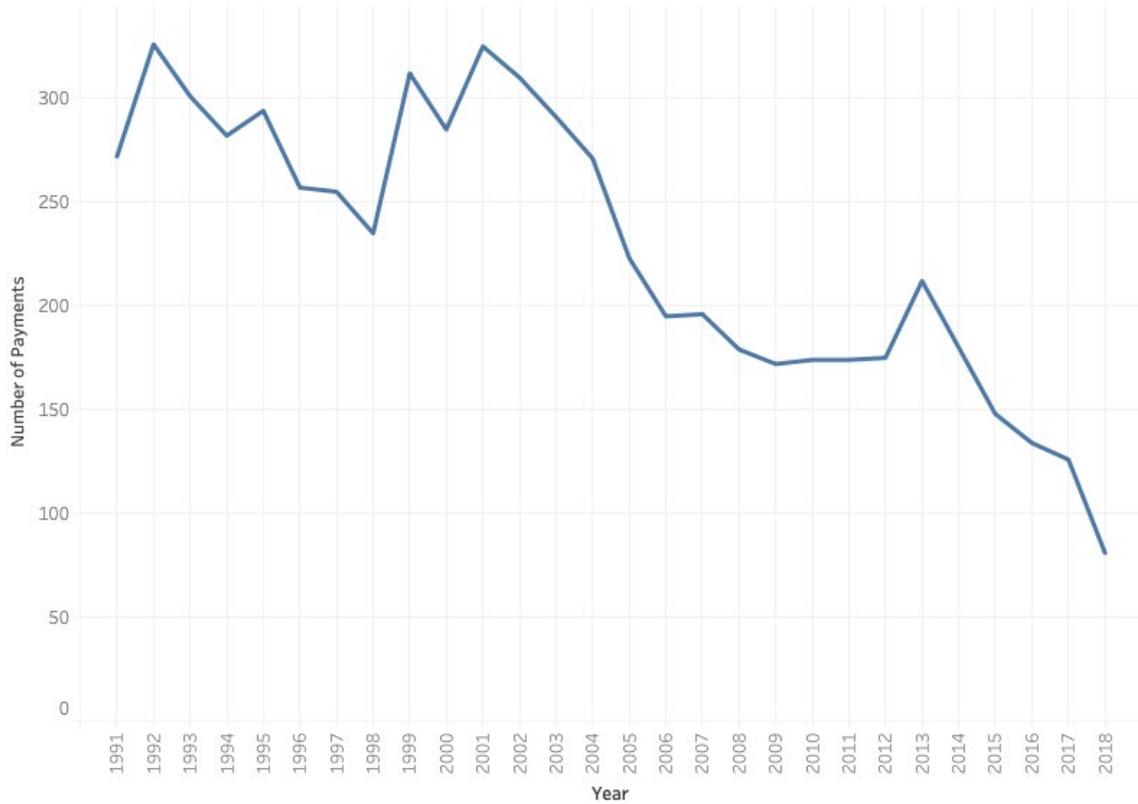
Figures

Figure 1. Annual Number of Malpractice Payments (1991-2018). Line graph depicting the total number of otolaryngology malpractice payments made in each year.

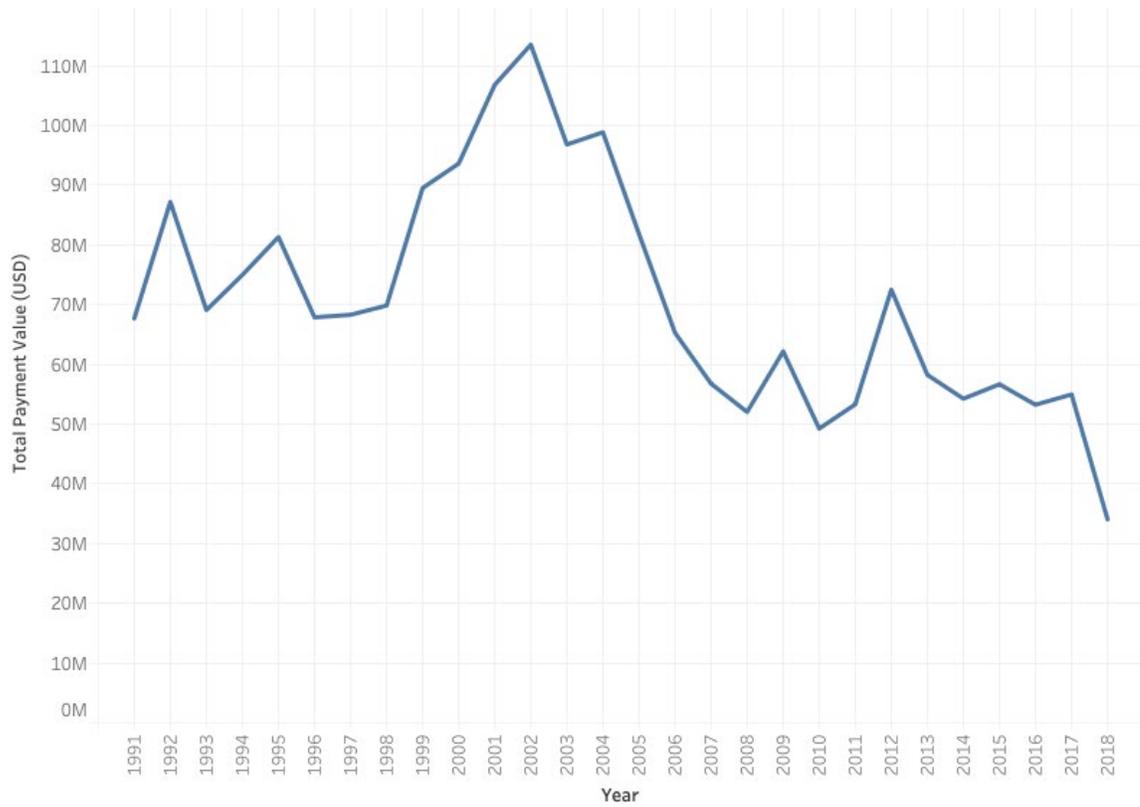


Figure 2. Total Annual Value of Malpractice Payments (1991-2018). Line graph depicting the total monetary value (in 2018 USD) of all otolaryngology malpractice payments made in each year.

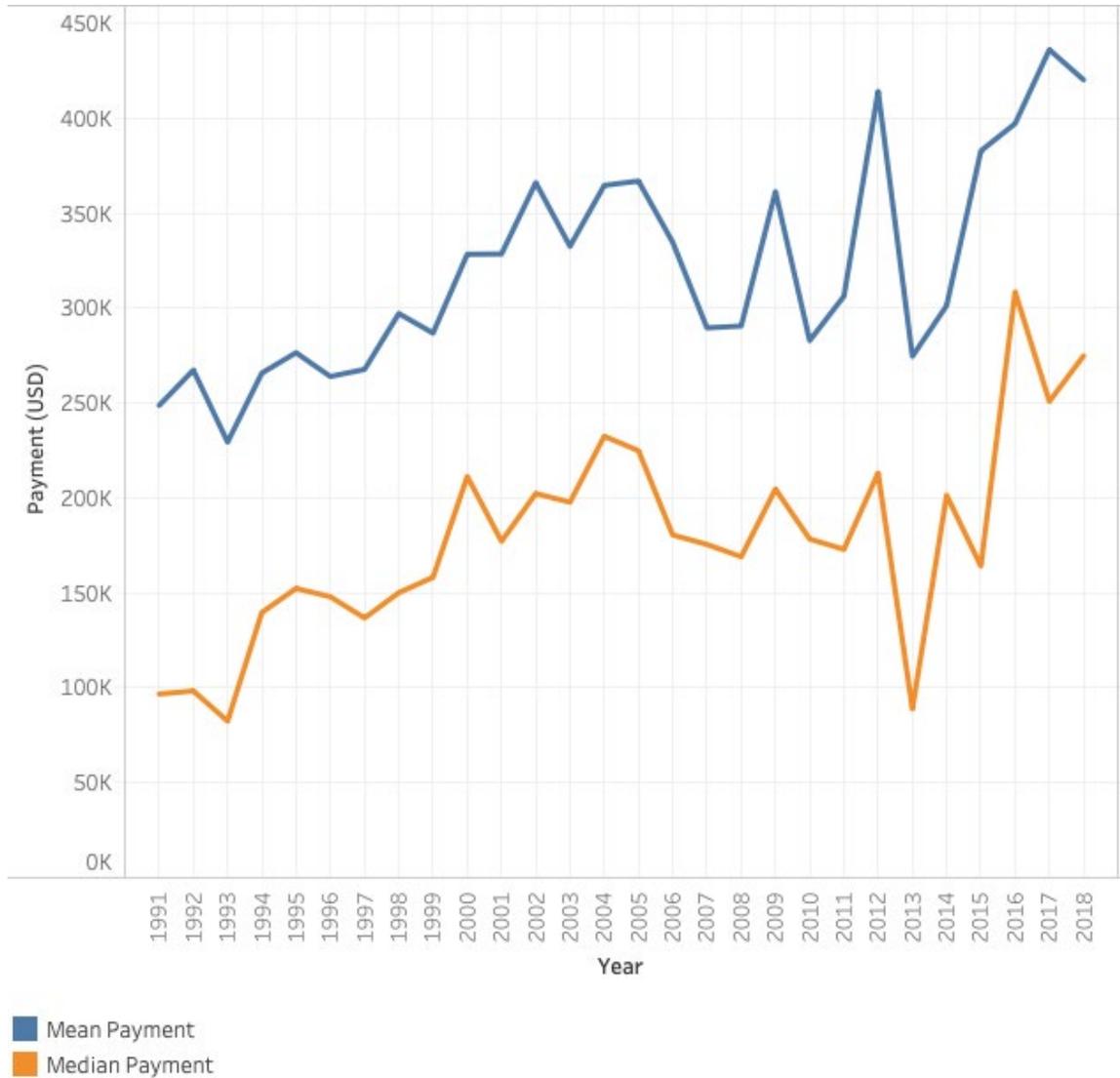


Figure 3. Annual Mean and Median Malpractice Payment Amounts (1991-2018).

Line graph depicting the mean and median otolaryngology malpractice payments (in 2018 USD) made in each year.