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The Medical Malpractice Crisis: A Comparative Empirical Perspective

Donald Dewees
Michael Trebilcock
Peter Coyte

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“The Medical Malpractice Crisis: A Comparative Empirical Perspective”

Donald Dewees, Michael Trebilcock and Peter Coyte
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For further information:
Political Economy Research Group,
Department of Economics,
Social Science Centre,
London, Ontario, Canada N6A 5C2
phone: (519) 661-3877
fax: (519) 661-3292
THE MEDICAL MALPRACTICE CRISIS:
A COMPARATIVE EMPIRICAL PERSPECTIVE

Donald N. Dewees
Michael J. Trebilcock
Peter C. Coyte
University of Toronto

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I. Introduction

The 1980's have seen a crisis in medical malpractice liability in the United States, in Canada, and in the United Kingdom. We have undertaken a detailed empirical study of the Canadian malpractice experience. This paper presents that experience, with two important comparative foci. First, the paper compares the malpractice liability experience in Canada of physicians with that of hospitals, with dentists, engineers, lawyers, and chartered accountants, and with trends in personal injury claims for automobile accidents. Second, it compares the Canadian medical malpractice liability experience with that in the United States and in the United Kingdom. This comparative approach allows us to suggest factors that have contributed to growth in claims frequency and severity in all three countries, and to reject some popular conceptions about the origins of the crisis. Those factors are treated in three groups: the professional environment, the social environment, and the legal environment.

A. The Trends to Be Explained

Between 1971 and 1988, the average compound annual growth rate in claims filed per 100 physicians in Canada was about 8.2%, implying almost a quadrupling in the claims frequency rate over this period. See Table 1. Between 1971 and 1988, the number of claims paid per 100 physicians grew at an average compound annual growth rate of 6.1%, implying somewhat less than a trebling in the paid claim frequency rate over this period. While the recent Canadian growth rate in frequency of claims is quite similar to that in the U.S. and the U.K., the average rate of claims filed against physicians in the U.S. is about five times greater than in Canada. With respect to severity, the Canadian data indicate a four-fold increase in the
average malpractice claim payment in real terms between 1971 and 1988 - a 9.5% per year compounded annual rate of increase. See Table 2. Again, the increase in average payments in Canada and the U.S. in recent years is quite similar, doubling between the mid-1970s and the mid-1980s. Furthermore, the absolute level of average payments in Canada and the U.S. as of 1984 was not significantly different. U.K. data on rates of growth in frequency and severity of malpractice claims over the past decade reflect rates of increase comparable to those experienced in Canada and the U.S. See Table 4. U.K. frequency rates, on a population basis, appear to be significantly higher than Canadian rates. With respect to insurance fees (levied in Canada by the Canadian Medical Protective Association), the overall compound annual rate of growth in CMPA fees, adjusted for inflation, between 1976 and 1988 is 15.4%, although between 1982 and 1986 average fees tripled in real terms and rose over 40% in 1987, yielding an average annual compound growth rate of 39% between 1982 and 1987. See Table 3.

With respect to hospital liability, we found an increase in the frequency of claims per one thousand beds filed against hospitals since 1976, with the rate of annual increase varying dramatically - between 4% and 40% - from hospital to hospital and from hospital insurer to hospital insurer. We found that after accounting for inflation there has also probably been an increase in the average severity of paid claims against hospitals, but we cannot estimate the growth rate for this variable. Total real losses have increased, but again we cannot estimate a growth rate. With respect to hospital insurance, the increase in real insurance costs in Ontario from 1983-84 to 1985-86 was in excess of a factor of 10 (1000%). Prior and subsequent to this period, trends in insurance costs have been
much lower.

B. Data Analyzed

For this study, we assembled several data sets that have never been analyzed for these purposes before in Canada. Physician liability data for the years 1976 to 1987 were gathered from the Canadian Medical Protective Association (CMPA). Malpractice claims against most physicians in Canada are defended by the CMPA, a non-profit organization of which over 90% of all active civilian physicians in Canada, including interns and residents, are members. The CMPA agreed to allow us to analyze data in their files, subject to the requirement that we protect the confidentiality of the records. The CMPA data include information on the type of injury alleged, the specialty of the physicians named, patient age, gender and place of residence, and other information about the patient, the physicians, the event, and about the progress of the claim to dismissal, settlement or trial. This is a data set that is unmatched in North America. We refer to data from the CMPA closed and open claims file throughout this paper as the semi-aggregate data set. In addition to this data set, the CMPA identified all paid claims over the period 1976-1987 in which payment to the plaintiff exceeded $100,000 in 1976 dollars and provided us with a large body of detailed data on these claims. 107 such claims were identified accounting for just over one half of total payments measured in current dollars between 1976 and 1987: $56 million out of $106 million. Our hospital data confirms the significance of a small number of large claims in determining total losses: 4.27 percent of all claims filed against Canadian hospitals between 1977 and 1983 accounted for two-thirds of all incurred losses during this
period.

We also gathered information from hospital insurers regarding the claims experience of hospitals across Canada. Because no single company insures all hospitals, the hospital liability data are less complete than those for physicians, but they still present a fair picture of the trends in this liability. We also conducted a survey of hospital administrators to determine both their claims experience and their response to claims that were made.

Each province's health insurance plan generates data on the amount billed for all types of medical services. We have used summaries of these data, after adjusting for changing fee levels over time, as measures of the activity level of physicians in our attempt to explain liability trends.

We surveyed the provincial colleges of physicians and surgeons enquiring about the types of matters that attracted the attention of the discipline process, and about the level of activity of that process. The results of this survey have been used to evaluate the current and potential role of discipline bodies in the control of the quality of health care.

To test the hypothesis that the trends in health care liability are unique, we gathered data on the liability experience of other professionals: dentists, lawyers, accountants, architects, and engineers. These data were gathered either from the professional bodies themselves or from major insurers of those practitioners.

We also gathered data on the frequency and severity of third party bodily injury claims arising out of automobile accidents from the Insurance Bureau of Canada. These data provide a trend against which the medical liability trends may be compared. Unlike many areas of professional
determinant of past liability trends. Of course, even if this were found to be so, the central question would remain to be addressed of whether the impacts produced by these changes in the legal environment have been desirable or undesirable in terms of social welfare before prescriptions for changing the existing legal regime could be supported.

II. The Professional Environment

We identify four major explanations within the professional environment that may account for the increase in both the frequency and the severity of malpractice litigation: utilization of health care services; quality of health care professionals and/or institutions; mode of practice; and professional discipline. We review these four possible explanations, indicating for each the data used to test each hypothesis and the existing empirical results that are pertinent to our investigation.

A. Utilization of Health Care Services

1. Hypotheses

The frequency of malpractice claims and the total value of malpractice settlements are expected to be positively related to the utilization of health care services when other things are equal. Although increased utilization, in general, may be associated with an increase in iatrogenic injuries, some procedures, such as major surgery, or procedures on some patients, may be more prone to adverse outcomes than others. Conversely, some procedures, such as laboratory tests and diagnostic radiology, which clarify more precisely the patient’s illness and the appropriate course of treatment, may reduce the patient’s exposure to an iatrogenic injury.
Consequently, we considered the effect on claims frequency of more specific procedures, such as major surgery, laboratory tests and diagnostic radiology. We also examined the impact of several specific activity levels on the severity of malpractice awards. Since some activities, such as surgical procedures, may have more obvious and observable adverse outcomes than other procedures and since they may also result in more serious consequences for patients (in the event of a medical misadventure), we expect these procedures to be positively correlated with the frequency and severity of malpractice claims.

2. Results

(a) General Utilization

Focussing on the general increase in the frequency of claims filed over time, the seven-fold increase in the absolute number of claims filed between 1971 and 1988 (from 130 in 1971 to 873 in 1988) representing an estimated 12% per year increase is reduced to almost a quadrupling, or 8.2% per year increase when growth in number of claims is related to the growth in the number of CMPA physicians. See Table 1. Replacing the number of physicians with the total value of medical services provided, in the last column of Table 1, or with the value of major surgical services provided, adds nothing to explaining the increase, since the former utilization variable grew only slightly more rapidly than the number of CMPA practising physicians over this period and the latter variable grew substantially less rapidly. Several U.S. studies have used physicians per capita\(^2\), or more recently, surgical procedures per capita\(^3\) as explanatory variables, finding a positive relationship between each of these variables and frequency of
malpractice litigation. None of these studies has had access to the comprehensive physician population and billing data analyzed here, including data on the utilization of hospitals and private laboratories.

With respect to hospital liability, our analysis suggests that admissions are a somewhat better measure of utilization than are beds for predicting claims frequency, and that a 10% increase in utilization leads to a 5% increase in the number of claims filed.

(b) Specialization

Table 5 presents the average claim frequency by specialty for the years 1976-1984, derived from the semi-aggregate data. The average for orthopaedic surgeons is twice that of obstetricians and gynaecologists, four times that of anaesthetists, and over 10 times that of family practitioners. Statistical analysis on these data confirmed that the differences in claims frequency among the physician categories shown in Table 5 are statistically significant. Moreover, we found that most of the variation in frequency across specialties can be explained by variations in the performance of major surgery in each specialty. Indeed, utilization of major surgery explains fully 90% of the variation among years and among specialties in the frequency of claims filings, most of which represents variation across specialties. Because utilization of major surgery grew less rapidly than the number of physicians, major surgery does not explain the increase in litigation over time.

We also tested whether the severity or settlement size of claims differs significantly among the areas of practice. The severity of malpractice claims, measured in 1987 dollars, is reported in Table 5. The
mean (average) paid claim for all cases closed between 1976 and 1987 was 
$102,450. There appears to be considerable variation across the six 
specialties; the mean paid claim involving anaesthetists is over 60 
percent greater than that for all CMPA members, while obstetricians and 
gynaecologists record a mean severity that is 34 percent less than that for 
all CMPA members. However, if we focus on the median instead of the mean, 
as is appropriate for a skewed distribution such as this, we find that the 
differences in median severity among the six physician categories identified 
in Table 5 are not statistically significant. In other words, the 
differences in severity among the specialties in our data set are 
sufficiently small that we cannot be confident that the underlying severity 
is actually different for all specialties. Regression analysis confirmed 
this conclusion except that it found that severity of paid claims for 
aanaesthetists was significantly above that of the category "all other areas 
of practice".

This analysis does not explain why the severity does not differ 
significantly among specialties, but some rationales may be offered. 
First, our data combine gynaecology and obstetrics, so that the smaller 
expected frequency and severity of the former will produce a lower average 
severity than if obstetrics, which has generated very high premiums in the 
United States, could be isolated. Second, as we report above, the 
performance of major surgery explains most of the difference in claim 
frequency among specialties. We believe that this is consistent with a 
large portion of the losses being associated with the intrusive activities 
of the operating room, no matter which specialty performs the activities, 
simply because it is in the nature of these activities that if an error
occurs, the potential loss is large, and a claim is likely to be filed. Since all specialties perform some of these activities leading to large losses, all experience similar severity. The smaller injuries caused by other activities lead to fewer claims being filed in those areas. Third, in the Canadian legal system, costs follow the event, which means that it is not profitable to pursue claims with a small likelihood of success, in contrast to the rule in the United States in which the plaintiff is rarely liable for the defendant’s costs. The lesser prevalence of contingent fees in Canada (Ontario still does not permit this arrangement formally) reduces the incentive for a plaintiff to file small claims, while the CMPA’s reputation for defending a claim that it does not believe is meritorious, regardless of size, requires the plaintiff to be prepared for high legal costs unless his case is so strong that the CMPA is prepared to settle early. In short, in Canada, there is a narrower range of claims that a plaintiff will feel that it is economically worthwhile to pursue, so the size of the payments varies less by specialty than in the United States where large differences have been reported.

The total malpractice claim costs are defined as the product of the frequency of malpractice claims, the success rate of those claims and the average severity of paid claims. The proportion of total payments by the CMPA attributable to each specialty are shown in the last line of Table 5. Since the proportion of total payments attributable to anaesthetists, orthopaedic surgeons and obstetricians and gynaecologists exceeds their proportion in the stock of physicians, these specialties are overrepresented in the total payments by the CMPA. Indeed, orthopaedic surgeons are over-represented by a factor of 4.8, anaesthetists by 3.2, and
obstetricians and gynaecologists by 2.3, while family practice is under-represented by one third. We conclude that total malpractice payments per physician differ significantly by area of practice, with orthopaedic surgeons, anaesthetists, obstetricians and gynaecologists giving rise to significantly above-average payments, while family practitioners give rise to significantly below-average payments. This arises from frequency rates that differ greatly, while success rates and median awards are similar for all specialties.

(c) Treatments Giving Rise to Large Claims

The large paid claims data include a specification of the treatment being performed when the accident occurred. We have analyzed the frequency with which various treatments are listed as associated with a claim, and the total amount paid in respect of each category. With 54 mentions, "major surgery" is involved in almost one-half of all claims, and accounts for about 37% of all amounts paid. Obstetrics is associated with 16 percent of the claims and 14 percent of the amounts paid, indicating that these cases have a higher than average severity. "Other hospital visits" are associated with 15 percent of the claims, and 9.6 percent of the amounts paid. Over 90 percent of all the large paid claims arose out of procedures performed in hospital settings. These data present no great surprises, but they do suggest that the categories accounting for the largest number of claims also have above average severity.

We tested for trends in these data by defining each claim as early or late, according to whether the date of closing was before or after January 1, 1985, which divides the large claims roughly in half. This yields 65
mentions of treatments in the early claims, and 90 mentions in the late claims. The number of mentions of "major surgery" barely increases (from 26 to 28) from the early to the late claims, indicating a decline in the relative importance of this category of treatment. The largest increases occur for obstetrics (5 to 12), anaesthesia (3 to 9), and radiology (1 to 4). While these numbers are not statistically significant, particularly the small numbers of radiology claims, they are consistent with the hypothesis that injuries arising from obstetrical care are a factor in the increase in total liability.

We also examined the sub-categories of treatments to see whether there are patterns that help to explain the rising cost of claims. Again, there are no surprises. The largest sub-category of "major surgery" is "musculo-skeletal: other", and the second largest subcategory is "musculo-skeletal: fractures". The largest sub-categories in the obstetrics category simply indicate "services at the time of confinement", and "confinement". These data are not sufficiently specific to test the often-stated hypothesis that injuries to infants who would not in the past have survived cause enormous settlements and are an important force driving the increase in liability. We have, however, identified those cases involving injury to infants at childbirth. There are 10 such claims, representing 9 percent of our data set, with total damages paid of $9.6 million in 1987 dollars, or 15 percent of the large claims total. This confirms that serious injuries to infants during childbirth give rise to higher than average damages, and that the total magnitude of these claims is substantial. Furthermore, 6 of these 10 claims, representing $6.8 million were paid with the "late" claims, weakly suggesting an increase in the relative importance of this particular
category of claim over the period of analysis.

The large claims data also list the allegations of malpractice that
gave rise to the claim. One-quarter of the allegations (39) mentioned
"treatment", accounting for 19 percent of the damages. The most common
treatment errors were "delay in treatment", "improper choice of treatment",
and "other". Eighteen percent of the allegations (33) mentioned
"anaesthesia", and the expectation that anaesthesia errors would cause high
cost injuries is confirmed by the large implicit average severity, since
these claims account for 31 percent of the damages. The most common
anaesthesia errors were "failure to monitor", "improper administration",
"improper intubation", and "other". Surgery accounted for 18 percent of the
allegations (28) but only 12 percent of the damages, revealing a lower than
average severity for these accidents. The most common error listed is
simply "improper performance". "Diagnosis" accounted for 17 percent of the
allegations and 15 percent of the damages. Most of these errors are
attributed to "failure to diagnose" or to "misdiagnosis".

We compared the distribution of allegations of malpractice among
general categories between early and late claims. This revealed a decline
(17 to 10) in allegations related to diagnosis and to monitoring (5 to 1),
and increases in most other categories, particularly obstetrics (3 to 8).
Again, small numbers render robust conclusions from these data difficult,
and they do not appear to suggest important clues to causes of trends in
overall malpractice litigation.
(d) Defensive Medicine

Although some medical procedures may increase the public's exposure to the risk of an iatrogenic injury, other activities, which clarify more precisely the patient's illness and the appropriate course of treatment, such as those associated with laboratory tests and diagnostic radiology, may actually reduce the patient's exposure to an iatrogenic injury. In a survey conducted by the AMA in 1984, asking physicians to report changes in their practice patterns in response to the threat of civil liability, 41% reported ordering extra tests, 36% spend more time with patients, 57% keep more detailed records, 45% refer more cases\textsuperscript{4}. As the survey results suggest, the term defensive medicine is deeply ambiguous if it is taken to embrace all these responses, many of which seem beneficial to patients. A recent estimate of the cost of defensive medicine in the U.S. puts the figure at between $9 - 10 billion in 1984 (compared to $3 billion paid by physicians for malpractice premiums in that year)\textsuperscript{5}, while other U.S. estimates range from $15 - $40 billion per year\textsuperscript{6}. Defensive medicine, defined more narrowly, might be taken to refer only to procedures induced by the threat of liability that have little or no therapeutic value, but no studies to date of defensive medicine have attempted to segregate out such procedures\textsuperscript{7}. In our study, we examine increases in radiological services and laboratory tests, but do not attempt to quantify the purely defensive elements in these procedures. To test whether these procedures were important in explaining the trends in malpractice liability, we included the total cost of these procedures per physician, adjusted for increases in the fee-benefit schedule, in each of the regression equations. This cost was insignificant in each case, indicating that our measure of 'defensive
medicine' is unsuccessful in influencing the frequency of claims filed, the proportion of claims that succeed, and the average magnitude of an award.

B. Quality of Health Care Professionals and their Institutions

1. Hypotheses

Health care professionals may differ in the quality of care offered to their patients because of differences in professional expertise. Such differences might be due to their medical training, age and experience, or location of practice. While high quality should lead to fewer adverse outcomes, high quality providers may attract the most difficult cases, rendering any interpretation of a relationship between a quality measure and outcomes ambiguous. To capture the effect of quality on the litigation process, three proxies for quality were employed: the physician's age; place of training; and location of practice.

2. Results

Our statistical analysis of the semi-aggregate data yielded significant coefficients indicating that domestically-trained physicians are less likely than foreign-trained physicians to be sued and that their losses will be smaller. However, the large claims data did not show any significant difference in frequency or severity for domestically-trained and foreign-trained physicians. Moreover, high quality physicians may attract more difficult cases, so even these mixed results cannot be unambiguously interpreted. Nor do we find support in the large claims data for the hypothesis that malpractice is more common among newly graduated physicians or among older physicians, since we found that the age
distribution of physicians named in successful large claims did not contain a disproportionate number of young or old physicians. We have only a weak test of recidivism, but this test suggests that recidivism is not an important factor in generating the large claims. Of 107 large claims, only three involved physicians with the same birth year, place of training, and city of practice, and these may not have been the same individual. Finally, the large claims data reveal that large claims arise more often in large cities relative to the size of the place of residence of the patient. In other words, there is either a migration of difficult cases from smaller places to larger places for treatment or, less likely, there is a higher rate of malpractice in larger centres.

Similarly, with respect to hospital liability, increasing urbanization also increases the frequency of claims filed. Urbanization may be a proxy for increasing difficulty of procedures performed at urban hospitals, or for a greater propensity to litigate among patients of urban hospitals. It also appears that significantly more claims are lodged against Ontario hospitals than against those in other provinces, after adjusting for utilization and urbanization.

C. Mode of Practice, Degree of Specialization

1. Hypotheses

The mode of practice may affect both the frequency and severity of malpractice claims in either of two ways. As between a solo practitioner and one in a group practice, in the latter case there may be superior internal quality control checks, on the one hand, but a diminished sense of responsibility on the part of individual physicians for the outcome of
treatment, on the other. Unfortunately, the actual arrangements between practitioners in Canada are sufficiently varied that considerable errors of interpretation would arise in trying to measure the proportion of solo or group practitioners in Canada, so we have conducted no test of this relationship.

Another distinction is between the generalist and the specialist. Presumably the specialist offers higher quality care, but is held to a higher standard of care. More confusingly, the specialist may deal with the majority of the difficult cases in which adverse outcomes are more likely. Studying litigation rates for specialists and generalists should indicate which of these effects dominate.

2. Results

A specialist is defined as a physician in an area of practice other than family practice. Using this definition we find that an increase in specialization is negatively associated with both the proportion of paid claims and the severity of claims, while specialization is positively associated with the frequency of malpractice claims. However, none of these results is statistically significant in any of the estimated regression equations. Consequently, the effects of specialization on malpractice litigation, as identified above, appear to just offset each other such that changes in the degree of specialization do not significantly affect malpractice litigation. This does not contradict our finding, above, that some specialties experience much greater litigation rates than others.
D. Professional Discipline

1. Hypothesis

If the disciplinary process seeks actively to correct the problems brought about through medical malpractice, then an increase in adverse outcomes that leads to increased disciplinary action may result in an eventual reduction in the probability of an adverse outcome. We believe, however, that the disciplinary process may sanction rather different behaviour than that which is dealt with by the tort system. For example, Danzon\(^9\) reports that despite 1,500 paid malpractice claims in California in 1976 only six disciplinary actions for incompetence or gross negligence occurred in that year. Weiler\(^10\) reports that even after marked increases in disciplinary actions in the U.S. over the past decade or so, by the mid-80's there were only about 1,000 instances of probation, supervision and license revocation across the entire country -- around 400 losses of license in a physician population of about 400,000, compared to about 35,000 paid malpractice claims a year and a much larger number of negligently caused medical injuries which are not litigated for one reason or another. Moreover, most serious disciplinary actions related to behaviour such as improper drug prescriptions, alcohol or drug abuse, sexual misconduct with patients etc., rather than for substandard practice\(^11\). Therefore we expect to find that the frequency of malpractice claims is invariant to formal disciplinary proceedings by the provincial colleges of physicians and surgeons.

2. Results

Relatively little information has hitherto been available on the
interface between the tort system and the disciplinary activities of provincial colleges of physicians and surgeons. However, all provincial colleges provided us with information that yields some clues as to this interaction. The responding bodies indicated that it was extremely rare for a civil lawsuit to give rise to an investigation, and most said it never happened. Sources of information used to initiate investigations included patients, relatives and friends, other physicians, hospitals, and a mix of minor sources. The Deputy Registrar of the College of Physicians and Surgeons of Ontario stated that:

_Virtually no information relating to disciplinary action comes from malpractice awards or settlements. The ultimate resolution of these civil matters occurs many years after the facts upon which the case was based, and the College is literally the last to know. There is no requirement on members to notify the College of civil actions taken against them._

The disciplinary bodies of provincial colleges of physicians and surgeons appear to devote a substantial part of their resources to investigating and adjudicating allegations unrelated to negligence or incompetence. Data from the provincial colleges for 1983-1987 indicate that 69.8% of Canadian disciplinary cases which result in sanctions involve allegations other than negligence or incompetence; while 22.9% involve negligence and 7.3% involve incompetence. Thus existing disciplinary mechanisms appear to have very little overlap with the tort system.

Moreover, the number of physicians who are disciplined for negligence or for incompetence seems to be quite low compared with the number of settlements and awards for medical malpractice. As Table 6 indicates, the total number of physicians disciplined in Canada during 1983-1987 for negligence and/or incompetence was between 98 and 174. The actual number likely was closer to the former than to the latter. During 1983-1987,
plaintiffs received payments in respect of 916 malpractice lawsuits against CMPA-defended physicians (840 out-of-court settlements, plus 76 awards at trial). Thus, relative to the number of physicians in respect of whom payments were made to malpractice plaintiffs, the number of physicians formally sanctioned for negligence or for incompetence appears to be between 10.7% and 19.0% (but is likely closer to the former).

The actual ratio of physicians disciplined for negligence and/or incompetence, vis-a-vis the number of unsuccessful defendants in malpractice lawsuits likely is lower than indicated by this range. There are four reasons to believe that the denominator (916 claims resolved by payouts) significantly understates the number of negligent physicians. First, in some of the 76 awards at trial, more than one physician was found to be negligent. It also seems reasonable to assume that in some of the 840 out-of-court settlements, more than one physician effectively was admitted to be negligent. Second, it seems plausible that in some of the 1,826 malpractice actions against CMPA members which concluded during 1983-1987 without payment to plaintiffs, the defendant physician actually was negligent. Evidentiary and other problems may have left some plaintiffs who had inherently meritorious claims with neither out-of-court settlements nor court awards. Third, it seems reasonable to assume that some physicians in respect of whom payments were made to malpractice plaintiffs were not defended by the CMPA. The CMPA occasionally exercises its right to decline to defend a member physician. Furthermore, a small number of Canadian physicians are not CMPA members. Fourth, it seems plausible that many patients who suffered iatrogenic injury from a physician’s negligence did not undertake legal action. Danzon, on the basis of 1974 California data,
estimated that at most only one malpractice claim actually was filed for every 10 incidents from which valid claims could arise.\textsuperscript{13}

In light of these four factors, one must conclude that existing disciplinary mechanisms impose sanctions for negligence and/or incompetence in probably less than 10% of the cases of negligently-caused iatrogenic injury which are processed through the tort system, (and in perhaps much less than 10% of all incidents of negligently-caused iatrogenic injury). Hence, if a no-fault compensation system supplanted tort law in this area, existing disciplinary mechanisms -- if operating as they currently appear to do -- would fail substantially to fill whatever deterrence role tort law might otherwise play.

Yet it would be unfair to criticize the disciplinary bodies on this basis, since they are not at present mandated to function as a shadow tort system. Indeed, as we reported above, the large malpractice claims data reveal very little evidence of recidivism - recurrent or chronic defaults in performance - which might be thought to warrant the traditional disciplinary sanctions of suspension or revocation of licence, although it might be argued that the post-entry quality control mechanisms of the self-governing bodies of the medical profession should be more broadly conceived, e.g., practice guidelines, practice audits, practice limits, remedial retraining, etc.

III. The Social Environment

There are three major explanations for the increase in both the frequency and severity of malpractice litigation in Canada that are derived from within the social environment: general propensity to litigate, specific
propensity to litigate; and demographic shifts. Each of these three specific hypotheses is reviewed in turn.

A. General Propensity to Litigate

1. Hypotheses

Recent social and political theorizing has speculated that many individual members of communities in Canada, the U.S., the U.K. and probably other industrial societies, exhibit an increasing reluctance to accept risk. In this respect, reference is often made to the post-war growth of the welfare state, to a sharply increased role of governments in regulating health, safety, and environmental matters dating back to the 1960’s, and in the case of the tort system, attempts to shift risks to professional service providers (or in the product liability context, to manufacturers) who are assumed to possess the necessary technical expertise to reduce or eliminate risk or, because of greater resources, to bear residual risks. In the latter case, increasing social distance between clients and professionals may encourage this attitude and heighten claims consciousness. If this hypothesis is true, an increase in medical malpractice claims should be mirrored by similar increases in claims in other areas. In our study, we test this hypothesis by comparing litigation trends in other self-governing professions (lawyers, architects, accountants and engineers) and with respect to other personal injury claims (dentistry and automobile accidents). Consequently, our analysis of malpractice claims in non-medical areas provides a useful check on our analysis of medical malpractice not applied in previous studies.

That the proportion of injured victims who sue for malpractice is a
crucial determinant of claims frequency is revealed in several U.S. studies. Mills\textsuperscript{15} employed a team of medical/legal experts to review over 20,000 inpatient charts from 23 California hospitals for 1974 and found that about 1 in 20 hospital inpatients suffered an injury and 1 in 125 had a \textit{prima facie} legal claim of malpractice. Danzon\textsuperscript{16} subsequently estimated that at most only one malpractice claim was filed for every 10 potentially valid claims and at most only 1 in 25 patients with potentially valid claims received any compensation. The rate of claims filings in the U.S. has roughly doubled since the mid-1970's, so one might conjecture that currently one in five inpatients with potentially valid claims may file suit. If negligent injuries were equally common in Canada, then about one in 50 patients with a valid claim may file suit here. Clearly there is considerable scope for changes in the frequency of litigation arising out of changes in the propensity to sue once an injury has occurred.

2. Results

We compared trends in rates of frequency of claims against physicians with trends in frequency of claims rates in other litigation contexts. We found that over the past decade there have been marked increases in frequency rates for both Ontario and non-Ontario lawyers, for Ontario dentists, (see Table 7) and somewhat less dramatic increases in third party bodily injury claims arising out of automobile accidents in Ontario and the Atlantic provinces. (Not shown.) On the other hand, claims rates for Canadian architects, engineers and chartered accountants do not reflect any such increases. However, recent U.K. data with respect to architects, accountants, and veterinary surgeons do reflect sharp increases in frequency
rates. In the case of architects, there was one claim for every seven policies in 1979 and seven for every ten in 1987. Claims against veterinary surgeons in Britain doubled between 1981 and 1987, and the real value of paid and reserved claims against accountants increased by 82% between 1979 and 1984\(^\text{17}\).

To the extent that these comparative data suggest an increase in the general propensity to sue professionals, they may provide support for the hypothesis of an attitudinal shift towards risk-bearing. Increasing social distance between clients and professionals may also encourage greater resort to the tort system and heightened claims consciousness. However, our data revealed no significant positive relationship between interprovincial migration and immigration per capita and the frequency of malpractice litigation, although the higher frequency rates with respect to physicians practising in urban centres and with respect to hospitals located in urban centres might be interpreted as providing support for the social distance hypothesis.

B. Specific Propensity to Litigate

1. Hypotheses

The trends in malpractice liability against professionals not involved in health care and trends in liability arising from non-iatrogenic personal injury accidents, discussed above, provide some support for the proposition that there has been an increase in litigation against professionals who serve the general public, while in Canada there has been no such increase in litigation by institutional clients. To the extent that the data suggest a greater increase in the propensity to litigate claims against physicians or
hospitals than in other professional contexts, the conundrum that requires explanation is that with rapid rates of innovation in the provision of medical care, which presumably have reduced health-related risks to society, we have simultaneously witnessed a dramatic increase in the frequency of malpractice claims.

Grady has recently hypothesized that particular features of the tort regime of negligence liability imply that in periods of rapid technological innovation, which may indeed be reducing health risks for society at large, the possibilities for momentary acts of inadvertence by physicians and other medical staff are sharply increased and that the legal system is unforgiving of the costs entailed in achieving consistently higher levels of advertence. He argues, for example, that prior to the invention of dialysis machines, patients frequently died from kidney failure, but these natural events fell outside the purview of the tort system. Following the invention of dialysis machines, which sharply reduced mortality rates from kidney failure, the possibilities of inadvertence by physicians and other medical staff in initial diagnosis as to the appropriateness of prescribing this form of medical intervention and in monitoring its application to particular patients thereafter, sharply increased. Similar theses might be advanced with respect to technically complex forms of surgery, such as brain surgery or open heart surgery, or technically complex interventions in the case of premature babies, where the possibilities of momentary acts of inadvertence, with the potential for serious outcomes, have been significantly multiplied. The Grady hypothesis can be loosely tested by examining differences in frequency of claims rates across specialties and by examining the nature of the medical procedures involved in malpractice
claims.

2. Results

We have details of the nature of the treatment and the allegations of malpractice only for the 107 large claims, and a review of these data does not reveal large numbers of errors that appear to involve recent and demanding technology. Moreover it is often difficult to determine whether a report that a procedure was improperly performed is an example of momentary inadvertence. However the prevalence of major surgery (37% of losses) among the treatments giving rise to injuries and of anaesthesia (32% of losses) among the allegations of malpractice, indicate the importance of these highly intrusive activities in generating large claims. If it is fair to characterize major surgery as an activity in which a momentary lapse in attention or judgment raises risks of serious injury, then the Grady hypothesis is also supported by our finding above that much of the variation in claims frequency across specialties is explained by variations in the performance of major surgery. Among the anaesthesia claims were many alleging failure to monitor the patient’s condition, which is consistent with momentary inadvertence while using technology that is life-threatening. The errors in diagnosis (15% of losses) might represent momentary inadvertence, in cases where proper diagnosis could have led to an intervention of great efficacy. A number of other claims mention failure to monitor drug doses, or to diagnose certain patient conditions, but again it is difficult to determine whether these lapses represent momentary inadvertence. We were told by lawyers on both sides of the malpractice litigation bar that most of the claims do not arise from the general
incompetence of a physician, but from a momentary lapse by a competent practitioner. This view is supported by our inability to find evidence of recidivism in the large claims data. While our data do not allow us to prove the Grady hypothesis, they are clearly not inconsistent with it, particularly if one interprets it as referring not just to interventions involving sophisticated technology, but to all interventions that give rise to risks of serious harm if a small mistake is made.

C. Demographic Shifts

1. Hypothesis

Another way to identify sources of increase in claims is to try to identify population groups that are significantly at risk of costly injuries. One might hypothesize that the risks of childbirth would cause women of child-bearing age to be over-represented in the patient population, and similarly that newborns would be over-represented. One might also expect high representation from the elderly, given their reduced ability to recover from trauma, but this could be offset by lower damage awards for those who have lost fewer years of earning power, and whose cost of care will be limited by a limited natural lifespan.

2. Results

We performed a regression analysis of the semi-aggregate data, defining these high-risk groups as: children under 5; women aged 18-44; and patients over 65. We found that although the demographic variables were unrelated to both the frequency of malpractice claims and the proportion of paid claims, they were all significant in determining the
size of the average paid claim. Specifically, an increase in either the proportion of the population under 5 or women aged 18-44 raises the average paid claim, while an increase in the proportion of the population over 65 lowers the average paid claim.

Although the results derived from the inclusion of the demographic variables are consistent with the foregone earnings hypothesis, an explicit test of this hypotheses requires the inclusion of a variable representing the patient's real wages at the time the malpractice case was closed. Since the median interval between the incident date and the date at which the case closed is just over three years, we used average real wages three years after the incident date to test these hypotheses. Wages were found to be significantly positively associated with the average paid claim, but unrelated to the other dimensions of malpractice liability. These results provide support for the hypothesis that foregone earnings play a major role in the determination of the average paid claim.

In addition to foregone earnings, the nominal rate of inflation should be positively associated with the average paid claim because pre-judgment interest is added to the calculated damages. The large claims data revealed an increase in "interest" elements in claim payments from 4 percent in early claims to 7 percent in later claims. To test this hypothesis, we include the yield on long term bonds (ten years and above) lagged three years from the accident year to approximate the time that the case closed. The results show a significant positive relationship between the yield on long term bonds and the average paid claim, thereby supporting the hypothesis that pre-judgment interest is an important determinant of the severity of malpractice claims.
We explored a more limited set of demographic issues using the large claims data. The special risks arising from childbirth are demonstrated in the 10 patients, representing 9 percent of all patients, in the youngest category, all of whom were injured at or before birth. Of these newborns, 9 were male and only one was female. The age distribution of injured females includes large numbers in their 20's and 40's, while the males are predominantly in their 20's and 30's. Fully 64 percent of the patients are males, belying the hypothesis that females would predominate because of the risks associated with childbirth. Contrary to one hypothesis, the elderly are rare as plaintiffs in large claims, perhaps reflecting the relatively smaller damages that would be awarded based on lost earnings for a given injury to an elderly person in comparison to the damages for the same injury to a young person. Because we do not have data on the age distribution of medical patients in general, we cannot draw strong conclusions from these results, but of our three expected high risk groups, only infants stand out in these data.

The disproportionate number of males (9 versus 1 female) among injured infants is unlikely to represent random variation in the data, since the likelihood of finding only one female among 10 injured is one in 100 if the injuries are actually equally distributed. However an important element in damages is lost earnings, and even today most courts are likely to assess substantially higher lost earnings for a male than for a female. Higher expected damages for males could lead to a greater propensity to sue for an injured male newborn. Thus, this disproportionate number of male infants, and the general excess of males over females, may reflect greater lost earnings for males, which in turn causes an increase in the frequency with
which injuries are litigated. If so, it is an example of increased severity driving increased frequency.

IV. The Legal Environment

There are three major categories of changes within the legal environment that may explain the increase in malpractice litigation in Canada: liability rules, compensation rules; and legal costs. Each of these three specific hypotheses is reviewed in turn.

A. Liability Rules

1. Hypotheses

Over the last twenty years in many jurisdictions, there has been a relaxation in both the customary practice and locality rules, an enlargement of the scope of the doctrine of \textit{res ipsa loquitur}, enlarged scope for jury determination, erosion of the technical expertise/common knowledge distinction in defining standards of care etc. However, many of these changes, which might be expected to increase the frequency of malpractice claims, are difficult to measure. Two changes that are easier than others to identify concern the more stringent requirements for informed consent, which were imposed by a 1980 Supreme Court of Canada decision,\textsuperscript{19} and more generous limitations periods. In our study, we focus mainly on the former, since there were no major changes in limitation periods in Canada during the period under review.

Danzon\textsuperscript{20} has shown that in the United States, pro-plaintiff laws (covering the abolition of the locality rule and charitable immunity, more stringent requirements of informed consent and \textit{respondeat superior})
contributed significantly to the growth in both the frequency and severity of malpractice claims. Although similar conclusions were reached by Reder\textsuperscript{21} and Feldman\textsuperscript{22}, Sloan\textsuperscript{23} either found no effect or perverse effects of legislative changes on premiums. Adams and Zuckerman\textsuperscript{24} found the frequency of malpractice claims to be significantly positively associated with both more generous limitations periods and with restrictions on the doctrine of informed consent. While initially Danzon\textsuperscript{25} was unable to observe any significant effect of shorter statutes of limitations, in a more recent study she found that on average cutting one year off the statute of limitations for adults reduces claims frequency by eight percent\textsuperscript{26}.

2. Results

Our regression analysis reveals that both the severity of injuries and the proportion of claims responded to lagged dependent variables which roughly capture the slow evolution of legal doctrines. This result provides support for the view that considerable inertia exists in the determination of both the proportion of paid claims and in the severity of these claims.

The effect of liability rules on the frequency of malpractice cases is captured by the predicted proportion of claims paid, on the grounds that if a potential litigant anticipates a higher probability of a successful suit, the litigant has a greater incentive to file a malpractice claim. Our regression analysis found a significantly positive relationship between the predicted proportion of claims paid and the frequency of malpractice claims, supporting the hypothesis that liability rules play a significant role in the initiation of malpractice litigation. Indeed, after accounting
for the contribution of both surgical procedures and the predicted size of the paid claim on the frequency of malpractice claims, the predicted proportion of claims paid is the next most important variable accounting for variations in the frequency of malpractice litigation.

We tested the impact of more stringent requirements for informed consent on the three dimensions of malpractice liability: frequency of claims filing, proportion of claims paid, and magnitude of the award. Our informed consent variable distinguishes claims settled before and after January 1, 1981, the approximate date that informed consent requirements were changed. Other events at about the same time are also captured by this variable. The move to apply real discount rates to future costs, which increased awards with large future cost components, occurred about 1980 in Ontario. The inclusion of gross-up for taxes on awards occurred in Ontario during the early 1980's. Although the informed consent variable has an insignificant negative effect on both the proportion of paid claims and the severity of those claims, it is significantly positively related to the frequency of claims filing, indicating that these legal changes have significantly increased the claims frequency.

B. Compensation Rules

1. Hypotheses

Doctrinal changes, such as changes to the assessment of non-pecuniary damages, pre-judgement interest, use of real interest rates to discount future losses to present value, gross-up, and relatives' claims under Ontario's Family Law Reform Act, that increase the quantum of both pecuniary and non-pecuniary damages raise the value of both settlements and
court awards. This should increase the frequency of claims filing. Although the rules governing compensation have evolved slowly over the past twenty years, three landmark cases, the 1978 "trilogy" of decisions by the Supreme Court of Canada\textsuperscript{27}, laid out the general principles of damage calculation in personal injury cases. In our study, we focus particularly on the implications for frequency and severity of malpractice claims of the grossing-up of damage awards to offset the tax impact on the income stream from invested awards. The income tax gross-up was recognized by Ontario courts immediately following the "trilogy" and according to Rea\textsuperscript{28} (1987) has substantially increased the quantum of damages in serious personal injury cases.

Danzon\textsuperscript{29} has examined the impact of various doctrinal changes relating to quantum on malpractice litigation\textsuperscript{30} (see also Hughes, 1989). With respect to changes in compensation rules, she found that the introduction of laws that allow or require reductions in awards to reflect coverage from other sources (collateral benefits) reduce significantly both the frequency and severity of malpractice claims -- frequency by fourteen percent and severity by eleven to eighteen percent relative to comparable states without collateral source offset\textsuperscript{31}. Danzon\textsuperscript{32} and Danzon and Lillard\textsuperscript{33} also found that caps on awards have reduced the severity of malpractice claims by about twenty-three percent on average. Consequently, we anticipate finding a positive relationship between both the frequency and severity of malpractice claims in Canada and our estimates of the damages awarded to successful litigants.
2. Results

The semi-aggregate data allow only limited testing of hypotheses relating to compensation rules. The finding in the regression analysis that the frequency of claims is significantly positively related to the predicted severity of such claims provides support for the hypothesis that compensation rules play a significant role in the initiation of malpractice litigation, since an injured patient's incentive to initiate a malpractice claim should increase with increases in the predicted award for the malpractice claim. The predicted severity variable is the second most important variable accounting for variations in malpractice litigation after the utilization of major surgery.

By moving from a model of malpractice claims frequency that rests solely on surgical utilization to a model that also depends on the predicted severity of settlements, the predicted proportion of successful claims, restrictions on the defense of informed consent, and increases in the quantum of damages, we increase the proportion of the variability in the frequency of claims filing that we can explain from 90 to almost 95 percent. This means that the addition of the legal variables to the frequency equation allows us to account for 50 percent of the variation in the frequency of malpractice claims over time and 98 percent of the inter-specialty variation in the 1976-84 data set. We are not convinced, however, that these statistical results imply that changes in legal doctrine account for one-half of the almost quadrupling in frequency of suits filed per practicing physician between 1971 and 1988. The statistical analysis covers only one-half of the total time period of interest. Furthermore, there was little change in legal doctrine during the 1970's
when one-half of the growth in frequency occurred. We suspect that changes in legal doctrine actually account for closer to one-third than to one-half of the increase in frequency of litigation over the entire period.

The large claims data allow for more detailed analysis of the compensation rules, since they include the total amount awarded for each claim, and a breakdown of the award into the following components: lost income, medical expenses, past medical expenses, cost of care, initial outlay and past cost of care, gross-up, claims by relatives, interest, legal costs, other expenses, and nonpecuniary damages.

The relative importance of the components of damages is shown in Table 8. After some adjusting, the sum of the components of the CMPA share of payments is 65.7 million dollars in 1987 dollars. Approximately 27 percent of this amount is attributed to lost income, 36 percent to cost of care (including medical expenses, cost of care, initial cost, and gross-up). Nonpecuniary damages accounted for 15.4 percent of the total. Other elements are also shown in the table.

We note that Rea\textsuperscript{34} predicted that awards for short term partial disability could increase by 2% per year due to the effect of the "trilogy" cases on damage calculations, and that awards for permanent disability of a 21-year old might increase by as much as 16% per year. He also suggested that the judicial requirement that specific heads of damage be listed led to increases in damages asked and awarded. We therefore expected large increases in the magnitude of awards attributable to gross-up, to the use of lower real interest rates for discounting future earnings loss and cost of care, and increases in the early 1980's attributable to the awarding of pre-judgment interest.
To investigate whether there has been a change over time in the allocation of these damages, we divided the claims into those closed prior to January 1, 1985 (50 claims) and those closed after that date (57 claims). The distribution of payments among the components of damages for these "early" and "late" claims is also shown in Table 8. We had predicted that the allowance of gross-up in Ontario after January 1, 1980 and other factors would have led to an increase in the relative importance of care costs between the early and late claims. In fact, care costs actually decline in relative importance, but only fifteen claims closed prior to January 1, 1980, so this test is not robust. An examination of the amounts allocated specifically for gross-up shows that this allocation occurred only in Ontario, but that it accounted for a total of only $454,000 representing a small handful of claims, an amount too small to account for significant upward trends in liability. We are confident that gross-up has added much more than this to the amounts awarded in malpractice cases involving permanent disability, so we must conclude that the large claims data have failed to identify separately this head of damages in many cases. Ontario claims represented 53.6% of the total care costs, compared to 51% of total claims dollars paid, which only weakly supports the hypothesis that gross-up costs, included in these total care costs, in Ontario are significantly greater than in other provinces. On the other hand, payments for Ontario claims increased more rapidly than those of the other provinces during the 1980's, so gross-up may have contributed to this increase.

During the 1970s, most provinces began to allow compensation for pre-judgement interest. Ontario allowed pre-judgement interest in 1977. Unfortunately, most of these changes took place before the closing date of
most of the large claims, so we cannot test accurately whether there was a change in the amount of pre-judgement interest awarded. Table 8, however, shows clearly that interest payments rose from 3.9 percent in the early claims to 7.2 percent in the later claims. Since nominal interest rates increased greatly during the early 1980s, the increase in interest costs shown in Table 8 may be primarily attributable to increasing interest rates, rather than to changes in doctrine. Because our data do not separate pre- and post-judgement interest, we do not have a test for the relative importance of the former.

A third legal doctrine involves increased allowances for third party claims by relatives. Again, different provinces allowed this recovery at different times. Ontario expanded its compensation in this area with the Family Law Reform Act of 1978. Table 8 shows claims by relatives increasing from 7.8 percent of the total payments in the early period to 9.1 percent in the later period. This appears consistent with the expansion of the doctrine allowing such claims. Here, Ontario claims represent 70% of all awards for claims by relatives, indicating that such claims are relatively much more important in Ontario than in the other provinces. Since total payments to relatives amounts to about $5.6 million in the large claims data, the extra cost of Ontario’s expanded liability is significant.

Finally, legal fees rose from 4.7 to 5.8 percent of the total payments between the early and the late period. Here, again, Ontario’s share of legal costs exceeds its share of all costs, so Ontario plays a prominent role in this increase, although the total amounts are not large enough to contribute greatly to the overall growth in loss experience.
We may also use the large claims data set to examine whether the cost of a given type of claim has increased between the late 1970's and the mid-1980's, by selecting from the large claims those that seem similar in both the early and late part of the period and comparing their magnitude. Four sets of cases were examined.

First we examined the claims for serious injuries to newborns. Rea predicts that settlements for permanent total disability of young patients should rise dramatically in real terms between 1978 and 1983 or so. The data for 10 such claims in our large data set do seem to show a doubling of claim size between 1980 and 1983, but a drop in 1986 is inconsistent with the hypothesis. However, liability was not admitted in one of the 1986 claims, which may have led to a settlement lower than would have been achieved if liability were admitted (as it apparently was in all other cases). If the no-liability claim is omitted, the 1986 average is consistent with the hypothesis that there was a marked increase from 1980 to 1983.

Our second approach was to examine claims involving fatalities. The average magnitude of these claims was just over $419,000 in 1987 dollars. Here we found three males within the ages of 30 to 33 years whose claims were settled before the end of 1980, with an average settlement of $292,000. Four males aged 27 to 38 years were found whose claims were settled between 1982 and 1987. One of this group suffered almost $1 million in lost income, an extraordinarily high value in this data set. Setting aside that individual, we have three late fatalities for an average claim of $384,000. These data imply an increase in compensation for a fatality of approximately one-third between about 1979 and about 1983.
Third, we examined claims involving grave permanent disability excluding newborns. When we examined matched sets of males or females in similar age ranges, divided into the early and late period, no support could be found for the hypothesis that damage awards had increased. In fact, reductions of approximately one-quarter to one-third were observed in the three sets of matched data that were discovered. It seems likely that this result must arise from important differences between the matched pairs of data, but we have not been able to investigate this further.

Finally, we examined the data set involving major permanent total disability. Three matched pairs of cases, one male and two female, all in their mid-teens to mid-twenties were identified. In each of these cases, there was a considerable increase in the damage award ranging from 33 per cent to 500 per cent. We conclude from these data that with respect to this type of injury average compensation has indeed increased - by 50 per cent to 100 per cent - from the late 1970s to the mid-1980s.

The large claims data do not yield unambiguous support for the proposition that average severity has increased (unlike the semi-aggregate data). There is however strong evidence in the case of major permanent total disability that very considerable increases in damages have occurred. There may also have been a large increase in compensation for disabling injuries to newborns during the early 1980s.

C. Legal Costs

1. Hypotheses

A decline in legal costs may increase the frequency with which malpractice claims are filed since the plaintiff incurs a lower cost in the
event of an unsuccessful suit. Specifically, the availability of both legal aid and contingency fees\textsuperscript{36} in malpractice cases may have a significant effect. In addition, the state of the market for lawyers may be significant on the hypothesis that increased supply lowers the fee schedule for lawyers thereby making litigation more attractive for the plaintiff\textsuperscript{37}. Although there is considerable appeal to the hypothesis that both the frequency and the severity of malpractice claims are influenced by the supply of lawyers, the existing empirical results from the United States do not support this hypothesis\textsuperscript{38} In spite of finding a positive association between lawyers per capita and the frequency of malpractice claims, Danzon is able to reject this hypothesis when she controls for other characteristics of areas with a high lawyer density. We were not able to test for the effects of legal aid and contingency fees on the frequency of malpractice claims (the CMPA claims data does not reveal which cases were financed in these ways), but we did test the relationship between the supply of lawyers and the trends in malpractice claims.

2. Results

We performed an analysis of the impact of the supply of lawyers on the frequency of litigation, using the semi-aggregate data. Although a decline in legal costs may increase the frequency of malpractice litigation, we were unable to observe the legal costs associated with a malpractice claim directly in the semi-aggregate data. We were, however, able to approximate the movement in legal costs by considering the state of the market for lawyers. Specifically, we examined the effect of an increase in the number of lawyers per capita, excluding lawyers in corporate law departments and
notaries in all provinces including Quebec, on all three dimensions of malpractice liability: frequency, proportion of claims filed that yield compensation, and severity. The results all reveal insignificant effects of lawyers per capita on malpractice litigation, thereby rejecting the hypothesis that the trends in malpractice liability are due to an increase in the supply of lawyers. Of course, the real issue is not the supply of lawyers, but the cost or opportunity cost of lawyers' time, which depends on both the supply and the demand for legal services. We do not have the data necessary to perform this test, so our conclusion is a weak one: an increased supply of lawyers does not seem to cause an increase in malpractice litigation.

V. Conclusions

By way of summary of the results of our study, the cross-specialty differences in frequency of claims rates are almost entirely explained by differences across specialties in the performance of major surgery. With respect to the substantial general increase in frequency rates over the last decade and a half with respect to all physicians, a substantial portion of this increase, perhaps one-third, seems attributable to changes in legal doctrines, both with respect to liability rules and compensation rules, but predominantly the latter. As to the remaining increase, we find some evidence of an increased general propensity for individuals to sue professionals, thus tentatively confirming recent theorizing about changes in general social attitudes to risk bearing and to litigation as a vehicle for risk shifting. We also believe that the overwhelming role played by major surgery in explaining cross-specialty frequency rates and other more
impressionistic evidence from the large claims data set lend some credence to the Grady hypothesis that in a period of rapid technological and scientific innovation, which presumably is reducing health risks for society at large, possibilities for momentary acts of inadvertence by physicians and other medical staff are sharply increased and that the legal system is unforgiving of the costs entailed in achieving consistently high levels of advertence. The fact that rates of malpractice litigation in Canada, the U.S. and the U.K. have all grown rapidly in recent years suggest caution in seeking explanations exclusively in doctrinal nuances peculiar to a particular jurisdiction and require us to take seriously changes in the professional and social environment, in addition to changes in the legal environment. Moreover, the substantial increases in frequency and severity of malpractice claims in Canada over the course of the 1970s, before any significant doctrinal changes had occurred (principally in the early 1980s) reinforce the importance of these non-legal explanatory factors.

Our study finds no evidence that so-called defensive medicine significantly influences the frequency of claims filed, the proportion of claims that succeed, or the average magnitude of awards. Similarly, age and place of training of physicians and increases in the supply of lawyers do not seem to be significant factors in explaining malpractice litigation trends. There also appears to be little relationship between the functioning of the malpractice system and the functioning of the formal disciplinary processes of the medical profession.

As to trends in severity, we found few significant differences across specialties (with the exception of higher average awards against anesthetists). The substantial growth in average real severity over time
with respect to all physicians seems primarily attributable to changes in compensation rules and to a lesser extent to demographic changes and changes in medical technology, especially with respect to infants (again perhaps exemplifying the Grady hypothesis).
### Table 1

**Writs and Claims per 100 Physicians**

<table>
<thead>
<tr>
<th></th>
<th>Canada(^1) Writs Filed</th>
<th>Claims Paid</th>
<th>United States Claims Filed(^2)</th>
<th>Ratio (3)/(1)</th>
<th>Canada Writs Filed Per Real 1981 Billion $'s Billed</th>
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<tr>
<td>1970</td>
<td>0.55</td>
<td>0.21</td>
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<tr>
<td>1971</td>
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</tr>
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<td>0.22</td>
<td>7.5(^5)</td>
<td>8.8</td>
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<tr>
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<td></td>
<td></td>
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</tr>
<tr>
<td>1979</td>
<td>1.31</td>
<td>0.38</td>
<td>10.6(^6)</td>
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</tr>
<tr>
<td>1980</td>
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<td>11.4(^6)</td>
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<tr>
<td>1988</td>
<td></td>
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Growth rate\(^8\) 8.2% 6.1%

1. The number of writs filed and claims paid is obtained from the CMPA. The number of physicians is the membership of the Canadian Medical Protective Association. The population per active civilian physician in Canada, excluding interns and residents, has fallen from 791 to 542 between 1971 and 1987, so the writ frequency per 100,000 population has increased from 0.6 to 3.5.

2. These figures are derived from St. Paul Fire and Marine Insurance Company, the leading U.S. underwriter of malpractice insurance.

3. Danzon (1985, p. 60) reports the number of claims pending per 100 physicians. This figure overstates the claim frequency in 1970 since it includes both the claims filed in that year as well as the unresolved claims filed in prior years.

6. United States General Accounting Office (1986, Table 2.5).
8. Estimated using an exponential model.
Table 2  
Average Value of Paid Writs and Claims  
Thousands of Dollars

<table>
<thead>
<tr>
<th>Year</th>
<th>Canada1 Average Paid Claims</th>
<th>United States2 Average Paid Claims</th>
<th>Ratio (4)/(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Current $</td>
<td>1987 $</td>
<td>Current U.S. $</td>
</tr>
<tr>
<td>1970</td>
<td>8.0</td>
<td>26.2</td>
<td>11.53</td>
</tr>
<tr>
<td>1971</td>
<td>5.5</td>
<td>17.2</td>
<td>26.64</td>
</tr>
<tr>
<td>1972</td>
<td>9.0</td>
<td>26.2</td>
<td>75.1</td>
</tr>
<tr>
<td>1973</td>
<td>13.4</td>
<td>35.1</td>
<td>82.5</td>
</tr>
<tr>
<td>1974</td>
<td>18.5</td>
<td>43.7</td>
<td>34.84</td>
</tr>
<tr>
<td>1975</td>
<td>33.4</td>
<td>68.0</td>
<td>45.24</td>
</tr>
<tr>
<td>1976</td>
<td>15.0</td>
<td>27.9</td>
<td>80.75</td>
</tr>
<tr>
<td>1977</td>
<td>48.4</td>
<td>82.8</td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td>27.1</td>
<td>42.1</td>
<td></td>
</tr>
<tr>
<td>1979</td>
<td>38.2</td>
<td>52.8</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>38.9</td>
<td>48.6</td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>53.5</td>
<td>63.1</td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td>101.4</td>
<td>114.6</td>
<td>80.75</td>
</tr>
<tr>
<td>1983</td>
<td>91.9</td>
<td>99.9</td>
<td></td>
</tr>
<tr>
<td>1984</td>
<td>80.2</td>
<td>83.7</td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>117.2</td>
<td>117.2</td>
<td></td>
</tr>
<tr>
<td>1986</td>
<td>126.3</td>
<td>121.4</td>
<td></td>
</tr>
</tbody>
</table>

Growth Rate6
18.3% 9.5%

1. Average paid claims are obtained from Figure 2-3, while the Consumer Price Index, derived from the Bank of Canada Review, various issues, was employed to convert the paid claims into 1987 dollars.
2. The U.S. consumer price index was used to convert the U.S. dollars in column 3 to 1987 U.S. dollars. The Canada-U.S. exchange rate, derived from the Bank of Canada Review, was employed to convert 1987 U.S. dollars to Canadian dollars.
5. United States General Accounting Office (1987, p.2). This is the total indemnity payment by 102 insurers divided by the number of claims closed with payment. About 9 percent of these paid claims represent 61 percent of the total indemnity payment.
6. Estimated by an exponential model. Estimation for columns 1 and 2 over the period 1976-87 produced growth rates of 15.0% and 6.3%, respectively.
Table 3
Average Malpractice Fees

<table>
<thead>
<tr>
<th>Year</th>
<th>Canada(^1)</th>
<th>United States(^2)</th>
<th>United States</th>
<th>Ratio (^{(4)/(2)})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Canadian Dollars</td>
<td>Current US $</td>
<td>1987 Canadian $(^3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current $</td>
<td>1987 $</td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>1974</td>
<td>185</td>
<td>407</td>
<td>2500</td>
<td>7708</td>
</tr>
<tr>
<td>1975</td>
<td>198</td>
<td>403</td>
<td>4700</td>
<td>12567</td>
</tr>
<tr>
<td>1976</td>
<td>242</td>
<td>452</td>
<td>5800</td>
<td>9135</td>
</tr>
<tr>
<td>1977</td>
<td>241</td>
<td>413</td>
<td>7100</td>
<td>10835</td>
</tr>
<tr>
<td>1978</td>
<td>239</td>
<td>372</td>
<td>8400</td>
<td>12292</td>
</tr>
<tr>
<td>1979</td>
<td>232</td>
<td>445</td>
<td>10500(^4)</td>
<td>14832</td>
</tr>
<tr>
<td>1980</td>
<td>314</td>
<td>391</td>
<td>9135</td>
<td>12292</td>
</tr>
<tr>
<td>1981</td>
<td>436</td>
<td>514</td>
<td>10835</td>
<td>14832</td>
</tr>
<tr>
<td>1982</td>
<td>716</td>
<td>809</td>
<td>12292</td>
<td>14832</td>
</tr>
<tr>
<td>1983</td>
<td>950</td>
<td>1033</td>
<td>14832</td>
<td></td>
</tr>
<tr>
<td>1984</td>
<td>1238</td>
<td>1292</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>1828</td>
<td>1828</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1986</td>
<td>2190</td>
<td>2104</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Growth rate\(^5\)

<table>
<thead>
<tr>
<th>Period</th>
<th>Rate</th>
<th>Annual Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976-88</td>
<td>24%</td>
<td>15.4%</td>
</tr>
<tr>
<td>1982-87</td>
<td>42%</td>
<td>39%</td>
</tr>
</tbody>
</table>

1. Total CMPA fee revenues divided by the number of members.

2. The average malpractice fees for the U.S. were reported by Reynolds, R. A., J. A. Rizzo and M. Gonzales, "The Cost of Medical Professional Liability", (1987) 237 JAMA 2776. These figures were derived from the American Medical Association’s Periodic Survey of Physicians and Socioeconomic Monitoring System Survey.

3. The U.S. consumer price index was used to convert the U.S. dollars in column 2 to 1987 U.S. dollars. The Canada-U.S. exchange rate, derived from the Bank of Canada Review, was employed to convert 1987 U.S. dollars to Canadian dollars.


5. Estimated by a general Box-Cox model.
Table 4
Malpractice Litigation Trends in the U.K.

<table>
<thead>
<tr>
<th>Year</th>
<th>Claims Opened&lt;sup&gt;1&lt;/sup&gt; Region E (Claims per 100,000 pop.)</th>
<th>Average Award&lt;sup&gt;2&lt;/sup&gt; (1976=100)</th>
<th>Maximum Award&lt;sup&gt;3&lt;/sup&gt; (£ 000)</th>
<th>Defence Society Rates&lt;sup&gt;4&lt;/sup&gt; (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>100</td>
<td>140</td>
<td>229</td>
<td>40</td>
</tr>
<tr>
<td>1977</td>
<td>110</td>
<td>105</td>
<td>220</td>
<td>70</td>
</tr>
<tr>
<td>1978</td>
<td>4.0</td>
<td>140</td>
<td>312</td>
<td>120</td>
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<tr>
<td>1979</td>
<td>4.1</td>
<td>105</td>
<td>263</td>
<td>95</td>
</tr>
<tr>
<td>1980</td>
<td>4.2</td>
<td>200</td>
<td>135</td>
<td>195</td>
</tr>
<tr>
<td>1981</td>
<td>5.1</td>
<td>230</td>
<td>399</td>
<td>264</td>
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<tr>
<td>1982</td>
<td>5.3</td>
<td>360</td>
<td>414</td>
<td>288</td>
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<td>1983</td>
<td>7.5</td>
<td>280</td>
<td>581</td>
<td>336</td>
</tr>
<tr>
<td>1984</td>
<td>9.3</td>
<td>370</td>
<td>679</td>
<td>576</td>
</tr>
<tr>
<td>1985</td>
<td>12.3</td>
<td>420</td>
<td>1030</td>
<td>1080</td>
</tr>
<tr>
<td>1986</td>
<td>16.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>20.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1988</td>
<td>19.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All data from Ham, C., R. Dingwall, P. Fenn, D. Harris. 1988. **Medical Negligence: Compensation and Accountability.** (London, King's Fund Institute, 1988). All financial data are in current pounds; that is, there is no correction for inflation in these figures.

1 Ham, *et. al.*, Fig. 5. Claim rate for region E in England, which is the region with the highest claims rate.

2 Ham, *et. al.*, Fig. 2. Average cost of settlements, from the Medical Protective Society.

3 Ham, *et. al.*, Fig. 3. Highest sum awarded in medical negligence cases, as reported by the Medical Defense Union.

4 Ham, *et. al.*, Table 3. Full subscription rates paid to the medical defense societies. These rates appear to be common to the Medical Defense Union and the Medical Protective Society.
Table 5
Litigation Characteristics by Physician Specialty
Semi-aggregate Data: Closed Claims

<table>
<thead>
<tr>
<th>Anaesthesia</th>
<th>Obstetrics &amp; Gynaecology</th>
<th>Family Practice</th>
<th>Orthopaedic Surgery</th>
<th>Missing Cases</th>
<th>Other Areas of Practice</th>
<th>All Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Number Defendant Physicians per 100 Physicians</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1976-84</td>
<td>4.39</td>
<td>9.08</td>
<td>1.55</td>
<td>18.00</td>
<td>2.76</td>
<td>2.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claim Severity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Paid Claim $</td>
<td>164,840</td>
<td>67,625</td>
<td>111,500</td>
<td>78,329</td>
<td>91,530</td>
<td>103,590</td>
</tr>
<tr>
<td>Standard Deviation $</td>
<td>371,540</td>
<td>246,910</td>
<td>302,280</td>
<td>140,360</td>
<td>202,850</td>
<td>285,070</td>
</tr>
<tr>
<td>Coefficient of Variation</td>
<td>2.25</td>
<td>3.65</td>
<td>2.71</td>
<td>1.79</td>
<td>2.22</td>
<td>2.75</td>
</tr>
<tr>
<td>Median Paid Claim $</td>
<td>16,215</td>
<td>10,170</td>
<td>15,657</td>
<td>19,162</td>
<td>16,297</td>
<td>16,297</td>
</tr>
<tr>
<td>Ratio of Mean to Median</td>
<td>10.17</td>
<td>6.65</td>
<td>7.12</td>
<td>4.09</td>
<td>5.62</td>
<td>6.36</td>
</tr>
<tr>
<td>Percentage of Total Paid Damages</td>
<td>10.13</td>
<td>6.34</td>
<td>26.30</td>
<td>7.55</td>
<td>7.14</td>
<td>42.54</td>
</tr>
</tbody>
</table>
Table 6
AGGREGATE CANADIAN DISCIPLINE
OF NEGLIGENT OR INCOMPETENT PHYSICIANS, 1983-1987

<table>
<thead>
<tr>
<th>Physicians Formally Sanctioned For</th>
<th>All Reasons</th>
<th>Negligence</th>
<th>Incompetence</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Columbia, 1983-1987</td>
<td>60</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Alberta, 1982, 1984-1986</td>
<td>27</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Saskatchewan, 1983-1987</td>
<td>25</td>
<td>4</td>
<td>11&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Manitoba, 1985-1988</td>
<td>6</td>
<td>1</td>
<td>1&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Ontario, 1983-1987</td>
<td>105</td>
<td>64</td>
<td>5</td>
</tr>
<tr>
<td>Québec, 1983/84-1986/87</td>
<td>56</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>New Brunswick, 1983-1987</td>
<td>35</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Nova Scotia, 1986-1987</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Prince Edward Island, 1983-1987</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Newfoundland, 1983-1987</td>
<td>15</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>328</strong></td>
<td><strong>75&lt;sup&gt;d&lt;/sup&gt;</strong></td>
<td><strong>24&lt;sup&gt;d&lt;/sup&gt;</strong></td>
</tr>
</tbody>
</table>

<sup>a</sup>Sept. 1981 to Jan. 1988. There is a fair likelihood that two other physicians, who refused to attend competency hearings, also would have been found to be incompetent.

<sup>b</sup>The physician in question appears in both the "negligence" and the "incompetence" columns, as he was disciplined on both grounds.

<sup>c</sup>The total number of physicians sanctioned for all causes in Québec during the four year period 1983/84-1986/87 was 56. Extrapolated to the five year period 1983-1987, the total would be 70. Because this total includes sanctions for reasons other than negligence or incompetence, 70 is estimated as the maximum possible number of physicians sanctioned for negligence or incompetence.

<sup>d</sup>This amount understates the Canadian total. The unavailability of one year's Alberta data and of one year's Manitoba data probably entails an understatement of no more than 2 physicians and of 1 physician, respectively. The unavailability of Québec data involves, at most, an understatement of less than 70 physicians (see note "b" above) for negligence and incompetence combined; but the actual Québec-related understatement likely is significantly less than 70. Finally, the unavailability of Nova Scotia data for 1983-1985 implies an understatement of probably no more than 5 physicians. Slightly offsetting these understatements is an extra 16 months of data on Saskatchewan competency assessments, probably accounting for an overstatement of 2 physicians.
Table 7
Claims Experience of Non-Health Professions
Incident-Year Basis

Relative Claims Frequency 1982 = 100

<table>
<thead>
<tr>
<th>Year</th>
<th>Ontario Lawyers</th>
<th>Non-Ontario Lawyers</th>
<th>Canadian Chart. Accts.</th>
<th>Canadian Arch &amp; Eng</th>
<th>Ontario Dentists</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>N.A.</td>
<td>38.3</td>
<td>N.A.</td>
<td>102.9</td>
<td>53.6</td>
</tr>
<tr>
<td>1977</td>
<td>71.5</td>
<td>31.0</td>
<td>N.A.</td>
<td>90.5</td>
<td>60.1</td>
</tr>
<tr>
<td>1978</td>
<td>115.5</td>
<td>45.8</td>
<td>N.A.</td>
<td>105.6</td>
<td>74.3</td>
</tr>
<tr>
<td>1979</td>
<td>123.4</td>
<td>56.0</td>
<td>N.A.</td>
<td>120.1</td>
<td>83.5</td>
</tr>
<tr>
<td>1980</td>
<td>147.0</td>
<td>53.3</td>
<td>144.8</td>
<td>109.0</td>
<td>72.0</td>
</tr>
<tr>
<td>1981</td>
<td>134.1</td>
<td>58.5</td>
<td>76.6</td>
<td>112.4</td>
<td>93.9</td>
</tr>
<tr>
<td>1982</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>1983</td>
<td>104.5</td>
<td>75.4</td>
<td>116.5</td>
<td>95.7</td>
<td>91.4</td>
</tr>
<tr>
<td>1984</td>
<td>122.9</td>
<td>99.5</td>
<td>116.1</td>
<td>79.3</td>
<td>191.7</td>
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<tr>
<td>1985</td>
<td>112.1</td>
<td>103.3</td>
<td>95.2</td>
<td>56.0</td>
<td>145.9</td>
</tr>
<tr>
<td>1986</td>
<td>106.7</td>
<td>66.4</td>
<td>98.0</td>
<td>58.1</td>
<td>168.6</td>
</tr>
<tr>
<td>1987</td>
<td>115.0</td>
<td>N.A.</td>
<td>81.7</td>
<td>71.9</td>
<td>190.8</td>
</tr>
</tbody>
</table>

[Numbers in recent years underestimate frequency rates because of unreported claims.]

Relative Severity 1982 = 100

<table>
<thead>
<tr>
<th>Year</th>
<th>Ontario Lawyers</th>
<th>Non-Ontario Lawyers</th>
<th>Canadian Chart. Accts.</th>
<th>Canadian Arch &amp; Eng</th>
<th>Ontario Dentists</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>N.A.</td>
<td>45.3</td>
<td>374.6</td>
<td>97.6</td>
<td>97.8</td>
</tr>
<tr>
<td>1977</td>
<td>82.1</td>
<td>45.1</td>
<td>122.4</td>
<td>129.7</td>
<td>385.8</td>
</tr>
<tr>
<td>1978</td>
<td>88.6</td>
<td>57.5</td>
<td>142.8</td>
<td>103.6</td>
<td>69.5</td>
</tr>
<tr>
<td>1979</td>
<td>78.4</td>
<td>82.8</td>
<td>48.7</td>
<td>105.4</td>
<td>83.6</td>
</tr>
<tr>
<td>1980</td>
<td>71.5</td>
<td>95.2</td>
<td>154.6</td>
<td>97.9</td>
<td>120.4</td>
</tr>
<tr>
<td>1981</td>
<td>111.6</td>
<td>92.6</td>
<td>184.1</td>
<td>118.3</td>
<td>102.4</td>
</tr>
<tr>
<td>1982</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>1983</td>
<td>137.9</td>
<td>66.8</td>
<td>107.0</td>
<td>91.0</td>
<td>118.2</td>
</tr>
<tr>
<td>1984</td>
<td>125.2</td>
<td>75.6</td>
<td>61.3</td>
<td>83.2</td>
<td>65.7</td>
</tr>
<tr>
<td>1985</td>
<td>142.1</td>
<td>43.9</td>
<td>60.3</td>
<td>98.6</td>
<td>62.0</td>
</tr>
<tr>
<td>1986</td>
<td>161.2</td>
<td>44.6</td>
<td>42.0</td>
<td>102.4</td>
<td>76.4</td>
</tr>
<tr>
<td>1987</td>
<td>176.6</td>
<td>N.A.</td>
<td>46.2</td>
<td>90.4</td>
<td>97.0</td>
</tr>
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</table>

[Numbers in recent years may understate severity rates because of underreporting of more serious claims.]
Table 8
Components of Damages in Large Claims
(Millions of 1987 $)

<table>
<thead>
<tr>
<th>Category</th>
<th>All Claims</th>
<th>Early $</th>
<th>%</th>
<th>Late $</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lost Income</td>
<td>17.9</td>
<td>8.07</td>
<td>26.5</td>
<td>9.88</td>
<td>27.8</td>
</tr>
<tr>
<td>Care cost</td>
<td>23.9</td>
<td>11.8</td>
<td>38.7</td>
<td>12.1</td>
<td>34.2</td>
</tr>
<tr>
<td>Medical Exp.</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Post Med. Exp.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of Care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial Outlay</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross-up</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Relatives</td>
<td>5.6</td>
<td>2.38</td>
<td>7.8</td>
<td>3.24</td>
<td>9.1</td>
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<tr>
<td>Interest</td>
<td>3.7</td>
<td>1.18</td>
<td>3.9</td>
<td>2.55</td>
<td>7.2</td>
</tr>
<tr>
<td>Legal Cost</td>
<td>3.5</td>
<td>1.42</td>
<td>4.7</td>
<td>2.07</td>
<td>5.8</td>
</tr>
<tr>
<td>Non-Pecuniary</td>
<td>9.8</td>
<td>5.07</td>
<td>16.7</td>
<td>4.71</td>
<td>13.2</td>
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<tr>
<td>Other</td>
<td><strong>1.45</strong></td>
<td><strong>.53</strong></td>
<td>1.7</td>
<td><strong>.93</strong></td>
<td>1.6</td>
</tr>
<tr>
<td>Total</td>
<td>65.7</td>
<td>29.9</td>
<td>45.7</td>
<td>35.7</td>
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</tr>
</tbody>
</table>

Note: Values are rounded to one decimal place.
Endnotes


7. Ibid. p. 160.

8. Tests conducted in the U.S. indicate that physicians in groups experience more claims than solo practitioners. Langwell, K.M., and Werner, J.L., "Regional Variation in the Determinants of Professional Liability Claims", (1980) 5 Journal of Health Politics, Policy and Law. 498; Adams, E.K., and Zuckerman, S. "Variations in the Growth and Incidence of Medical Malpractice Claims" (1984) 9 Journal of Health Politics, Policy and Law 475. Thus, group practice may not only be picking up the effect of this mode of practice on quality, but it may also capture the effect of social distance. Since many patients in groups are not attached to specific physicians they may file a malpractice claim with less hesitation than patients who have built up a strong patient-physician relationship.


10. Weiler, op. cit.


32. Ibid.


35. Ibid.
