

THE MEDICAL MALPRACTICE EXPLOSION: AN EMPIRICAL ASSESSMENT OF TRENDS, DETERMINANTS AND IMPACTS

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[This article briefly describes trends in the frequency and severity of medical malpractice claims in Canada and the U.S., with some comparative references to trends in Britain and Australia. In all cases, frequency and severity rates appear to have risen quite dramatically over the past decade and a half. The article proceeds to explore various hypotheses that might explain these trends. While empirical analysis does not yield firm conclusions, the fact that so many jurisdictions have experienced a somewhat similar phenomenon makes it doubtful that the primary cause of the increase is likely to be idiosyncratic features of one particular country's tort system. Instead, the authors conjecture that various changes in medical technology may well be a more important explanatory factor. The article goes on to examine the empirical evidence on the impact of expanding liability on physician behaviour and in turn whether observed changes in physician behaviour have caused reductions in the medical injury rate. While it seems clear from the evidence that the liability system has induced various changes in physician behaviour, it is much less clear whether these changes have reduced the medical injury rate or are otherwise socially desirable.]

I INTRODUCTION

The 1970s and 1980s have witnessed a dramatic increase in the frequency and severity of medical malpractice claims in the U.S., Canada and the U.K. This phenomenon has provoked a perception in many quarters of a medical malpractice crisis, and has precipitated major tort law reforms at the state level in the U.S. aimed at containing the crisis.¹ A strikingly divergent view, on the other hand, suggests that this phenomenon merely reflects a reduction in some of the slack in the medical malpractice system in which previously a very high proportion of negligently caused iatrogenic injuries did not result in suits. To the extent that there is a medical malpractice crisis, those who adopt the second view assert that the real crisis continues to be not too many claims but too few claims to achieve optimal deterrence of substandard health care and compensation of victims.²

We see two linkages between medical malpractice litigation and technological development. On the one hand, advances in medical practice and technology may, by increasing the frequency with which a patient's life or health depends on split-second judgments or actions by the physician, increase the opportunity for

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¹ Danzon, P. M., *Medical Malpractice: Theory, Evidence and Public Policy*, 1985; Weiler, P., *Legal Policy for Medical Injuries*, 1988, Harvard Law School, Mimeo.

² Abel, R. L., 'The Real Tort Crisis — Too Few Claims' (1987) 48 *Ohio State Law Journal* 443.

medical malpractice litigation in the event of physician error. On the other hand, liability for losses arising from events of malpractice creates incentives to develop technology that reduces risks and losses, including technology that is more forgiving of momentary acts of inadvertence. Both linkages are explored below.

In this essay, we briefly review comparative trends in malpractice liability over the past decade or so in the U.S., Canada, the U.K. and Australia (section II). Then drawing on a recent empirical study of the Canadian experience which we have undertaken,³ we examine various hypotheses as to the determinants of these trends (section III). We believe that the fact that rates of malpractice litigation in the U.S., Canada, the U.K. and, apparently, Australia, have all grown rapidly in recent years suggests caution in seeking explanations exclusively or even primarily in doctrinal nuances peculiar to a particular jurisdiction, and requires us to take more seriously than has often hitherto been the case various non-legal explanatory factors which we canvass below. In particular, two sets of these non-legal factors — hypothesized cultural changes in attitudes to risk-bearing, and the response of the tort system to errors which manifest themselves in periods of rapid technological innovation — if supported by the empirical evidence, would have direct and significant implications for the impact of the tort system on rates of innovation and technological change in the health care system.

After reviewing the empirical evidence on trends in medical malpractice liability and determinants thereof, we survey the existing empirical evidence on the impact of the medical malpractice system on physician behaviour, indicating some of the analytical complexities that must be confronted in making normative judgments about these tort-induced changes (section IV). Notwithstanding the ambiguous evidence on the welfare effects of the present medical malpractice system, however, the empirical evidence also suggests that alternative quality control mechanisms in place for addressing post-entry negligence and incompetence of physicians — principally the disciplinary mechanisms of the self-regulating institutions of the medical profession — seem poorly adapted to perform this role. In the concluding section of the paper (section V), we review this evidence and also briefly evaluate claims for preserving a significant role for the tort system as a quality control mechanism, but with a redirected focus on institutional 'gatekeepers', principally hospitals.

II GENERAL TRENDS

Following a period of minimal malpractice litigation in the 1940s and 1950s in Canada, claims filings and payments began to grow in the mid-1960s. Between 1971 and 1988, the average compound annual growth rate in claims filed per 100 CMPA⁴ member physicians in Canada was about 8.2 per cent, implying almost a

³ Dewees, D., Coyte, P., and Trebilcock, M., *Canadian Medical Malpractice Liability: An Empirical Analysis of Recent Trends*, Study for Federal-Provincial Task Force on Medical Liability, September 1989.

⁴ The Canadian Medical Protective Association (C.M.P.A.) is a physicians' mutual that provides coverage for over 90 per cent of all physicians in active practice in Canada.

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 per cent, implying somewhat less than a trebling in the paid claim frequency rate over this period. Between 1970 and 1985, the growth rate in frequency of claims in the U.S. is quite similar to that in Canada. Danzon estimated a 10 per cent annual growth rate in U.S. claims

Table 1 Writs and Claims per 100 Physicians

	<i>Canada</i> ¹		<i>United States</i>		<i>Canada</i>
	<i>Writs Filed</i>	<i>Claims Paid</i>	<i>Claims Filed</i> ²	<i>Ratio</i> ³ <i>(3)/(1)</i>	<i>Writs Filed Per Real 1981 Billion \$'s Billed</i>
	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	
1970			4.5 ⁴	8.2	
1971	0.55	0.21			
1972	0.60	0.22			
1973	0.62	0.13			
1974	0.77	0.23			
1975	0.77	0.17	7.0 ⁵	9.1	
1976	0.76	0.23			63.6
1977	0.85	0.22	7.5 ⁶	8.8	71.5
1978	1.00	0.25			82.5
1979	1.03	0.33			83.9
1980	1.31	0.38	10.6 ⁷	8.1	104.5
1981	1.42	0.39	11.4 ⁷	8.0	113.2
1982	1.38	0.41	13.3 ⁷	9.6	109.2
1983	1.55	0.53	15.1 ⁷	9.7	124.0
1984	1.60	0.32	16.5 ⁷	10.3	127.2
1985	2.13	0.36	17.8 ⁸	8.4	175.6
1986	1.84	0.46			
1987	1.81	0.41			
1988	1.70	0.39			
Growth rate ⁹	8.2%	6.1%			

¹ The number of writs filed and claims paid is obtained from the C.M.P.A. 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 In the U.S. there is one claim per physician, while in Canada there is one claim per accident, frequently with multiple defendants. Thus while the U.S. has 8-10 times as many claims, there are probably only 5 times as many litigated medical injuries in the U.S. as in Canada.

⁴ Danzon, P., 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: *Medical Malpractice: Theory, Evidence and Public Policy* (1985) 60.

⁵ Danzon, P., 'The Frequency and Severity of Medical Malpractice Claims: New Evidence' (1986) 49 *Law and Contemporary Problems* 57, 63.

⁶ Danzon, P., *Medical Malpractice: Theory, Evidence and Public Policy* (1985) 60.

⁷ United States General Accounting Office (1986, Table 2.5).

⁸ Weiler, P., *op. cit.* (1988), 7.

⁹ Estimated using an exponential model.

Table 2 Average Value of Paid Writs and Claims (Thousands of Dollars)

	Canada ¹		United States ²		Ratio (4)/(2)
	Average Paid Claims		Average Paid Claims		
	Current \$ (1)	1987 \$ (2)	Current U.S. \$ (3)	1987 CDN \$ (4)	
1970			11.5 ³	44.8	
1971	8.0	26.2			
1972	5.5	17.2			
1973	9.0	26.2			
1974	13.4	35.1			
1975	18.5	43.7	26.6 ⁴	75.1	1.72
1976	37.5	82.5	26.7 ⁴	71.4	0.87
1977	33.4	68.0	34.8 ⁴	87.3	1.28
1978	15.0	27.9	45.2 ⁴	105.3	3.77
1979	48.4	82.8			
1980	27.1	42.1	33.6 ⁵	61.9	1.47
1981	38.2	52.8	49.3	82.4	1.56
1982	38.9	48.6	61.5	96.8	1.99
1983	53.5	63.1	70.4	107.4	1.70
1984	101.4	114.6	83.4	122.0	1.06
1985	91.9	99.9	88.3	126.8	1.27
1986	80.2	83.7	95.7	132.6	1.58
1987	117.2	117.2			
1988	126.3	121.4			
Growth Rate ⁶	18.3%	9.5%			

¹ Average paid claims are obtained from Dewees, Coyte and Trebilcock, *supra* n. 3, Table 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.

³ Danzon, P. M., *Medical Malpractice: Theory, Evidence and Public Policy*. 1985, 151.

⁴ National Association of Insurance Commissioners (1980).

⁵ 1980-1986 data from Sloan, F. and Borbjerg, *Medical Malpractice: Crisis, Response and Effects* (1989) 8.

⁶ Estimated by an exponential model. Estimation for columns 1 and 2 over the period 1976-87 produced growth rates of 15.0 per cent and 6.3 per cent, respectively.

frequency between 1976 and 1984.⁵ However, the average frequency of claims filed against physicians in the U.S. is about five times greater than in Canada. With respect to severity, the Canadian data indicates a four-fold increase in the average malpractice claim payment in real terms between 1971 and 1988 — a 9.5 per cent per year compounded annual rate of increase. (See Table 2.) Again, the

⁵ Danzon, P.M., *The 'Crisis' in Medical Malpractice: A Comparison of Trends in the United States, Canada, the United Kingdom and Australia*, 1989, University of Pennsylvania, Mimeo.

Table 3 Malpractice Litigation Trends in the U.K.

Year	Claims Opened ¹ Region E (Claims per 100,000 pop.)	Average Award ² (1976=100)	Maximum Award ³ (£ 000)	Defence Society Rates ⁴ (£)
1976		100		
1977		110	133	
1978	4.0	140	229	40
1979	4.1	105	220	70
1980	4.2	200	263	95
1981	5.1	230	312	120
1982	5.3	360	399	135
1983	7.5	280		195
1984	9.3	370		264
1985	12.3	420	414	288
1986	16.5		581	336
1987	20.4		679	576
1988	19.6		1030	1080

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

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

² *Ibid.* Fig. 2. Average cost of settlements, from the Medical Protective Society.

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

⁴ *Ibid.* 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.

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; Danzon reports a growth rate of real severity of 14 per cent per year between 1980 and 1987.⁶ However, the absolute level of average payments in Canada has been somewhat less than in the U.S. U.K. data on rates of growth in frequency and severity of malpractice claims over the past decade reflect rates of increase broadly comparable to those experienced in Canada and the U.S. (see Table 3), and even, in Australia, claims frequency — at least in New South Wales — doubled between 1984 and 1986.⁷ U.K. frequency rates, on a population basis, appear to be significantly higher than Canadian rates. With respect to insurance fees, the overall compound annual rate of growth in CMPA fees, adjusted for inflation, between 1976 and 1987 is about 14 per cent, although between 1982 and 1986, average fees tripled in real terms and rose over 40 per cent in 1987, yielding an average annual compound growth rate of 39 per cent between 1982 and 1987.

⁶ *Ibid.*

⁷ *Ibid.*

Danzon reports that U.S. insurance fees grew at an annual rate of 10 per cent to 20 per cent in real terms between 1976 and 1987.⁸ However, in 1987 Canadian dollars, average malpractice fees in the U.S. appear to be about nine times higher than in Canada, reflecting principally the much higher litigation rate in the U.S.

The Canadian data reveal major differences in the frequency of claims among the set of specialities that we examined. Orthopaedic surgeons, obstetricians and gynaecologists, and anaesthetists exhibit the largest claims frequency rate, while family practice physicians exhibit the lowest frequency. On the other hand, differences in the median award amongst these specialty groups appear not to be statistically significant. In terms of total payments attributable to various specialties relative to their proportion in the total stock of physicians, 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.

With respect to comparisons of premium costs across various professions, in Canada the average premiums paid for professional liability insurance as a percentage of average net professional income in 1985 reveal the following ratios: Ontario lawyers — 1.46 per cent; Canadian chartered accountants — 1.28 per cent; CMPA member physicians — 1.02 per cent; Ontario dentists — 0.21 per cent. Thus, the average premium-to-income ratio for Canadian physicians does not seem to be sharply different from that of other professions, although premium expenses for certain high risk medical specialties, such as anaesthesia and obstetrics, reflect much higher ratios.

III DETERMINANTS OF TRENDS IN THE FREQUENCY AND SEVERITY OF MEDICAL MALPRACTICE CLAIMS

To test various hypotheses that might explain the above general trends, we examined, in semi-aggregate form, all open and closed claims data from the CMPA for the period 1976 to 1987, and analysed in detail 107 large paid claims that were closed in this period (a large claim being defined as entailing a payment in excess of \$100,000 in 1976 dollars adjusted upwards in subsequent years for inflation). As to explanations for these trends, we tested various hypotheses that fall into three broad categories: changes in the professional environment; changes in the social environment; and changes in the legal environment.

1. *Changes in the Professional Environment*

(a) *Utilization of Health Care Services*

Most of the variation in frequency across specialties can be explained by variations in the performance of major surgery in each specialty. Utilization of major surgery explains fully 90 per cent of the variation among years and among

⁸ *Ibid.*

specialties in the frequency of claims filings, most of which represents variation across specialties. Focussing on the general increase in the frequency of claims filed over time, the seven-fold increase in the number of claims filed between 1971 and 1987 is reduced to about a four-fold increase when growth in number of claims is related to the growth in the number of CMPA physicians. Replacing the number of physicians with the total value of medical services provided, 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.

(b) *Quality of Health Care Professionals and Their Institutions*

We found only weak support in the semi-aggregate and less in the large claims data set for the hypothesis that domestically-trained physicians are less likely than foreign-trained physicians to be sued. Nor did we find support for the hypothesis that malpractice is more common among newly graduated physicians or among older physicians. We had only a weak test of recidivism, but this test suggests that recidivism is not an important factor in generating the large claims (at most three identical defendants in the 107 claims). 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. This suggests that there is either a migration of difficult cases from smaller to larger communities for treatment or, less likely, that there is a higher rate of severe malpractice in larger centres. So too, 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.

(c) *The Effect of Medical Innovation*

To the extent that the data suggests a greater increase in the propensity to sue physicians or hospitals than to initiate claims against other professionals (discussed below), the conundrum that requires explanation is how such a dramatic increase in claim frequency could accompany rapid rates of innovation in the provision of medical care, which presumably have reduced health-related risks to society. Considering the central role of major surgery in explaining differences in frequency rates across specialties, we speculate that observably serious outcomes that can readily be attributed to discrete medical interventions (albeit sometimes in contexts where the intervention is inherently risky) make physicians and hospitals more prone to suit by individuals than may be the case in other professional contexts. In this respect, it is useful to consider Grady's hypothesis⁹ that the law of negligence implies that in periods of rapid technological

⁹ Grady, M., 'Why are People Negligent? Technology, Nondurable Precautions, and the Medical Malpractice Explosion' (1988) 82 *Northwestern University Law Review* 293.

innovation, which may indeed be reducing health risks for society at large, the harm caused by momentary acts of inadvertence by physicians and other medical staff is 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 from kidney failure, 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 led to a great increase in physician-caused injuries, since properly administered dialysis could now save a life. A similar thesis 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 births, where the potential harm caused by momentary acts of inadvertence has been significantly multiplied.

Our data does not permit any rigorous testing of Grady's theory, although the higher claims rates with respect to orthopaedic surgeons, obstetricians and gynaecologists, and anaesthetists, along with the more general dominance of major surgery as an explanatory variable for differences in frequency rates across specialties, are consistent with his hypothesis. On the other hand, medical interventions in technically new and complex contexts did not account for a large percentage of the 107 large paid claims in our survey (although surgical procedures were involved in about half of the cases). Nevertheless, we were told by lawyers on both sides of the malpractice litigation bar that most 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 does not allow us to prove the Grady hypothesis, therefore, it is 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.

2. Changes in the Social Environment

(a) General Propensity to Litigate

We compared trends in frequency rates of claims against physicians with trends in frequency rates of claims in other litigation contexts (see Table 4). 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, and somewhat less dramatic increases in third party bodily injury claims arising out of automobile accidents in Ontario and the Atlantic provinces. On the other hand, claims rates for architects, engineers and chartered accountants do not reflect any such increases. However, U.K. data with respect to architects, accountants, and veterinary surgeons over recent years does reflect sharp

Table 4 Claims Experience of Non-Health Professions Incident-Year Basis

Relative Claims Frequency 1982 = 100

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

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

Relative Severity 1982 = 100

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

[Numbers in recent years may understate severity rates because of underreporting of more serious claims.]

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 per cent between 1979 and 1984.¹⁰ To the extent that this comparative data suggests an

¹⁰ Ham, C., Dingwall, R., Fenn, P., Harris, D., *Medical Negligence: Compensation and Accountability*, 1988, 15.

increase in the general propensity to sue professionals, it may provide support for recent social and political theorizing by Wildavsky and others¹¹ that many persons in Canada, the U.S., the U.K. and probably other industrial societies, exhibit an increasing reluctance to accept certain kinds of risks. 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 1960s, and in the case of the tort system, attempts to shift risks to professional service providers (or in the product liability context, manufacturers) who are assumed to possess the necessary technical expertise to reduce or eliminate risk or, because of greater resources, to bear residual risks.

Increasing social distance between clients and professionals may also encourage greater resort to the tort system and heightened claims consciousness. Although our data revealed no significant positive relationship between interprovincial migration and immigration per capita and the frequency of malpractice litigation, 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) *Demographic and Economic Factors*

There is evidence that infants and females aged 18 to 44 win higher than average awards, while the elderly achieve lower than average awards. Thus, 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. However, demographic variables appear to be unrelated to both frequency of malpractice claims and the proportion of paid claims. Average claims severity is positively associated with both wages and interest rates. Males are more common as plaintiffs in the large claims, and are especially predominant among injured newborns, which may be attributable to larger expected income losses for males, leading to larger awards, thus leading to an increased propensity to file a claim for an injured male than for an injured female.

3. *Changes in the Legal Environment*

Danzon¹² 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 *respondeat superior*) contributed significantly to the growth in both the frequency and severity of malpractice claims. Adams and Zuckerman¹³ found the frequency of malpractice claims to be significantly and positively associated both with more generous limitations periods and with

¹¹ Akaroni, Y., *The No-Risk Society*, 1981. Douglas, M. and Wildavsky, A., *Risk and Culture*, 1982; Polisar, D. and Wildavsky A., 'From Individual to System Blame: A Cultural Analysis of Historical Changes in the Law of Torts' (1989) 1 *Journal of Policy History* 129.

¹² Danzon, P.M., 'The Frequency and Severity of Medical Malpractice Claims' (1984) 27 *Journal of Law and Economics* 115, 137.

¹³ 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.

restrictions on the doctrine of informed consent. Danzon¹⁴ has found that on average cutting one year off the statute of limitations for adults reduces claims frequency by eight per cent.

Danzon¹⁵ has also examined the impact of various doctrinal changes relating to quantum on malpractice litigation. 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) reduces significantly both the frequency and severity of malpractice claims — frequency by 14 per cent and severity by 11 per cent to 18 per cent relative to comparable states without collateral source offset.¹⁶ Danzon¹⁷ and Danzon and Lillard¹⁸ also found that caps on awards for non-pecuniary losses have reduced the severity of malpractice claims by about 23 per cent on average.

In our study we found that both severity and the proportion of claims paid respond positively to lagged dependent variables which may capture slow expansion of liability from changes in legal doctrines. The frequency of paid claims is positively related to both the predicted severity of claims, supporting the hypothesis that compensation rules affect frequency, and the predicted proportion of paid claims, supporting the hypothesis that liability rules affect frequency. Legal variables with respect to both liability and compensation appear to account for no more than 50 per cent in the growth in frequency of claims in Canada since 1976 and probably less. There is evidence in the large claims data that expansion of compensation rules, including the compensation of relatives, the use of real interest rates as discount rates, the introduction of prejudgment interest, and gross-up for cost of care (to offset tax liability on income from invested awards), have contributed to increases in the severity of awards. Furthermore, more stringent requirements for informed consent are found to increase significantly the frequency of claims filings. The increase in the size of some awards increased the incentive to litigate some similar claims, and brought forth additional claims that might not have been worth litigating under less generous compensation rules. The net effect is an increase in the size of an average award, and an increase in the frequency of litigation. We believe that this is a significant factor in explaining the growth rates in both severity and frequency of claims for practising physicians. However, even given these effects, we have not attempted in this study to evaluate whether these changes in legal doctrine are socially beneficial or not. We were not able to investigate whether the wider availability of legal aid or contingent fees in some Canadian jurisdictions has contributed to an increase in the rate of claims against

¹⁴ Danzon, P. M., 'The Frequency and Severity of Medical Malpractice Claims' (1984) 27 *Journal of Law and Economics* 115.

¹⁵ *ibid.*; Danzon, P. M., *supra* n. 1; Danzon, P. M., 'The Frequency and Severity of Medical Malpractice Claims: New Evidence' (1986) 49 *Law and Contemporary Problems* 57; See also Hughes, J. W., 'The Effect of Medical Malpractice Reform Laws on Claim Disposition', (1989) 9 *International Review of Law and Economics* 57.

¹⁶ Danzon, P. M. 'The Frequency and Severity of Medical Malpractice Claims' (1984) 27 *Journal of Law and Economics* 115; Danzon, P. M. 'The Frequency and Severity of Medical Malpractice Claims: New Evidence' (1986) 49 *Law and Contemporary Problems* 57.

¹⁷ *Ibid.*

¹⁸ Danzon, P. M., and Lillard, L. A., 'Settlement Out of Court: The Disposition of Medical Malpractice Claims' (1983) 12 *Journal of Legal Studies* 345.

physicians or hospitals. However, we did not find support in our data for the hypothesis that an increase in the number of practising lawyers per capita has led to an increase in malpractice claims.

IV THE EFFECT OF THE MEDICAL MALPRACTICE SYSTEM

In this section we present evidence on changes in health care delivery attributable to the threat of malpractice liability. Because these 'outputs' alone tell us nothing about the ultimate impact of the civil liability system on the incidence of medical injuries, however, we also explore the likely relationship between these 'intermediate' responses and the medical injury rate. Finally, since optimal deterrence requires that health care providers undertake only cost justified reductions in the rate of medical injuries, we consider the costs of the liability system and the relationship between these costs and the possible benefits obtained by the medical malpractice system.

1. *The Impact of Civil Liability on Medical Practice*

In theory, the civil liability system can affect the incidence of medical injuries in two distinct ways: first, by forcing health care providers to bear the costs of all negligently-caused injuries, it encourages them to take care to prevent the occurrence of such injuries; second, by internalizing the costs of these injuries to health care providers, it encourages the substitution of low-risk procedures for high-risk procedures and the displacement of low-quality providers by high-quality providers. We will now review the evidence on liability-induced changes in these care and activity levels.

(a) *Care Levels*

- (i) *Individuals.* Aside from anecdotal commentary, available evidence on the impact of the civil liability system on the practice patterns of individual physicians is threefold. First, two econometric studies in the U.S. have found statistically significant correlations between increases in malpractice premium levels (as a proxy for malpractice risk) and the frequency of specific diagnostic procedures. For Greenwald and Mueller, working with cross-sectional data by state from 1970, a 10 per cent increase in malpractice premiums was associated with a 3.6 per cent increase in a weighted average of laboratory tests, x-rays and consultations.¹⁹ Examining more recent data from 1984, Reynolds, Rizzo and Gonzalez report an elasticity of 0.073 relating malpractice premiums and the volume of electrocardiogram utilization.²⁰ Lacking any obvious theoretical defects, both studies seem quite compelling. Nevertheless, further consideration suggests at least one possible deficiency: while many commentators have emphasized the causal

¹⁹ Greenwald, B., and Mueller, M., 'Medical Malpractice and Medical Costs', in Rotemberg, S., (ed.) *The Economics of Medical Malpractice*, 1978, 68.

²⁰ Reynolds, R., Rizzo, J., and Gonzalez, M., 'The Cost of Medical Professional Liability' (1987) 257 *Journal American Medical Association* 2776, 2779.

role of first party health insurance and fee-for-service reimbursement in the growth of diagnostic testing, neither study adequately controls for differences in the capacity of physicians to pass on the costs of such tests to health insurers. Cross-sectional data recognizing recent cost containment measures, such as the diagnostic-related group reimbursement (DRG) system, or alternative delivery systems such as health maintenance organizations (HMOs) or preferred provider organizations (PPOs) might well overshadow the significance of liability variables.

Second, since the time of the first American 'malpractice crisis' in the mid-1970s, several American and Canadian surveys have recorded changes in practice patterns attributed by respondent physicians to the threat of malpractice liability.²¹ In addition to increased record-keeping and increases in physician communication with both patients and other health care professionals, a substantial percentage of respondents have attributed increased diagnostic testing (*e.g.* amniocentesis and electronic fetal monitoring) and the use of specific treatment procedures (*e.g.* Cesarean sections) to the threat of civil liability. On the other hand, despite this tendency to attribute specific practice changes to the liability environment, these surveys also reveal that physician practice patterns are also strongly shaped both by direct patient demand and by professional considerations including recommendations from continuing medical education programmes, suggestions in medical journals and communications from a specialty society or licensing body. Consequently, this evidence tells us little about the marginal impact of the malpractice system itself on physician care levels. Furthermore, such surveys are likely to be biased in favour of attributing practice changes to the liability system both in the selection of respondents and in the answers provided: it is presumably those most concerned about medical malpractice who take the time to return questionnaires, and their responses are undoubtedly influenced by the very fact of being asked to comment on the effect of medical malpractice on their practice.

Indeed, given the prevailing standard of customary practice for determining medical malpractice,²² one might expect any liability effect to be slight, except for physicians exercising less than customary care, or where customary practice is displaced by a judicially-determined standard of care (as in some informed consent cases),²³ or where (as with record-keeping) practice changes are directed not at meeting the standard of care but at proving due care in the event of a suit. Otherwise, so-called 'liability-induced' practice changes are identical to those introduced for purely professional reasons. Thus, while physician surveys suggest that civil liability has had some effect on a variety of practice areas, one might reasonably conclude that its

²¹ See *e.g.* *American College of Obstetricians and Gynaecologists, Professional Liability and Effects*, 1988; Dewees, D., Coyte, P., and Trebilcock, H. *supra* 3.

²² See *e.g.* *McHugh v. Audet* 72 F. Supp. 394, 399 (M.D. Pa. 1947) *Crits & Crits v. Sylvester* (1956) 1 D.L.R. (2d) 502, 508 (Ont. C.A.) *aff'd* [1956] S.C.R. 991.

²³ See *e.g.* *Canterbury v. Spence* 464 F. 2d 772 (D.C. Cir. 1972); *Reibl v. Hughes* (1980) 114 D.L.R. (3d) 1 (S.C.C.).

impact has been greatest with respect to a variety of methods of record-keeping and time spent with patients discussing the risks and benefits of treatment. In contrast, while the legal standard of customary practice may help to perpetuate questionable diagnostic and therapeutic practices, empirical investigation seems to suggest that medical technological innovation is driven more by profession-specific factors than by changes in the medical-legal environment.²⁴ It is not surprising, therefore, that Canada and the United States recorded similar increases in their Caesarian birth rates in the 1970s and early 1980s, despite considerable differences in each country's liability climate at the time.²⁵

Nevertheless, it is implausible to conclude in the face of such widespread agreement among recent survey responses that the current liability environment has had no impact on the diagnostic and treatment procedures of a substantial number of practising physicians. On the contrary, as one commentator has remarked, 'where there is so much smoke, there must be some fire.'²⁶ In fact, despite the prevailing customary practice standard, there are at least four reasons why individual physicians might be led to abandon professionally-justified practices in favour of a different set of procedures motivated instead by a fear of malpractice liability. First, customary medical practices are fluid and provisional, not stable and well-defined. While liability rules guarantee immunity to a physician who employs a technique followed by a 'respectable minority' of the profession,²⁷ it is for the courts to determine exactly what minority remains respectable.²⁸ Confronted with this uncertainty, it is easy to see why a physician favouring a minority procedure on purely medical grounds might nevertheless be led to abandon such a practice in favour of the majority approach in order to minimize the risk of an adverse ruling.

Second, even where a practice is routinely followed by a majority of the medical profession, the determination of actual claims is subject to the risk of adjudicative error — a risk that is particularly acute where deliberative authority rests in the hands of layperson judges and juries who are apt to exaggerate the significance of professional options which, in light of subsequent events, might have prevented the plaintiff's injury. In such a context, an anxious physician could be well-advised to employ a variety of procedures for the purpose of their signalling effect on prospective adjudicators, rather than their diagnostic or therapeutic value. Moreover, to the

²⁴ See e.g. Thacker, S. B., 'The Impact of Technology Assessment and Medical Malpractice on the Diffusion of Medical Technologies: The Case of Electronic Fetal Monitoring', in Rostow, V., and Bulger, R., (eds) *Medical Professional Liability and the Delivery of Obstetrical Care*, Vol. II, 1989, 9-26.

²⁵ Anderson, G., and Lomas, J., 'Determinants of the Increasing Caesarian Birth Rate', (1984) 311 *New England Journal of Medicine* 887.

²⁶ Bell, P., 'Legislative Intrusions into the Common Law of Medical Malpractice: Thoughts About the Deterrent Effect of Tort Liability', (1984) 35 *Syracuse Law Review* 939, 971.

²⁷ See e.g. *Dahl v. Wagner* 87 Wash. 492, 495 (1915); *Bolam v. Friern Hospital Management Committee* [1957] All E.R. 118, 121 (Q.B.).

²⁸ See e.g. *Brain v. Mador* (1985) 32 C.C.L.T. 157, 163 (Ont. C.A.).

extent that laypersons embrace a highly technological conception of medical care (viewing technology as the means by which every physical malady may ultimately be remedied), and to the extent that the traditional fee-for-service reimbursement mechanism imposes few constraints on physicians' abilities to order expensive technologically sophisticated procedures, physicians are likely to respond with signals that satisfy precisely this technological bias.

Third, even if courts were not as susceptible to error as at least one recent study suggests they are,²⁹ physicians might adopt medically unjustified practices by reason of their unfamiliarity with applicable legal standards and exaggerated fears of liability based on collegial anecdotes or media reports of exceptional cases.³⁰ Indeed, in conjunction with the traditional fee-for-service system, such uncertainty provides a plausible account of the widely-reported phenomenon of defensive medicine according to which physicians tend to employ technologically sophisticated but non cost-justified procedures with a view to liability concerns rather than professional considerations.³¹

Finally, even if courts were perfectly accurate in their assessments of liability and physicians were perfectly informed about applicable legal standards, risk aversion would probably induce many physicians to adopt excessive (non cost-justified) precautions to reduce the risk of malpractice claims with their attendant costs of foregone income due to time taken out of professional practice, emotional anxiety and reputational damage. In this respect, the concept of risk aversion provides further support for the hypothesis that individual physicians are more prone to engage in defensive medicine than are institutional health care providers for whom liability costs constitute a less variable risk of professional practice.³²

The third form of available evidence on the impact of the civil liability system on the practice patterns of individual physicians consists of three studies which have attempted to trace the effect on physician practice patterns of a significant change in a given legal rule. For Wiley, studying the impact of a landmark Washington decision (*Helling v. Carey*³³) that disregarded medical custom to hold the defendant ophthalmologists liable for failing to conduct routine glaucoma tests on a 32 year-old patient who went blind, minor differences between practice changes in Washington and in other states from which data was gathered suggest that the direct impact of the ruling was negligible.³⁴ On the other hand, Wiley's findings are also

²⁹ Cheney, F., Posner, K., Kaplan, R., and Ward, R., 'Standard of Care and Anaesthesia Liability' (1989) 261 *Journal American Medical Association* 1599.

³⁰ Bell, P., *op. cit.* 973-90.

³¹ Chapman, B., 'Controlling the Costs of Medical Malpractice: An Argument for Strict Hospital Liability' (1990) 28 *Osgoode Hall Law Journal* 523.

³² *Ibid.* 556-7.

³³ *Helling v. Carey*, 83 Wash. 2d 415 (1974).

³⁴ Wiley, J., 'The Impact of Judicial Decisions on Professional Conduct: An Empirical Study' (1981) 55 *Southern California Law Review* 345, 361.

consistent with a 'carryover effect' on physician practices in other states, or with the hypothesis that the ruling's impact was muted by legislative reversal of the decision the year after its pronouncement. Although Wiley rejects these theories, neither the reasons advanced nor the sample size upon which his conclusions are based are convincing. Nevertheless, that most physicians attributed increased glaucoma testing not to the *Helling* decision, but to colleagues or the best interests of their patient suggests that the court participated in an ongoing process of redefining customary practices, so that any independent impact of the ruling was probably minimal.

Surveying Canadian surgeons shortly after the Supreme Court of Canada decision in *Reibl v. Hughes*³⁵ (imposing more stringent conditions on the defence of informed consent), Robertson expresses similar doubts regarding the impact of the civil liability system on physicians' disclosure of treatment risks.³⁶ A year and an half after the landmark ruling, only 26 per cent of respondents had heard of the case, and only 59 per cent of this group cited any impact attributable to *Reibl* on their practice of informing patients of risks. The majority of respondents (and 50 per cent of respondents aware of the decision) continued to favour the pre-*Reibl* standard of risk disclosure. Nevertheless that 59 per cent of those indicating an appreciation of the decision rejected the pre-*Reibl* standard, and that more recent surveys indicate noticeable increases in liability-induced patient communication, suggest that the decision has indeed had the intended impact but that well-established medical practices are slow to change.

In sharp contrast to Wiley's and Robertson's conclusions are those of Givelber, Bowers and Blitch,³⁷ reporting on the responses of American mental health professionals to the California Supreme Court decision in *Tarasoff v. Regents of the University of California*³⁸ in which the defendant was held liable for failing to take reasonable precautions to protect the plaintiff from a violent psychiatric patient. While most incorrectly believed that the case required them to warn the potential victim, this confusion is understandable since a preliminary decision had in fact articulated a duty to warn,³⁹ and on the facts of the case, warning the potential victim was what the court deemed necessary to satisfy the reasonable care standard. Furthermore, although roughly a third of respondents who considered themselves legally bound by the decision reported increased note taking and reduced willingness to treat potentially violent psychiatric patients as a result of the decision, a much larger number indicated a greater willingness to hospitalize the patient (32-50 per cent), or to notify the police (39-50 per cent),

³⁵ *Reibl v. Hughes*, (1980) 114 D.L.R. (3d) 1.

³⁶ Robertson, G., 'Informed Consent in Canada: An Empirical Study', (1984) 22 *Osgoode Hall Law Journal*, 139, 160-1.

³⁷ Givelber, G., Bowers W., and Blitch, C., *Tarasoff*, Myth and Reality: An Empirical Study of Private Law in Action' [1984] *Wisconsin Law Review* 443.

³⁸ *Tarasoff v. Regents of the University of California* 17 Cal. 3d 425 (1976).

³⁹ 13 Cal. 3d 177 (1974).

public authorities (47-61 per cent) and potential victims (56-75 per cent) — precisely the sort of actions contemplated by the court. Thus, as ultimately with *Reibl*, *Tarasoff* appears to have had the intended effect on the practice patterns of health care professionals.

- (ii) *Institutions*. Evidence on practice changes by health care institutions is limited. In our survey, 23 of 30 Canadian hospitals reported always or usually investigating or reviewing malpractice claims, despite being typically insured for such claims; 18 reported that some claims had resulted in changes to hospital policies and procedures.

More generally, although less well-documented, recent increases in hospital premiums, the growth of hospital self-insurance plans, and the expansion of hospital liability both in Canada and the United States have been closely associated with the introduction of institutional quality assurance and risk management programmes. While these programmes have also been stimulated by government regulation, casual observation suggests that their earlier emergence and more advanced form in the United States reflects differences in the liability environment.

(b) *Activity Levels*

Activity level responses to the experience or threat of civil liability are of three forms. First, liability concerns may stimulate medical practitioners to curtail or discontinue high-risk practice areas. This result has been reported in a number of provider surveys.⁴⁰ The data indicates a marked tendency to attribute to medical malpractice both the reduction and elimination of specific practices, particularly among obstetricians and gynaecologists, certified nurse-midwives (CNMs) and among general practitioners and family physicians who previously performed obstetrical and prenatal care, anaesthesiology or emergency room services.⁴¹ As with changes in practice patterns, however, it is impossible to conclude from these surveys that reported changes in practice scope are wholly attributable to the civil liability system. Besides the possibility of bias inherent in subjective survey responses, the reasons for reported activity level responses are varied and complex. Personal motives (changes in lifestyle and family reasons) generally constitute the most significant reasons for changes in practice scope. In fact, age profiles of those reporting the most changes in practice scope suggest total or semi-retirement as their primary motive. Furthermore, considerations related to respondents' practices (not enough cases per year, inadequate compensation, competitive pressure, and growth in other areas of practice) often play a larger role than liability concerns — although such 'practice' considerations may be liability related to the extent that insurance costs affect medical fees (and patient

⁴⁰ See e.g. Charles, S., Pyskoty, C., and Nelson, A., 'Physicians on Trial — Self-Reported Reactions to Malpractice Trials', [1988] *Journal of Medicine* 358; Lewis-Idema, D., 'Medical Professional Liability and Access to Obstetrical Care: Is There a Crisis?' in Rostow and Bulger, (eds) *Medical Professional Liability and the Delivery of Obstetrical Care*, Vol. II, *supra* 24, 78-96.

⁴¹ See e.g. Institute of Medicine, *Medical Professional Liability and the Delivery of Obstetrical Care*, Vol. I, 1989, 35-53.

demand) or alter provider supply decisions. Finally, the rigidity of most malpractice insurance policies — which typically fail to reflect lower risks associated with part-time practice or the performance of low-risk procedures by CNMs and GP/FMs — makes it difficult to attribute any activity level responses to the liability system *per se* as opposed to the structure of the liability insurance regime. Nevertheless, that many physicians react strongly to the prospect or experience of a malpractice suit regardless of its outcome and independent of any perceived impact on malpractice premiums suggests that some changes in practice scope may be motivated by the liability system directly rather than by the liability insurance system.

A second reported activity level response involves physician decisions to relocate away from a highly litigious region to an area with lower claim frequency and severity and lower malpractice premiums. According to surveys taken at the height of the U.S. malpractice crisis of the mid-1970s, between 0.5 and 3.0 per cent of responding physicians had relocated at least in part because of malpractice insurance problems.⁴² On the other hand, two statistical analyses have found no significant relationship between the malpractice environment and physician location decisions.⁴³ While some marginal effect seems plausible, particularly among high risk specialists whose premiums and exposure to liability have increased enormously since these studies were conducted, liability considerations are likely dwarfed by more conventional determinants of geographical location such as employment opportunities, relative salaries, climate, and social/cultural attractions.

Finally, activity levels can be affected by the choices of new participants in the market. Unfortunately, the evidence here is minimal. Looking at the distribution of newly licensed U.S. physicians in 1974, Burghardt concludes that market entrants 'do not appear to have been driven away from the crisis states.'⁴⁴ On the other hand, recent evidence (much of it anecdotal) suggests that medical students are choosing not to enter high risk fields like obstetrics, anaesthesiology and orthopaedic care, and that family physicians who started practising in the 1980s are much less likely to include obstetrics in their first year of practice than those who began their practice earlier. According to the American Association of Medical Colleges, for example, the percentage of fourth-year medical students selecting obstetrical residencies fell from 8.8 in 1984 to 6.7 in 1987.⁴⁵ In the absence of more comprehensive econometric studies, however, it is difficult to assess the validity of these assertions.

2. *The Impact of Practice Changes on the Injury Rate*

Whatever changes the civil liability system has generated in medical care and activity levels, their final impact on the incidence of medical injuries remains

⁴² Law, S., and Polan, S., *Pain and Profit: The Politics of Malpractice*, 1978, 22-3.

⁴³ Burghardt, G., Jr, 'Medical Malpractice and the Supply of Physicians', in Rotenberg, *op. cit.* 119; Greenwald and Mueller, *op. cit.* 73.

⁴⁴ Burghardt, *op. cit.* 122.

⁴⁵ Cited in Institute of Medicine, *Medical Professional Liability and the Delivery of Obstetrical Care*, Vol. I, *op. cit.* 36-7.

uncertain. In the absence of detailed econometric studies, one can only speculate on this ultimate effect on the basis of existing evidence linking the quality of medical care to specific practices or categories of physicians.

(a) *Care Levels*

(i) *Individuals*

Documentation. Some commentators suggest that increased record-keeping leads to better quality medical care.⁴⁶ There are no studies to support this opinion. While detailed medical records are invaluable for effective risk management, documentation solely designed to pre-empt potential litigation increases medical costs without any benefit to patients. Furthermore, the evidence that does exist suggests that the critical element in medical care delivery is not the recording of information, but the reliability with which a patient's history is taken and physical findings are elicited.⁴⁷ Consequently, to the extent that the civil liability system has motivated physicians to record less pertinent information or information designed primarily for evidentiary purposes in the event of litigation, it appears to have provoked overdeterrence and 'defensive medicine'.

Patient Communication. Many studies have challenged the extent to which patients actually desire information on treatment risks and alternatives, the adequacy of physician disclosure and the ability of most patients to comprehend and act rationally upon the information that they receive.⁴⁸ Nevertheless, surveys indicating the significance of patient demand in physician decisions to increase patient communication suggest that the benefits of such disclosure, although uncertain with respect to the medical injury rate, are no less real. Furthermore, recent survey results suggest that changes in the law of informed consent have had a noticeable impact on the manner in which physicians convey medical information to patients. Here, it would seem, by rejecting customary practice as the standard for disclosure, tort law has managed to play an effective role as 'ombudsman'.

Diagnosis and Treatment. The marginal benefits of liability-induced diagnostic and treatment procedures are considerably less certain. Recent evidence not only calls into question justifications for increased utilization rates of technologically sophisticated procedures such as electronic fetal monitoring (EFM), amniocentesis, and Cæsarian-sections, but suggests that these and others are sometimes harmful to patients.⁴⁹ While subjective assessments are inherently unreliable, to the extent that physicians themselves report little medical justification for many

⁴⁶ See e.g. McKerrow, L. W., 'Litigation and the Health Care Professional — Defensive Medicine is not the Answer' (1983) 4 *Health Law in Canada* 35, 38.

⁴⁷ Brook, R., Brutoco, R., and Williams, K. 'The Relationship Between Medical Malpractice and Quality of Care', (1975) *Duke Law Journal*, 1197, 1221.

⁴⁸ For a comprehensive and critical review of these studies, see Meisel, A., and Roth, L., 'Toward an Informal Discussion of Informed Consent: A Review and Critique of the Empirical Studies' (1983) 25 *Arizona Law Review* 265.

⁴⁹ Institute of Medicine, *Medical Professional Liability and the Delivery of Obstetrical Care*, Vol. I., *op. cit.* 75-82.

of the procedures adopted on the basis of liability concerns, it is reasonable to suppose that the marginal effect of these practice changes on the rate of medical injuries is slight.

On the other hand, we are not entirely convinced by physician arguments that much increased testing is not necessary. For example, it has been argued that routine fetal monitoring is unnecessary because it may only identify a problem in, for example, one in a thousand cases. Yet if that monitoring prevents a severely brain-damaged baby, with enormous attendant costs, the benefits of the monitoring may outweigh the costs. Then again, detailed cost-benefit evaluations are by no means so straightforward. Even if EFM were to pass a test of 'first-order' effects, second-order consequences might reverse the initial calculation. For example, if as more than one study has suggested,⁵⁰ routine EFM leads to a higher rate of Caesarian-sections, one would want to consider as well the costs and benefits of this second-order effect. In this respect, it is worth noting that while maternal mortality rates are comparable for both vaginal delivery and Caesarian-section, the latter procedure has a significantly higher incidence of morbidity (where this includes a higher rate of infection, longer hospitalization, rarer complications such as hysterectomy and bowel trauma), as well as less tangible drawbacks of women's loss of control and increased impediments to maternal-infant bonding.⁵¹ So too, one should consider evidence of a \$4,000-\$5,000 cost differential between vaginal delivery and Caesarian-section for uncomplicated deliveries, and reports that even a five per cent reduction in the rate of Caesarian-sections in the United States (currently at about 25 per cent of all live deliveries) would generate health-care savings in the order of \$800 million.⁵² Of course, a fundamental question about the liability system (to which we return in the final section of this paper) is who is best placed to make these cost-benefit evaluations.

Professional Interaction. To the extent that liability considerations encourage physicians to study the professional literature more closely and to attend more continuing education courses, one might anticipate a reduction in the incidence of medical injuries. Perhaps surprisingly, however, there is little evidence that these activities alone have a meaningful impact on professional competence and quality of care. Instead, most studies have concluded that effective practice modification requires educational programmes to focus on identified problem areas and to be aimed at specific behavioural changes. Furthermore, to the extent that the professional literature studied and the educational programmes attended are directed more toward litigation pre-emption techniques (such as detailed record-keeping) than at injury avoidance practices, patient benefits might be non-existent. Increased consultation with other professionals seems beneficial, but we are unaware of any studies assessing its impact on medical quality.

⁵⁰ See e.g. Sachs, B., 'Is the Rising Rate of Caesarian Sections a Result of More Defensive Medicine?' in Rostow and Bulger, (eds) *op. cit.* 31; Institute of Medicine, *op. cit.* 75.

⁵¹ Sachs, B., *op. cit.* 33-4.

⁵² *Ibid.* 36, 38.

(ii) *Institutions*

There is little evidence relating risk management programmes to malpractice claims experience or to the incidence of medical injuries. Nevertheless, many successful experiments at improving the quality of medical care appear to have been conducted within the organizational framework that is the touchstone of institutional risk management.⁵³ Consequently, despite anecdotal evidence that liability considerations have combined with rules of documentary disclosure to impede physician participation in hospital quality assurance and risk management committees,⁵⁴ institutional liability seems likely to reduce the number of medical injuries (an issue to which we return in the concluding section of the paper).

(b) *Activity Levels*

The relationship between activity level responses and the incidence of medical injuries is even harder to assess. Some commentators welcome increased liability in high-risk areas as discouraging excessive use of expensive and invasive diagnostic and surgical procedures.⁵⁵ Similarly, to the extent that quality of care is inversely related to physician age and directly related to physician training and specialization, early retirement and restrictions on the scope of GP/FM practices may produce welcome reductions in the number of medical injuries. With respect to GP/FMs at least, this interpretation is supported by evidence that many such physicians have also experienced difficulty in obtaining hospital privileges in obstetrical and surgical areas of patient care;⁵⁶ thus, sound medical reasons may justify their exclusion from high-risk practice areas.

Other evidence, however, suggests a potentially detrimental aspect to reported activity level responses. More than one survey reveals a marked tendency for many physicians to reject certain patients not on the grounds of medical complexity, but instead solely because they display indications of potential litigiousness.⁵⁷ Thus, as one group of researchers concludes: 'for an as yet undefined group of patients, access to health care may be becoming restricted because of factors associated with malpractice litigation.'⁵⁸ So too, increases in

⁵³ See e.g. Eichorn, J., Cooper, J., Cullen, D., Maier, W., Philip, J., and Seeman, R. 'Standards for Patient Monitoring During Anaesthesia at Harvard Medical School', (1986) 256 *Journal American Medical Association* 1017; Chassin, M., and McCue, S., 'A Randomized Trial of Medical Quality Assurance', (1986) 256 *Journal American Medical Association* 1012; Myers, S., and Gleicher, N. 'Successful Program to Lower Caesarian-Section Rates', (1988) 319 *New England Journal of Medicine* 1511.

⁵⁴ See Duff, D. G., 'Evidentiary Privilege for Hospital Quality Assurance and Risk Management: Assessing Statutory Reform (1989) *University of Toronto Faculty of Law Review* 526, 536-8.

⁵⁵ Brook, Brutoco and Williams, *op. cit.* 1211.

⁵⁶ Weiss, B., 'Hospital Privileges for Family Physicians at University Hospitals', (1984) 18 *Journal of Family Practice* 747.

⁵⁷ Charles, S., Wilbert, J., and Franke, K., 'Sued and Nonsued Physicians' Self-Reported Reactions to Malpractice Litigation', (1985) 142 *American Journal of Psychiatry* 437, 440; Peters, D., Nord, S., and Woodson, R.D., 'An Empirical Analysis of the Medical and Legal Professions' Experiences and Perceptions of Medical and Legal Malpractice,' (1986) 19 *Michigan Journal of Law Reform* 601, 616.

⁵⁸ Charles, Wilbert and Franke, *op. cit.* 440.

the volume of technologically intensive diagnostic and therapeutic interventions, and reports of diminished accessibility to obstetrical services, raise doubts about the current allocation of medical resources. Nevertheless, it is difficult to determine the extent to which the liability system itself is responsible for these allocative characteristics, and difficult to define optimal tradeoffs between improved quality and enhanced access. These issues call for a comparative evaluation of all the available policy instruments to achieve improvements in public health status and for a difficult social calculus as to whether patients are better or worse off with less ready access to more specialized practitioners compared to readier access to physicians with a somewhat more disparate range of expertise. We have not seen a convincing evaluation of these issues, nor can we offer one of our own.

3. *The Costs of the Civil Liability System*

Whatever benefits the civil liability system generates in terms of reduced injury costs, optimal deterrence requires that these savings exceed the costs incurred in preventing those injuries. Consequently, a thorough analysis of the deterrence properties of the medical malpractice system requires both the identification and estimation of accident prevention costs.

One approach to this task involves econometric studies relating malpractice premium increases (serving as a proxy for exposure to malpractice liability) to reported increases in aggregate physician fees and hospital expenditures. On this basis, Greenwald and Mueller conclude that the 400 per cent rise in U.S. malpractice premiums between 1970 and 1975 added \$2.3 billion to health care expenditures over the same period.⁵⁹ Working with 1984 data, Reynolds, Rizzo and Gonzalez estimate the total cost of liability-induced practices in the United States for that year (both care and activity level changes) at between \$8.4 and \$12.1 billion.⁶⁰ Since these studies fail to account for differences in health care reimbursement mechanisms, however, they are likely to overstate the impact of liability alone on health care costs.

Similarly, since physician surveys are likely to exaggerate the extent of purely liability-induced practice changes, attempts to estimate the total cost of such practices by aggregating the estimated price of reported changes over all physicians also inflates the total costs of specifically liability-related practices. Nevertheless, this method has yielded two U.S. estimates of about \$10.6 billion annually,⁶¹ and between \$15 billion and \$40 billion per year.⁶²

On the other hand, both econometric and survey techniques of measuring the costs of the civil liability system fail to account for additional expenses that

⁵⁹ Greenwald and Mueller, *op. cit.* 83.

⁶⁰ Reynolds, Rizzo and Gonzalez, *op. cit.* 2780.

⁶¹ *Ibid.* 2778.

⁶² American Medical Association Special Task Force on Professional Liability and Insurance, *Professional Liability in the 1980s* (1984), cited in Weiler, *op. cit.* 157-8.

should properly be included in measuring the deterrence costs of the current medical malpractice system. First, in addition to the price of 'positive' practice changes attributed to the civil liability system, a comprehensive accounting should also consider the costs of 'negative' practice responses, involving restricted accessibility, impediments to medical innovation, and reluctant participation in quality assurance and risk management programmes. No studies have attempted to measure these costs. Second, the administrative 'transactions costs' of establishing legal incentives for the prevention of injuries should also be considered. These include the private costs of defending and litigating malpractice claims (totalling about 60 per cent of the \$3 billion devoted to malpractice premiums in the United States in 1984,⁶³ plus about \$50 million paid to attorneys employed directly by defendants as opposed to their insurers⁶⁴), the foregone income of physicians who lose an average of 2.7 days per malpractice claim filed against them (totalling about \$70 million in the U.S. in 1984⁶⁵), and the public costs of providing courts, judges and/or juries to resolve malpractice claims (amounting to about \$3.7 million per year in the United States⁶⁶). Finally, since many studies have documented the emotional trauma experienced by individual physicians sued for malpractice (regardless of the outcome), some estimate of the price that physicians would be willing to pay to avoid this experience should also be included as a cost of injury prevention through the current malpractice system. We are unaware of any attempt to measure this cost.

4. *Conclusion*

While existing studies indicate some impact of civil liability on medical practice, inadequate evidence on both the costs and benefits of liability-induced changes in medical practice, and on the precise character of those changes themselves makes it impossible to reach firm conclusions regarding the operation of the medical malpractice system as a mechanism for deterring medical injuries. Whether the system actually stimulates cost-justified injury prevention is impossible to determine from the existing data. Nevertheless, even this limited evidence suggests two areas where the civil liability system may have had a noticeable impact, and where the benefits of these practice changes probably outweigh the costs: physician communication of treatment risks and alternatives to patients, and institutional programmes for injury prevention.

⁶³ Reynolds, Rizzo and Gonzalez, *op. cit.* 2778; Weiler, *op. cit.* 129.

⁶⁴ Calculated from figures presented in Reynolds, Rizzo and Gonzalez, *op. cit.* 2778; and U.S. Congress General Accounting Office (G.A.O.), *Medical Malpractice; Characteristics of Claims Closed in 1984, 1987*, 26.

⁶⁵ Calculated from data found in Zuckerman, S., 'Medical Malpractice: Claims, Legal Costs, and the Practice of Defensive Medicine', (1984) 3 *Health Affairs* 128, 130-1; and G.A.O., *op. cit.* 26.

⁶⁶ Calculated from estimates presented in Danzon, *supra* n. 1, 31; G.A.O., *op. cit.* 22; Kakalik, S. S., and Ross, R. L., *Costs of the Civil Justice System: Court Expenditures on Various Types of Civil Cases*, 1983, 65.

V ALTERNATIVE APPROACHES TO THE QUALITY CONTROL ISSUE

1. *Administrative Oversight*

Traditionally, the principal regulatory form of post-entry quality control has been the disciplinary processes of the self-governing institutions of the medical profession. However, the disciplinary process appears to address rather different behaviour from that addressed by the tort system. For example, Danzon⁶⁷ 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. Weiler⁶⁸ reports that even after marked increases in disciplinary actions in the U.S. over the past decade or so, by the mid-1980s there were only about 1,000 instances of probation, supervision and licence revocation per year across the entire country — around 400 losses of licence 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. Despite dramatic increases in claims rates, a recent U.S. study found that only one in eight negligently-caused medical injuries results in claims and only one in sixteen results in paid claims.⁶⁹ 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.⁷⁰

Our own recent analysis of the interface between the tort system and the disciplinary activities of Canadian provincial colleges of physicians and surgeons tends to support the conclusions drawn from the U.S. analysis. While limited data is available in Canada, 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 relied on in initiating investigations included patients, relatives and friends, other physicians, hospitals, and a mix of minor sources.

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 indicates that 69.8 per cent of Canadian disciplinary cases which result in sanctions involve allegations other than negligence or incompetence; while 22.9 per cent involve negligence and 7.3 per cent 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

⁶⁷ Danzon, P. M. 'The Frequency and Severity of Medical Malpractice Claims' (1984) 27 *Journal of Law and Economics* 115.

⁶⁸ Weiler, *op. cit.*

⁶⁹ Harvard Medical Practice Study, *Patients, Doctors and Lawyers: Medical Injury, Malpractice Litigation, and Patient Compensation in New York* (1990).

⁷⁰ *Ibid.* 209-10.

incompetence seems to be quite low compared with the number of settlements and awards for medical malpractice. The total number of physicians disciplined in Canada during 1983-1987 for negligence and/or incompetence was between 98 and 174, and 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 plaintiffs in malpractice actions, the number of physicians formally sanctioned for negligence or for incompetence appears to be between 10.7 per cent and 19.0 per cent (but is likely closer to the former). As a percentage of all incidents of negligently-caused iatrogenic injury, this ratio is much lower again.

Hence, if, for example, a no-fault compensation system were to supplant tort law for medical misadventures, existing disciplinary mechanisms — if operating as they currently appear to do — would fail substantially to fill whatever deterrence role tort law might otherwise play. Perhaps it is unfair to criticize existing disciplinary processes on this basis, since they are not designed to function as a shadow tort system. Indeed, as noted above, the large malpractice claims data reveals 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. However, it can be persuasively argued that the post-entry quality control mechanisms of the self-governing bodies of the medical profession should be much more broadly conceived, *e.g.*, practice guidelines, practice audits, practice limits, remedial retraining, *etc.*, and assume a more pro-active, rehabilitative orientation.⁷¹ Legislative reforms might well be directed to ensuring that the self-governing institutions of the medical profession have the powers and the impetus to take this expanded quality-control role seriously.

2. Institutional Liability

In addition to a re-orientation of the administrative mechanisms of the medical profession directed to monitoring and enhancing post-entry care and competence of physicians, proposals have recently been advanced for reconstituting the tort system as a quality control mechanism by focussing its incentives on the institutions within whose precincts medical treatments giving rise to malpractice claims occur.⁷² Both U.S. and Canadian evidence suggests that about 90 per cent of all medical malpractice claims arise out of hospital treatments. However, because of the independent contractor rule, hospitals are not generally liable for the negligence of independent, non-employee physicians who treat their patients in hospital settings pursuant to privileges granted by the admitting hospital.

The argument for substituting institutional liability for individual physician liability, perhaps with limited rights of indemnification in cases of gross

⁷¹ See Trebilcock, M. J., Tuohy, C. J., and Wolfson, A. D., *Professional Regulation*, (1979) ch. 11.

⁷² Weiler, *op. cit.* s. VIII(d); Chapman, *op. cit.*

physician negligence, is that the goal of optimal accident reduction is likely to be advanced in the following ways: (a) because of the law of large numbers, hospitals are less likely than individual physicians to adopt excessive precautions due to risk aversion, and more sensitive forms of experience-rating of insurance premiums are likely to emerge at the institutional level than at the individual physician level; (b) budget constrained hospitals will have less of an incentive to promote socially wasteful forms of 'defensive' medicine than individual physicians; (c) due to economies of scale, one would expect institutional providers to be more familiar with applicable legal standards than individual physicians, and thus less likely to engage in defensive practices motivated by exaggerated fears of liability; (d) hospital managements are likely to have a broader and more intimate appreciation than individual physicians and their insurers of systemic deficiencies that permit the occurrence of an excessive incidence of human failures, and of the potential for corrective adaptations of these systems, including systems for conferring, pricing, and terminating hospital privileges; (e) institutional providers are likely to be better placed to make the difficult cost-benefit calculations involved in the selection of available medical procedures.

With an expanded, more pro-active, rehabilitative focus assigned to the post-entry competence enhancement mechanisms of the medical profession, and a redirected focus for the tort system that would substitute institutional liability for individual physician liability for medical misadventures occurring within hospital precincts, it is possible that socially less ambiguous enhancements in the quality of health could be realized than from the present system of post-entry quality control that rests so heavily on individual physician civil liability. In both cases, more effective harnessing of expert institutions as 'gatekeepers' — the self-governing institutions of the medical profession in terms of administrative oversight and regulation, and hospitals in terms of civil liability — is the unifying policy premise.

3. *Technological Development*

If, as we believe, Grady is correct that the increasing complexity of medical practice and technology is a significant factor in the increase in medical malpractice liability, there is an important implication for the direction of technological development. It appears that a major objective of medical development has been to develop procedures and equipment that can save lives and reduce dysfunction. Once one recognizes that it is not uncommon for errors to occur in medical diagnosis and treatment, an additional important objective may be defined; rendering procedures and technology more forgiving of physician error. Grady notes that the present malpractice system in the U.S. creates strong incentives to develop such risk reducing technology; indeed he worries that this incentive may be excessive. We can see in other areas, however, that the development of technology that is forgiving of known human frailties can have benefits that outweigh the costs and that the inducement of such development is not left to the tort system alone. Three decades of improvements in the

crashworthiness of automobiles, including seat belts, air bags, side guard door beams, padded dashes, and redundant braking systems appear to have significantly reduced the human carnage resulting from automobile accidents. While most accidents may be the result of driver error, we have had limited success with programs designed to eliminate those errors, while the crashworthiness programs appear to have proven cost-effective.⁷³ Significantly, many of these improvements have resulted directly from government regulation; many activities of NHTSA reflect a belief, supported by some evidence, that the tort system did not create incentives for the incorporation of cost effective crash-worthiness features in automobiles. Aircraft have also incorporated increasingly sophisticated systems that operate the aircraft (the auto-pilot) and that warn of system malfunctions or dangerous conditions caused by pilot error. In the fields of motor vehicle accidents, product accidents and occupational accidents, the tort system has been supplemented by systems of government regulation, some of which deal with risks caused by human inadvertence, and while many have criticized the excesses of the regulatory agencies, most critics favour reform rather than abolition of the regulatory system. We believe that it is worth studying whether one could devise an institution with a mandate for assessing trends in medical malpractice claims, and recommending modifications in both practice and technology that would be cost-effective in reducing the risks that have driven the dramatic liability increase of the 1970s and 1980s.

⁷³ See Friedland, M. L., Trebilcock, M. J., and Roach, K. *Regulating Traffic Safety* (forthcoming).