"Medical Adversity Insurance"— A No-Fault Approach to Medical Malpractice and Quality Assurance

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A "no-fault" insurance system is proposed to replace the present adversary legal system for dealing with medical malpractice. Designed to obviate inquiries into providers' blameworthiness wherever possible, the system has features which would bring certain adverse medical outcomes to light, compensate for them promptly though not lavishly, and generate incentives for providers to avoid relatively bad outcomes experience. The difficulty of specifying compensable events might dictate that, at least initially, only events which are relatively avoidable and easily identified when they occur could be made compensable, the remainder being left for adjudication under traditional principles. The system would be operated primarily by providers and would stimulate peer review, self-regulation, continuing education, and increased attention to clinical outcomes rather than inputs or processes. Direct regulation of the quality of care would be unnecessary in areas where the system proved workable, and medical decision-making would be left largely free from outside interference. Costs could appear high but would be manageable.

Although difficult to formulate, a "no-fault" system for handling the untoward results of medical care, replacing the present system of medical malpractice law, is a tantalizing goal. Potential savings in legal and administrative costs as well as in doctors' time, reduction of distrust in physician-patient relations, elimination of the often unwarranted stigma attached to claims and the bitter adversariness of malpractice trials, and wider and prompter compensation of injured patients are but a few of the benefits that might be gained (Secretary's Commission on Medical Malpractice, 1973; Duke Law Journal, 1971:940–952; McDonald, 1971; U.S. Senate, Subcommittee on Executive Reorganization, 1969). Whether anything substantial might be lost depends on whether the new system would be inferior to the present system in inducing higher-quality care and on whether one regards the probable reduction in the size of some damage awards as a plus or a minus. We

think we have found a way to organize a no-fault system which would produce substantial net gains, would elicit considerable support within the medical profession, and would advance quality assurance in medicine well beyond its present primitive state. We call our scheme "medical adversity insurance" (MAI).

The "no-fault" idea is not unitary and may be misleading in the present context. For automobile accidents, no-fault insurance is of the first-person, casualty variety and compensates the insured for such losses as he suffers (Keeton and O'Connell, 1965; New York State Insurance Department, 1970). An accident-prone insured may find his policy cancelled or his rates raised as he demonstrates his propensity to cause harm to himself and his vehicle, but harms which he causes to others are not his or his insurer's responsibility (except above a specified dollar amount, where traditional liability concepts have been retained). With respect to small claims, therefore—up to $10,000 in the plan of Keeton and O'Connell (1965), for example—the system is "no-fault" not only in dispensing with the expensive process of assigning blame in each case but also in seeming to excuse harm done to third parties. Our system for dealing with adverse outcomes of medical treatment is "no-fault" only in the former sense and retains an element of provider responsibility for adverse outcomes as a means of maintaining desirable incentives. The extensive fault-finding process, with its attendant stigmatization and bitterness, is largely eliminated, but we adhere to the principle of using legal means to prevent or reduce the frequency of avoidable harms.

The paper is divided into four parts. The first describes the compensation system visualized, showing how experience with other compensation schemes has been adapted to the medical context. We believe we have introduced a number of features that make the scheme administratively workable, generally attractive to the various parties concerned (other than trial lawyers, perhaps), and easily comprehended.

The second section sets out the results of an analytical study of the problem of defining "compensable events," the major stumbling block in devising a no-fault approach. One important insight here is the frank recognition that it is impossible to reduce all possible incidents of medical malpractice to handling under our system; nevertheless, the effort may be carried forward step by step, adding to

the "list" of compensable events as experience and further study dictate. Further, we are not reluctant to classify some events as compensable even though they may often be literally unavoidable under good medical practice. The possibility of overbreadth is incidental to any classification effort in an impure world, and a substantial amount of such seemingly unwarranted compensation is tolerable in view of the high cost and unreliability of case-by-case adjudication, the probability of randomness in the incidence of such events over time, and other factors. The paper makes some explicit suggestions for inclusion on the list of compensable events but dwells primarily on the analytics of list compilation.

The paper's third section deals with the costs of MAI, distinguishing apparent dollar costs from real costs. Although the apparent costs—i.e., the premiums—could be high, providers with normal loss experience would be able to pass them on to their patients, or, alternatively, the MAI system could be subsidized to reduce the apparent cost without diluting the sought-for incentive effects. Even though a total social cost accounting should make the plan seem cheap in view of the accident avoidance to be achieved, the pressures generated by MAI could stimulate further inflation in medical care costs. Thus, MAI calls renewed attention to the need to bring the system's inflationary tendencies under social control by either market or regulatory means as well as to the difficult trade-offs which would necessarily exist between cost and MAI-induced quality.

The fourth section relates MAI to other mechanisms of quality assurance in medicine, both current and proposed. As a fundamentally nonregulatory system, MAI contrasts favorably with other mechanisms in leaving providers free, within wide limits, to use methods of their own choosing to maximize the quality of care delivered, as judged by the outcomes achieved. Nothing in MAI is inconsistent with maintaining direct regulatory controls, but we believe it would obviate most of them.

MAI is a complex idea, and this paper suggests ways of overcoming the immense difficulties of making it work. Much remains to be done in the way of education and experimentation, however, before MAI can become a reality. The conclusion suggests how such experimentation might begin.

I. Medical Adversity Insurance Described

The proposed compensation scheme would be roughly analogous to the workmen's compensation system for handling industrial accidents (see National Commission on State Workmen's Compensation Laws, 1972; Ehrenzweig, 1964). Health care providers—physicians, hospitals, and health maintenance organizations (HMOs)—would each be required to purchase from a private insurer a policy of "medical adversity insurance" covering their patients. Under MAI, any patient suffering a "compensable event," as defined in the policy, would be automatically indemnified for certain expenses and losses associated therewith and would be denied other recovery. The payment would cover all medical and hospital expenses and also loss of wages up to a predetermined maximum amount per week.

Loss of wages beyond a specified weekly level would not be compensated because persons in higher income brackets could be fairly expected to insure themselves. Moreover, we do not believe it would be seen as desirable to create a substantial discrepancy, based on the patient's income, in the doctor's economic incentives to exercise care in different cases. By the same token, we would also prescribe a minimum figure as the entitlement of persons not actively, or lucratively, employed—housewives, children, and the poor, for example. Use of such maxima and minima (adjusted periodically in accordance with wage trends) might also eliminate the problem of specifically adjudicating damages in the majority of cases. Some minimum claim level—say, $500—would also be prescribed to avoid burdening the system with small claims and merely technical departures from good medical results. As will be seen, larger or smaller deductibles or coinsurance might be employed for particular events as a means of fine-tuning the incentives.

The compensation payment might or might not include a factor for "pain and suffering," which is the item usually responsible for lavish jury awards in malpractice and other tort actions (O'Connell and Simon, 1972; Franklin, 1967). It is of course practically impossible to determine the presence, extent, and nature of this individualized experience and therefore to assign an accurate economic value to it. Nevertheless, for those compensable events which carry with them a high incidence of discomfort for the victim, some fixed amount, or perhaps a specified percentage of medi-

cal expenses, might be paid. An appropriate distinction might also be drawn between transitory pain and suffering and that attending a permanent affliction.

A further important technical feature of MAI would be its treatment of so-called "collateral" sources of compensation to the patient. Often, other insurance or other compensation programs will cover some or all of the patient's expenses. Thus, a patient's health insurer or a government program might cover his medical and hospital costs, and his lost wages might be covered by an employer's sick-pay or disability insurance program or by Social Security. Tort law ordinarily ignores the existence of such collateral compensation sources in awarding damages (Calabresi, 1970:5–11; Fleming, 1966), and it is often argued that, to prevent windfalls, damage awards should be reduced by the amount of such collateral compensation. We would propose not that MAI awards be reduced to reflect payments from collateral sources but rather that the collateral sources themselves be compensated under the insurance policy, preventing the windfall to the patient and restoring to such sources at least some of the money paid out as a result of the compensable event. Although this approach would burden the MAI system with an amount approaching the total cost of the events which occur, elimination of windfalls would produce a concomitant reduction in the cost of health and disability insurance and of employer sick-pay plans; we mention later the possibility that health insurers and other third-party payers could be required to subsidize MAI insurers as a means of keeping premiums at reasonable levels without distorting quality incentives. A further reason for allowing compensation to collateral sources is that they will be more likely than patients to initiate inquiries as to the possible existence of a compensable event.

Premiums on MAI policies would be "experience-rated." This means that a provider having a loss experience higher than normal would have his (its) premium for future years raised.[1] The mechanics of experience rating could be extremely complex. For example, the formula for premium adjustment might vary for particular compensable events or for different levels of payout to reflect perceived needs for greater or lesser incentives or for protection of

[1]In workmen's compensation, an annual premium of $500 is thought sufficient to make "merit-rating" feasible and desirable (National Commission on State Workmen's Compensation Laws, 1972:98), suggesting the feasibility of experience rating for solo medical practitioners.

the provider against costs associated with truly catastrophic outcomes. Also, the increased premium might be regarded to a greater or a lesser extent as a repayment to the insurer of the damage awards paid out, and, if this approach were adopted, the physician's age and remaining years in practice might be a factor in the premium adjustment. Experience rating is, of course, the feature which retains the element of provider responsibility and maintains the important incentives to avoid adverse outcomes. The opportunity for individually specifying the incidence of the cost for each class of compensable events adds greatly to the plan's flexibility, permitting allocation of specific risks in such a way as to induce attention of various participants in the health care system to particular quality questions. Clearly, if the sought-for incentives are to be maintained, cost-reimbursement systems of financing health care should not automatically pick up the provider's insurance premiums.

It is widely suspected that a large number of potential malpractice claims are never asserted under the present system because patients or their survivors never become aware of the fact that negligence played a part in the outcome. If a system is effectively to discourage adverse outcomes, opportunities or incentives for physician or provider "cover-up" of adverse results must be minimized or altered. We propose that a statutory obligation be imposed upon the provider to inform the patient of the existence of a claim within a prescribed period of time after its recognition. Failure to disclose would render the provider personally liable for the amount of the claim. In addition, it might be decided that a willful withholding of information should prompt a denial to the provider of the protection otherwise provided against a lawsuit under traditional tort principles. We believe that a disclosure requirement of this kind is consistent with providers' obligations to their patients and would in time promote disclosure of adverse outcomes as a matter of course. The provider would not have the opportunity to insure against liability for nondisclosure, and the sanction thus imposed, being proportional to the magnitude of the patient's potential loss, would surely minimize the provider's temptation to gamble that the patient would not become aware of the existence of a claim by other means. Moreover, the effect on the provider's insurance premiums and the possibility of a quality-related inquiry by the doctor's peers would reduce the likelihood of patient-provider collusion.

Another benefit from a disclosure requirement would be the collection of valuable data on the frequency of adverse outcomes of various kinds in the health care system. Data of this kind is utterly lacking today, and its availability would greatly improve the system's ability to measure both its over-all performance and the performance of each provider (Ellwood *et al.*, 1972). We regard the quality "feedback" feature of our scheme as among the most important. Nevertheless, we would regard the data relating to each provider as privileged against general disclosure, at least until it was concluded that the information, or certain pieces of it, had positive value to consumers and would neither mislead them nor affect some providers unfairly.

A related and important element in our system is the noncancellability of MAI policies. Although the insurer might raise the provider's premium in accordance with the experience-rating formula to be prescribed, it would be unable to terminate the coverage of individual providers. The only other recourse of the insurer carrying an apparent bad risk would be to call the attention of governmental or professional quality-control authorities to the provider's poor or sub-par performance. This would allow the normal peer-review and other mechanisms to determine whether the necessity existed for limiting the provider's practice in some way or imposing some other quality-promoting sanction; the provider would, of course, have an appropriate opportunity to defend against the imputation by showing such things as the special circumstances in particular cases, or the high-risk character of the cases treated or the population served. Variations in the experience-rating formula could be used to make the medical specialty or the medical profession as a whole a risk bearer, thereby inducing strengthened professional oversight and perhaps other professional efforts at improving outcomes.

Inevitable disputes would be minimized by listing only compensable outcomes which were readily detectable and by specifying events in such a way that, at the price of a certain arbitrariness, issues about etiology or collateral facts would be avoided. Occurrence of an event might nevertheless occasionally be in doubt, and claims payment might be resisted on this ground by either the insurer or the provider (even after giving the patient notice of a possible claim). Administrative adjudication or arbitration would be em-

ployed, and the provider's cooperation in the fact-finding effort would be compelled. To deter insurers from unreasonably resisting payment and to guarantee patients their day in whatever forum was provided, an added fixed fraction of the award could be allowed a successful claimant as attorney's fees.

Because the list of compensable events in the MAI policy would not purport to cover all of the possible occurrences which might be treated as compensable under traditional notions of malpractice, a parallel system for adjudicating claims not falling within the policy would have to be maintained. Although this system would not be part of MAI, it would be complementary, and its design would require some specific attention. Presumably an arbitration system or a system of administrative adjudication similar to that which would be needed to handle disputed claims under MAI would be provided for, and providers would purchase liability insurance covering this residual exposure. Design of this system would draw heavily on the experimentation currently being carried on to develop improvements in existing malpractice adjudicatory processes (Medical World News, 1972; Ellwood *et al.*, 1972:403–463).

MAI would require legislation to implement it. Administrative supervision would be needed to operate the adjudication system, and some authority would be needed to preside over the development and improvement of the list of compensable events. Whether the machinery would be operated at the federal or state level is not clear, but a period of experimentation at the state level would seem desirable before a national system tied to federal financing programs is considered. A pending legislative proposal to establish a Commission on Quality Health Care at the federal level (U. S. Senate, 1973), with specific instructions to concentrate on quality-control measures emphasizing the outcomes of medical treatment, suggests that a federal solution might ultimately be adopted. Such a Commission would surely consider something like MAI as one means of carrying out this mandate.

II. Identifying Compensable Events

An Illustrative List for Future Study

The difficulty of defining a compensable event is self-evident to nearly everyone, but particularly to physicians. Bad results of medi-

cal treatment can be regarded as incidents of the original disease or condition or of the probabilistic character of most therapies just as easily as they can be seen as results of errors or negligence in the health care system. Others who have considered the prospects for a no-fault system in this field have very nearly despaired of reducing medical outcomes to a list of compensable events (Keeton, 1973; Rubsamen, 1972; McDonald, 1971), and our study only began when it was recognized that it would not be necessary to handle all cases of possible negligence under the scheme we were proposing. Our object then became to develop a list of compensable events which, without being all-inclusive, would remove the greater number of cases from the fault-liability system, regularize compensation, and strengthen quality-promoting incentives. We began by devising an empirical study to delineate in a rough manner some possible compensable events in one area of medical care having substantial experience with malpractice claims—orthopedic surgery.

Appellate cases involving orthopedic care over the past forty years were reviewed to sort out those which presented a strong medical presumption that the event was avoidable, in the sense that good care would have prevented the adverse outcome. After these cases were collated under various categories to develop a tentative listing of compensable events, a small meeting of orthopedic specialists, law professors, and lawyers was convened to consider it. Following a briefing on the purpose of the exercise and the principles that in our view should be applied in including an outcome on the "list," the group examined the items in the preliminary listing and proposed a number of significant additions. The resulting list, although still regarded as highly tentative, included the outcomes found to be negligently caused in the great majority of the cases previously reviewed.

The orthopedists who participated in the meeting appeared enthusiastic about the scheme as presented. As the list illustrates, they were quite free in their willingness to include items. In addition to demonstrating that some agreement could be reached by medical specialists on the over-all concept and a list of appropriate compensable events, the meeting provided the opportunity for examining the complex medical, economic, and social issues which must be addressed in developing the list.

The compensable events tentatively identified fell into three broad groupings. The first grouping consisted of medical care se-

quelae which can affect the nonorthopedic as well as the orthopedic patient and which arise from the over-all surgical treatment and post-operative course of patients. The suggested list included the following:

–post-operative infections
–thrombophlebitis and embolism
–catheter infections
–allergic and toxic reactions to antibiotics and other drugs
–blood transfusion reactions
–foreign bodies
–hospital accidents
–adverse consequences during experimental treatment (see Havighurst, 1970a)
–secondary injuries from surgery.

Many of these events are relatively frequent occurrences and will be controversial. We would emphasize, however, that their inclusion here is meant to be suggestive only, that greater specification would be needed, and that a complete examination of each item has yet to be undertaken. Our criteria for such an examination and our thoughts on the nature of the specification required are set forth further on.

The second category of compensable events consisted of those which affect only the orthopedic patient and physician because they involve diagnosis and treatment of orthopedic conditions. This list, also highly tentative, was somewhat more specific:

–growth deformity secondary to bone injury
–Volkmann's contracture and other consequences of improperly administered casts
–failure of healing of fractures (including malunion, nonunion, and delayed union)
–the consequences of bone pathology errors
–the consequences of misreading skeletal X-rays.

A third category of events was also identified. Entitled "Consequences of Conduct Appropriate for Specific Sanctions," this group included the adverse consequences of failure to obtain informed consent, abandonment of the patient, gross negligence, intentional misconduct, and illegal behavior. Because these behavioral lapses

relate to special societal expectations regarding professional conduct, they seemed inappropriate for treatment in a no-fault system. Traditional legal doctrines and forums seem adequately to express and effectuate societal norms with regard to these matters. We recognize, of course, that the letter of the law on informed consent and other matters is apt to be confusing, but we regard the jury's role as substantially more important than stated legal doctrine in enforcing society's paramount expectation that the physician will accord his patients their full due as sovereign human beings. Damages in cases where such duties are violated need not be strictly compensatory.

Criteria

A definitive list of compensable events can ultimately be compiled only by drawing heavily on the informed judgments of accomplished clinicians. Our experience in attempting to identify compensable events is limited, but we have hypothetically addressed numerous possible candidates in seeking general principles to be employed in list development. We will state our conclusions on the general nature of the inquiry, giving some simple examples, and then provide, by way of illustration, a detailed analysis of the pros and cons of adding adverse reactions from blood transfusions to the list.

Arriving at our scheme, as we did, by way of seeking an alternative to the present judicially administered tort system, we have naturally used judicial experience as a starting point, and any list that is developed to test the idea in practice is likely to include for the most part things which the courts have frequently identified as compensable events. Our analytical method may ultimately lead well beyond such events, however, resulting in the listing of adverse outcomes which have seldom been the subject of a lawsuit. It is at this point that medical adversity insurance would begin to be seen more as a new and more finely tuned instrument of quality assurance in medicine and less predominantly as a means of providing physicians relief from the stigma and trauma of malpractice claims. The open-ended character of our list is well suited to gradual evolution in this direction as experience with the easy cases indicates the system's capacity to deal with harder ones.

Relative Avoidability (Perceived Fairness). The first criterion for use in deciding about inclusion of an outcome on the list is relative

avoidability. By this term we invoke epidemiological probabilities and call attention to the difficulties of designing a system which meets providers' general expectations of fairness. Having removed the attribution of actual fault as either the main object or a by-product of the system, we have shifted substantially outward the boundary at which perceived unfairness sets in and have thereby improved the prospects for acceptance of compensation even though the outcome in a significant proportion of the cases is arguably unavoidable. Nevertheless, until a good deal of education has been done, the medical community can be expected to resist treating as compensable a set of outcomes over which they consider that they have little control.[2]

So long as MAI's purpose is seen primarily as one of replacing the judicially administered system of malpractice law, the judgment of the minimum degree of avoidability required for a compensable event will be relatively straightforward. The issue would be simply whether the benefits (in increased fairness) of maintaining the opportunity for a fault-related inquiry are worth the cost. This opens up, first of all, the frequency with which the adverse outcome could be expected to have a satisfactory explanation which would exculpate the provider.[3] But this is only a small part of the problem.

[2]Fairness is likely to be overemphasized as a concern by physicians accustomed to the fault system. Workmen's compensation, covering all industrial accidents, makes no pretense at limiting compensation to cases in which the employer could have prevented the event. In fact, a substantial percentage of the cases in which compensation is paid involve actual fault on the part of the injured employee himself. Although there are many factors which may outweigh fairness concerns, we adhere to a fairness requirement as a means of recognizing the impracticality of turning providers of medical care into guarantors of life and health for all.

[3]On the question of fairness, our conception of the compensable though possibly unavoidable event may be compared with malpractice claims which fall under the legal doctrine of *res ipsa loquitur*. This doctrine permits a jury to find a physician to have been negligent solely on the basis of the court's lay judgment that the adverse outcome (e.g., the sponge left in the incision) is not likely to have occurred in the absence of negligence. Doctors often object to this doctrine on two fairness grounds: first, that the presumption of negligence is sometimes factually unwarranted and, second, that, although theoretically rebuttable by an affirmative showing of due care, the presumption is practically conclusive in a jury's hands. Although under our theory, likewise, occurrence of an event included on the list

One must also contend realistically with the imperfections of whatever fact-finding system may be adopted and with the problems and costs of getting proof which will adequately reveal whether the case was in fact one of unavoidability, negligence, or what. The risks of encouraging unproductive, litigation-inspired kinds of "defensive medicine" must also be counted (Duke Law Journal, 1971). Given these imperfections in any system requiring extensive fact- and fault-finding, as well as the high costs of maintaining such a system, a substantial degree of seeming arbitrariness in a no-fault system could be justified.[4]

Once MAI has proved its capacity for effective quality assurance in areas previously policed with some frequency by malpractice suits, the process of moving it into other areas would be merely evolutionary. To the extent that a greater number of seemingly arbitrary payments were compelled, there would be desirable incentives to find ways, through research and otherwise, to avoid currently "unavoidable" occurrences. Moreover, the plan could appropriately be regarded as containing an element of social insurance, under which providers would initially bear some of the burden of the population's unavoidable illnesses. So regarded, the scheme should not seem unfair since, to the extent that unavoidable compensable

makes compensation automatic, the fundamental difference is that there is no imputation of fault to the physician. Indeed, avoidability is explicitly a relative matter in our formulation. We would not require compensation to be confined only to highly avoidable events, since that would be to reintroduce fault through the back door. Another important difference between MAI and *res ipsa loquitur* lies in the medical input into the process of defining compensable events. The criteria and the data used by medical experts in defining compensable events would go well beyond anything that enters a judge's mind in deciding whether to apply the doctrine of *res ipsa loquitur.*

[4]The law frequently sacrifices the parties' opportunities for a full factual inquiry of the kind which might be deemed necessary for perfect justice. Strict tort liability for defective products and the use of "per se" rules in antitrust law are two examples. One senses, however, that there is a greater willingness to indulge in such conclusive presumptions where corporations rather than individuals are thus imposed upon. Whether a physician is a fit candidate for "enterprise liability" is no longer an open question, however, since the doctrines of *respondeat superior,* the "borrowed servant," and the "captain of the ship" all reflect judicial acceptance of nonfault liability for medical practitioners.

events are randomly distributed, providers would have little trouble in passing the costs on to consumers through higher charges, thus spreading the burden throughout the population. There would be no windfalls to patients or large legal fees included in the payments, and no doctor would have reason to feel victimized, as physicians so often do now, by an *ad hoc* judgment against him and his professional reputation by a seemingly hostile agency of the state.

To arrive at an estimate of relative avoidability, it is necessary first to estimate the frequency with which an event is therapy-induced (iatrogenic) and the extent to which it can in fact be prevented, or detected and treated if it should develop. Iatrogenicity would usually be comparatively easy to determine but would not be conclusive on compensability because it is common in medical practice for a treatment regimen to be selected with full awareness and expectation of its side effects. In these cases, the therapy may indeed be the best available, in which event the side effects may appropriately be regarded as unavoidable incidents of the condition which occasioned the therapy.

A decision to make an event compensable must also reflect a judgment of unexpectedness and of preventability through correct application of medical knowledge. Although perfect preventability is not a necessary condition, it may often be possible, by further classification and subcategorizing, to identify events having a higher degree of avoidability. Thus, for example, a particular adverse drug reaction, usually tolerable, might be compensated when it occurs in pregnant women but not otherwise, if pregnancy is a particular contraindication. Moreover, even if a side effect were predictable and acceptable, it might still be made compensable (perhaps with a higher deductible) if medical science was capable of initiating early and effective treatment once it develops, reducing concomitant morbidity or mortality. Other fairness problems might be dealt with by adjustments in experience-rating formulas. Also, as we suggest later, subsidies might appropriately be paid to MAI insurers to the extent of the unavoidable events which were estimated to be covered. Such subsidies would reduce the over-all financial burden on providers without disturbing the desired incentives.

The important thing about relative avoidability as a criterion is that it provides no absolute guide. A lesser degree of avoidability, i.e., a greater proportion of seemingly arbitrary payments, can be justified by a perceived opportunity to obtain substantially im-

proved outcomes in the small percentage of cases where the adverse outcome is avoidable, by a need to stimulate greater attention (perhaps research) to increasing preventability, by a need to balance incentives resulting from classifying another outcome as compensable, or by other pragmatic factors. The issue to be faced is simply the effect on the system's over-all credibility and workability and the value of the quality inducements achieved. At the outset, however, in order to assure acceptance by physicians and to prevent the social-insurance element (and costs, if insurer subsidies are unavailable) from becoming too large, the list would probably include only events which were regarded as avoidable in a high percentage of cases.

Impact on Quality. The second criterion for use in defining a compensable event is the impact on the quality of care. The quality-improving dimension of medical adversity insurance rests, as does much of the theory underlying the tort of malpractice, on an expectation that the consequences attached to a bad outcome will induce efforts to avoid it. The challenge is to arrange cost-bearing in such a way as to harness such efforts and direct them toward achieving net gains in quality. Incentives are difficult to order perfectly, however, and some parties are in a better position to influence certain outcomes than are others (Calabresi, 1970:135–173). Identifying the compensable event will often call for additional judgments, beyond specification of the event itself, which will contribute to a greater positive effect on quality.

The selection of the appropriate risk bearer is a more complex question than first appears. One obvious question illustrating this complexity is which provider's MAI policy—the physician's or the hospital's—should bear a particular loss. We visualize distinct lists of compensable events in the two policies and would expect a risk to be assigned to one policy or the other in accordance with a judgment about which provider was best able to organize to reduce or eliminate it. Thus, for example, post-operative staph infections would probably be on the hospital's list, whereas the surgeon would likely bear the primary responsibility for, say, antibiotic reactions. Although this allocation of burdens will often seem arbitrary because responsibility is shared to a large degree,[5] it may prove in-

[5]For example, staph infections may prove to be more resistant to preventive measures if hospital physicians have used antibiotics indiscreetly over time.

consequential from a quality point of view because the hospital and the medical staff relate in ways which enable them to work together to minimize adverse outcomes. Bargaining between them would surely be initiated whichever way the responsibility was initially assigned, and it is probable that the same preventive actions would be taken whichever party bore the initial loss (Calabresi, 1970:150–152, 161–173; Coase, 1960). It is an important insight that MAI would create incentives not only for direct action but also for initiating bargaining with others who are in a position to contribute to obtaining better outcomes.[6] Thus, continuing to hold the surgeon responsible for the sponge count would make sense if one wished to see the surgeon remain in control of the operating room and thought that the surgical staff would be effective in persuading the hospital to hire better counters.

The hospital and the physician are not the only possible risk bearers. The risk may be shifted from the provider to others by adapting the experience-rating formula for the particular event. It would be possible, for example, to impose the costs of a class of adverse outcomes on a particular hospital's medical staff, a particular medical specialty, or all local physicians or hospitals simply by requiring the insurer to spread them widely rather than allowing them to be reflected in the premiums of the provider experiencing the outcome. In this way, professional efforts to improve outcomes in the particular class of cases could be stimulated.

In the last analysis, a decision not to make an event compensable is equivalent to imposing the risk on the patient himself, subject to the possibility of his recovering for malpractice. Whether the loss should be so assigned is a question which ultimately should be explicitly considered. There will be cases where the patient is indeed in the best position to control costs. One such case would be where patients' frequent failures to follow doctors' orders produce the harms and where it seems unreasonable (or costly) to rely primarily on the doctors' ability to take special steps to follow up with the

[6]If bargaining was thought to be too costly or ineffective for other reasons, the risk could be apportioned, in which case some bargaining might still occur. Assignment of the entire risk to one provider or the other, however, would produce stronger incentives for initiating bargaining and might better stimulate desirable, quality-oriented interaction between hospitals and their medical staffs. The obstacles to such bargaining are not costs so much as jealousies, which might yield to financial pressures.

patient or to maintain the regimen (Calabresi and Bass, 1970:86–87). Relegating the patient to his malpractice remedy would of course allow his contributory negligence to be put in issue, whereas explicitly listing an event as noncompensable could be given the effect of precluding a malpractice suit altogether, in effect establishing a conclusive presumption of contributory negligence. Perhaps a high deductible under MAI would produce the risk-sharing arrangement which would generate the desired incentives on both sides.

As another means of imposing costs on the party best equipped to control them, the MAI insurer might be induced or required in some cases to seek recoupment against an independent party rather than through an upward adjustment of MAI premiums. For example, where a particular adverse drug reaction was initially compensable under a physician's policy, the MAI carrier might attempt to recover against the drug manufacturer, perhaps with the patient as a co-plaintiff seeking any additional damages payable under tort principles. Under present law in many states the drug company's fault must be affirmatively demonstrated, but in at least some circumstances the better rule might be one of warranty or strict liability, subject perhaps to the need to show that the physician had prescribed the drug properly, observing contraindications and dosages specified in the labeling, and that the patient had followed instructions in the drug's use. The physician would then be liable (through an MAI premium adjustment) only in those cases where he or the patient, whom he has considerable power to influence, had misused the drug; whether it would be desirable or administratively feasible to absolve the doctor in a case of patient fault would have to be separately considered. Employed in this manner, MAI would fit nicely into a legal trend to strengthen the safety-promoting incentives bearing on the drug manufacturer, the party best able to obtain safety information and advise users of the risks. It would also rather neatly effectuate proposals to improve the reporting of adverse drug reactions (International Conference on Adverse Reactions Reporting Systems, 1971:23).

In identifying the appropriate risk bearer in a class of cases, there are reasons why the physician should not be imposed upon too quickly. It is not sufficient, for example, to create adverse consequences for him where a certain outcome occurs without first appraising the likely impact on his decision making; precisely because we have chosen to take a piecemeal approach in developing our list

of compensable events, we must be concerned about introducing unwarranted biases into the choice of treatment. One would expect, of course, that a physician faced with a choice of two treatment modes would select the one which had the least likelihood of resulting in a compensable event. But, if the adverse results of one method of treatment were on the list while the results of another available method were not, the physician might be led to adopt the latter method even if it was not the best in the circumstances. The problem in defining compensable events is to encourage proper choices, all things considered, and to avoid creating incentives which distort doctors' judgments. Thus, if tetanus infections are to be made compensable, so must adverse reactions from tetanus toxoid, since to prevent one is to invite the other and the object is to induce the physician to consider the trade-offs.

Because of the need for a "systems" approach to the large disease categories, special rules of compensability may occasionally be necessary. Thus, although certain surgical mishaps might be generally compensable, exceptions might be made in the case of particular disease conditions where surgery was to be encouraged and the results of not operating could for some reason not be made compensable. Occasionally a high degree of seeming arbitrariness would have to be tolerated in order that a "closed system" could be achieved. In other cases where balancing of incentives was difficult, imposition of the loss on the medical profession might be preferable —because of the peer influences generated—to reliance on the incentives bearing on the individual physician.

A final risk to be considered is whether MAI might induce physicians either to refuse to treat patients whose conditions involved a high probability of resulting in a compensable event or to enter those medical specialties in which MAI's coverage was less extensive. If professional fees reflect higher risks, as they should, these problems would not be significant. Although physicians would be induced to avoid handling cases where they lacked confidence in their ability to measure up to the professional average, this is a desirable effect and should promote consultations and referrals. If the less skilled physicians did congregate in certain specialties, it is not clear that they would do more harm there than where they are now.

Administrative Simplicity. Our third and last criterion is administrative simplicity. The necessity for defining compensable events so

that they can be easily recognized in practice can hardly be overemphasized. In cases where the etiology of an outcome may be in doubt, the event must nevertheless be defined to avoid disputes. For example (to anticipate the later discussion), hepatitis contracted within six months following a blood transfusion might be paid for from the transfuser's insurance even though the causal connection could be disputed. Thus, a relatively low degree of avoidability and an element of arbitrariness in attributing causation are accepted as the price of obtaining desirable incentives without extensive (and probably inconclusive) fact-finding efforts.

Issues of administrative simplicity are implicit in much of the foregoing discussion of criteria. Thus, relative avoidability will often have to be sacrificed for simplicity, and responsibility for particular harms may sometimes have to be arbitrarily assigned to a particular risk bearer to avoid disputes and to provide a starting point for bargaining directed to improving outcomes.

These and other difficulties illustrate the complexity of system design, but our judgment is that enlightened practicality together with high-level medical expertise could design a system which would be capable at the outset of taking most malpractice litigation out of the courts or other forums and ultimately of expanding to provide quality-inducing incentives in most areas of medical care. A high level of sophistication would be called for, but we believe dedicated medical specialists would be capable of making the system work.

A Sample Inquiry: Reactions From Blood Transfusions

By way of further illustration but also to show that we do not minimize the difficulties, let us sketch some of the problems which are encountered in deciding whether to treat adverse reactions to blood transfusions as compensable events. Again, our purpose is only to be suggestive and to show the dynamics of accommodating medical complexities and uncertainties to the need for a workable system. We are aided by the earlier studies of the problem of hepatitis reactions by Franklin (1972) and by Calabresi and Bass (1971:83–86).

Approximately five per cent of patients who receive blood transfusions suffer some untoward effects, although only a much smaller percentage actually experience large medical expenses, extended disability, or death (Erichson and Laufman, 1970). Complications from blood transfusions range from mild allergic reactions

to the transmission of serious diseases such as hepatitis, syphilis, and malaria (Wintrobe and Foerster, 1970; Allen and Sayman, 1962). In contrast, allergic reactions and transmission of viral hepatitis may be significantly less preventable, though definite measures can be taken either to decrease the likelihood of contracting the condition or to mitigate the disabling effects (Erichson and Laufman, 1970).

Using the parameters developed in the previous section for determining whether a class of events should be compensable, we examine two particular blood reactions. The first, blood incompatibility reactions, falls within that group which might be considered highly avoidable, a likely case for a malpractice suit under the principle of *res ipsa loquitur,* and therefore arguably appropriate for inclusion on the list of compensable events. Hemolytic reactions which are caused by the administration of incompatible A, B, O, and Rh groups (or other independent antigen systems) are the most frequent of the severe acute transfusion reactions (Schwartz, 1969). The clinical manifestations of intravascular hemolysis fall along a spectrum from mild symptoms such as fever, chills, flushing of the face, tachycardia, and respiratory distress to severe complications, such as generalized bleeding, hypotensive shock, acute renal disease, and death (Schwartz, 1969). Most often these reactions are due to mistaken identification of recipient or donor blood or inaccurate typing or cross-matching in a laboratory (Erichson and Laufman, 1970). Moreover, if an error should occur despite precaution, early treatment—such as discontinuing the transfusion and administering intravenous mannitol (an osmotic diuretic) or compatible blood—may prevent serious acute renal failure, which is the most disabling of the common sequelae of these reactions (Erichson and Laufman, 1970).

Hemolytic reactions are also usually easy to identify. The clinical manifestations begin immediately following the transfusion, and careful examination of the blood should permit quick and accurate diagnosis of the blood incompatibility (Schwartz, 1969).

Because of the high degree of avoidability, the probable beneficial impact on incentives for exercising care, and the minimal opportunities for factual disputes, hemolytic reactions should certainly be included as a compensable event under MAI.

The second adverse result of blood transfusions to be examined—transmission of viral hepatitis—is substantially less detecta-

ble and less avoidable and consequently provides an opportunity for considering some of the many problematical aspects of including complex and arguably unavoidable events within the insurance system (Erichson and Laufman, 1970). The importance of post-transfusion hepatitis was highlighted in *Cunningham v. MacNeal Memorial Hospital* (Illinois, 1970), in which the Illinois Supreme Court held that a hospital administering infected blood was "strictly liable in tort" for the consequences. It is noteworthy that the legal doctrine employed eliminated the question of fault or negligence altogether, requiring compensation whenever hepatitis results from a transfusion, regardless of the efforts taken to avert the event. Although not an issue in the court's decision, the causal relationship between the transfusion and the hepatitis would probably not have to be established conclusively but only to the jury's satisfaction, presumably by showing that the hepatitis followed a blood transfusion within the disease's incubation period and that the plaintiff had not been otherwise exposed.

The *Cunningham* decision was later overruled in Illinois by new legislation which, similar to laws in most other states, relieved hospitals of liability in the absence of fault (Illinois, 1971; Franklin, 1972:459–461). Such legislation is arguably inconsistent with the no-fault compensation system which we are proposing in this paper. However, we regard our proposal, embodying as it does a "systems" approach relying on sophisticated medical judgments, as preferable to judicial singling out of particular events for special treatment, as in the *Cunningham* case.

Among the methods available for decreasing the incidence of post-transfusion hepatitis (aside from refraining from unnecessary transfusions or unnecessary surgery requiring blood), rigorous selection of donors is the most effective (Erichson and Laufman, 1970). Donor selection requires at least extensive history-taking to determine if there has been any jaundice or recent exposure to hepatitis. As shown by the decided decrease in the incidence of hepatitis where family donors and friends are used, donors, and particularly paid donors, cannot be relied upon to report accurately, or truthfully. However, record keeping and donor screening on socioeconomic grounds can dramatically improve results (Erichson and Laufman, 1970). In addition to careful selection of donors, use of blood components, such as frozen red cells and plasma, has been shown to prevent much hepatitis, and the administration of gamma

globulin during the week following transfusion and again one month later was found in one study to reduce the incidence of icteric hepatitis by over 75 per cent (Erichson and Laufman, 1970). There is some evidence, too, that a method of screening potential donors for "Australian" antigen, an agent specific for serum hepatitis, may be an important technique for detecting hepatitis in donated blood, but it is reported to be only 25 per cent effective (Ad Hoc Committee on Hepatitis-Associated Antigen [H.A.A.] Tests, 1971). Once the condition is contracted, the treatment is at best palliative, including primarily bedrest and nutritional support (Koff and Isselbacher, 1970). Although some helpful steps can be taken, post-transfusion hepatitis would be difficult and costly to eliminate altogether and must be classed as having a relatively low avoidability quotient.

Our second criterion for determining whether an event is to be compensable was the impact that such a decision would have on the quality of care. We have no doubt that designation of blood reactions as compensable events would result in constructive efforts to avoid them, including efforts of the kinds just mentioned. The nature of the efforts to be anticipated dictates that the hospital, rather than the prescribing physician or the pathologist, is the appropriate primary risk bearer.[7] The hospital is responsible both for procuring the blood, either from donors or from independent blood banks, and for performing the cross- and type-matching in its laboratories. Moreover, the hospital is well situated to bargain with or take measures against the blood banks and to allocate higher-risk blood to patients less susceptible to severe sequelae. The hospital can also induce peer-review efforts by the medical staff to encourage use of blood components where appropriate, to eliminate unnecessary transfusions, and to reduce the quantity of blood given. Possibly some unnecessary surgery would also be prevented by introducing the cost of these adverse consequences into the hospital's calculus, thereby sharpening incentives for effective tissue and utilization review.

[7]The blood bank's potential liability raises an issue similar to that mentioned earlier with respect to drug manufacturers. The MAI insurer would be subrogated to part of the patient's claim, but because the bank's ultimate strict liability might weaken the hospital's incentive to shop for blood supplies on quality grounds and to encourage responsible behavior by physicians, we would recommend that the bank be liable to the patient and the insurer only for negligence (see Franklin, 1972:466–470, 479–480).

A serious quality issue is whether designating blood reactions as a compensable event will discourage the use of blood in therapy where it is in fact the best treatment for various conditions. This is a very difficult issue to resolve. Deterring physicians from certain types of activities which require blood transfusions is of course one object, but, unless the improper use of substitutes (plasma or plasma expanders) or the omission of indicated transfusions or surgery are subject to sanctions sufficient to induce physicians to use blood when appropriate, making blood reactions compensable might be counterproductive. Each indication for blood transfusion would have to be considered, and some exceptions from compensability might be made for particular antecedent disease conditions where balancing of incentives proved impossible. Although patients in these exceptional categories would usually get the benefit of the improved blood-collection and dispensing methods induced by MAI, disproportionate allocation to them of high-risk blood would have to be guarded against by regulation and malpractice sanctions.

Although the potential quality gains would easily be substantial enough to warrant listing post-transfusion hepatitis and ignoring the practical impossibility of preventing it completely, the exigencies of administering MAI would require acceptance of an even higher degree of seeming arbitrariness. The problem results of course from the practical impossibility of establishing a causal relation between a particular case of hepatitis and an antecedent transfusion.

Although a distinction is sometimes made between serum hepatitis and the infectious variety, there is no accepted means of distinguishing between the two by diagnosis except by reference to the incubation period, which is thought to be anywhere from six weeks to six months for the former and three to six weeks for the latter (Schwartz, 1969; Koff and Esselbacher, 1970). While serum hepatitis is transmitted primarily through blood, infectious hepatitis can be transmitted both person-to-person and parenterally (Koff and Isselbacher, 1970). These factors introduce numerous complexities into the identification of post-transfusion hepatitis as a compensable event.[8]

[8]A similar set of diagnostic problems is presented by the possibility that hepatitis might result from the administration of chemical (pharmacologic) agents. Even if transfusion-related hepatitis and that occurring as a side ef-

First, because the two types of viral hepatitis cannot be clinically distinguished, some infectious hepatitis contracted by the person-to-person route will have to be compensated for if a complex inquiry about causation, exposure, etc., is to be avoided. Reliable data are not available to reveal the relative frequency of contracting the disease by the two routes, but it would almost certainly be found that a very high percentage of the cases among persons recently receiving transfusions was the result of infected blood rather than interpersonal contact. More important, viral hepatitis contracted by transfusion, which reportedly has a mortality in the 10 percent range, is much more severe than that contracted by person-to-person contact, for which mortality is estimated to be from 0.1 to 0.4 per cent (Koff and Isselbacher, 1970; Committee on Plasma and Plasma Substitutes, 1970). Hence, the amounts of compensation paid on account of hepatitis contracted otherwise than by transfusion would be relatively very small. We would therefore have no hesitation in making post-transfusion hepatitis a compensable event even though some hepatitis contracted interpersonally would be swept into the category. The consequences of accepting this necessarily arbitrary classification would be less troublesome than, for example, trying to treat post-transfusion syphilis as a compensable event.

Second, the frequency of the infectious variety of hepatitis contracted from blood is not well documented. If rare, a decision to deny compensation for hepatitis contracted in the first six weeks following a transfusion (the minimum incubation period for the serum variety) might be contended for (Clark and MacMahon, 1967:482). It is not clear that such transmission might not be fre-

fect of drug therapy were both compensable events, an issue could still exist over whether the loss should be borne by the hospital procuring the blood or the doctor prescribing the drug. If a differential diagnosis is required, "direct toxic" hepatitis can usually be distinguished by history of exposure to chemicals along with rather characteristic morphological abnormalities on liver biopsy. Hypersensitivity reactions are more difficult, and under certain conditions may be indistinguishable in critical manifestations from viral hepatitis. However, extrahepatic clinical manifestations of hypersensitivity are quite common (rashes, fever, leukocytosis) and would be useful in most cases in distinguishing this condition. Hepatitis may also be a feature of other diseases, such as leptospirosis and lupus erythematosis. But these conditions would be readily distinguishable from viral hepatitis by their systemic nature and through diagnostic measures.

quent in the experience of at least some transfusers (Koff and Isselbacher, 1970), however, and it would seem desirable to maintain incentives to minimize its occurrence.

Third, in view of the disease's incubation periods, it might be appropriate to deny compensation for hepatitis contracted within three weeks after the transfusion—or six weeks, if the desire was to compensate for the serum variety only. Nevertheless, to avoid factual issues about the precise date when the disease manifested itself, we would ignore the possibility that the disease was in incubation when the transfusion occurred and would pay for any case appearing after the transfusion. Not only would this obviate a difficult explanation to the patient, but also, in almost all cases, a physical exam given at the time of the transfusion would document the absence of hepatitis symptoms as of the starting point (Koff and Isselbacher, 1970). Failure of the patient to bring overt hepatitis symptoms to a doctor's attention by the end of six months would cut off the patient's claim.

Another causation problem requiring an arbitrary solution would be presented if the patient had received several transfusions at the hands of different providers in the six months preceding onset of the disease. The most recent transfuser might be made the risk bearer in this case, or the cost might be spread proportionally in some way.

Another important epidemiological consideration, especially with respect to the drug addict population, is that other types of needle penetration can transmit serum hepatitis (Clark and MacMahon, 1967:482). The disease contracted in this way has been shown to be comparatively uneventful, however, possibly because of a close correlation between the total dose of the contaminated material and the severity of the disease (Clark and MacMahon, 1967:482). In addition, it should be relatively easy through detailed histories and physical examinations to identify that population which might have received the hepatitis virus via hypodermic needles and to take extraordinary prophylactic measures (gamma globulin). Liver function studies on admission may also aid in screening those addicts who have entered the hospital in the subclinical stages of hepatitis (Koff and Isselbacher, 1970; Chalmers *et al.*, 1965). If, however, the probable incidence of claims for non-transfusion-related hepatitis seemed excessive, it might be acceptable and would create few administrative problems simply to

eliminate all hepatitis seen in the drug addict population from the list of compensable events. Independent liability would attach, however, if such an exemption should induce the hospital to allocate higher-risk, commercially procured blood to this population.

Another major question which would be presented from time to time is the extent of compensation when the listed outcomes can directly produce a chronic condition which may require expensive long-term treatment. There is, for example, evidence that post-necrotic cirrhosis can be a sequela for a small proportion of patients with hepatitis, and this condition can progress to severe deterioration of the liver, requiring frequent and expensive hospitalization and treatment (Clark and MacMahon, 1967:269). Because cirrhosis is caused by other diseases, such as alcoholism, it would probably be necessary to deny compensation for this disease even when appearing in patients previously suffering post-transfusion hepatitis (Tisdale and Isselbacher, 1970). The alternative of excluding severe alcoholics from compensation would create the basis for unpleasant factual disputes which would be less manageable than the exclusion of heroin addicts suggested earlier. It is notable that administrative simplicity can be a ground for excluding an event from the list as well as including it, especially where substantial quality gains are not to be anticipated.

The foregoing discussion suggests our conclusion that, subject to open questions which await expert attention, most adverse reactions to blood transfusions can be appropriately designated compensable events. More important, however, it reveals the analytics of arriving at such a conclusion for any medical outcome, including those with obscure etiologies. In our view it *is* possible to accommodate medical complexities to the need for appropriate incentives and administrative simplicity and to achieve a system whereby, in most of the important areas of medical practice, malpractice suits will be rare. Those providers with better outcomes will be rewarded in proportion to their better performance. Much remains to be done, of course, to verify our instincts.

III. Cost Implications of Medical Adversity Insurance

The Distribution of Costs Among Providers

One premise of our plan is that literally unavoidable outcomes (and

their costs) will be randomly distributed over the provider population so that they will be reflected uniformly in fees. No single provider will suffer a financial disadvantage except insofar as his outcomes reflect a lower degree of care or skill. This premise is not altogether valid. Aside from the statistically predictable variations in experience which the assumption of randomness obscures, some physicians and some hospitals will be more exposed than others to increasing insurance premiums because of the nature of their practice. Thus, the best specialists, who have the hardest cases referred to them, could expect to have poorer experience than their less talented colleagues. Providers serving poorly educated patients or patients from unhealthy environments could also expect a greater incidence of various mishaps—such as hepatitis contracted otherwise than by transfusion but nevertheless compensable under our scheme. We believe it is apprehensions such as these, as well as a pardonable fear of a run of bad luck, which would lead many physicians to accuse us of trying to "guarantee" the results of medical care. We take very seriously this accusation and the problems it reflects.

The system as we have designed it supplies many built-in protections against egregious distortions. Other protections could be introduced if they were thought necessary. A provider serving a poor population might end up paying more claims, but each would be somewhat smaller in amount because of the economic status of the patients themselves. Furthermore, physicians similarly situated—in terms of population served or type of practice—would face similar costs and therefore minimal competitive disadvantages; the expert physician accepting high-risk referrals would receive higher fees and thus could reasonably be expected to bear higher costs. In some instances, compensable events might be defined to reflect certain excessive exposures, as in the suggested exception for post-transfusion hepatitis contracted by heroin addicts. Similarly, adverse outcomes in cases presenting particular, definable complications could be excluded to reduce the exposure of physicians or hospitals accepting such patients. On the other hand, care must be exercised not to eliminate the incentive to refer complicated cases to the more qualified provider, perhaps by exempting only the board-certified physician from the bearing of particular risks. The most flexible solution would allow providers with greater exposure

to qualify for a less burdensome experience-rating formula.[9] Although this range of concerns clearly complicates further the delineation of some compensable events—coming under the criterion of relative avoidability and fairness—we believe it can be handled equitably in our analytical scheme.

To characterize our scheme as "guaranteeing" results misrepresents the matter a bit and obscures the overriding purpose. The compensable events will for the most part be outcomes which were avoidable by good medical practice and which left the patient worse off than he had a right to expect to be. The event will only occasionally be such as to produce an absolute warranty of a cure and then only when the medical experts formulating the list conclude that this is the best means of inducing high-quality care. Again, the achievement of the practical objective requires suppressing some qualms, and it should be noted that our decision to treat a particular provider's outcomes experience as privileged against disclosure reflects our sensitivity to the fairness issue involved.

MAI Premiums vs. Real Costs

Ultimately the dollar cost of MAI premiums to providers could be quite high. We would argue, however, that on a total social accounting there may be no net increase in real costs at all and, moreover, that the quality gains to be anticipated would justify some increased cost in any event. There are several points to be made.

First, substantial savings are possible by eliminating the administrative costs of the present malpractice tort and insurance system. It has been estimated that as little as 17 per cent of total liability insurance premiums paid is actually paid out to injured patients, the rest going for administrative and legal costs (McDonald, 1971:5); this figure is much lower than the comparable and also disturbingly low figure (44 per cent) in automobile liability insurance (Conard *et al.*, 1964). It is far from clear that adjudication of the fault, or freedom from it, of health care providers is worth this high cost, particularly in view of the untrustworthiness of the verdicts rendered in emotion-laden trials. Since MAI would almost certainly eliminate a great deal of these administrative and legal

[9]An analogy may be drawn to "manual rating" in workmen's compensation, under which industries having different risk exposures are treated separately. Similar classification of hospitals, for example, would facilitate arrival at an appropriate average for use in cost-reimbursement financing schemes.

costs, it promises on its face a substantial saving in total expense for the public. Even if providers' MAI premiums would be larger than their current malpractice insurance premiums, they would more clearly represent payments actually made to unfortunate patients and should therefore occasion less resentment.

Second, MAI would result in compensation for many injuries which are not the subject of malpractice suits today. It is widely accepted that many claims are not brought because patients are unaware of any mishap. Many more adverse results are accepted by patients who either lack a litigious spirit or sympathize with the physician and regard him as nonculpable. To the extent our plan would result in compensation for meritorious claims not brought under the present system, there is arguably no new cost but only a transfer of costs from injured patients to others who were, in one sense at least, always legally obligated to bear them. Moreover, even the amounts paid under MAI to patients suffering unavoidable results represent only the socialization of private costs and are not really new expenses in a social sense. Nevertheless, the transformation of patients' lost wages, etc., into a cost of health care, reflected in doctors' fees and hospital charges, will contribute to the appearance of inflation.

Third, many of MAI's dollar costs will reflect payments to collateral sources, such as health and disability insurers and employers' sick-pay plans. Thus, reductions in the costs of other public and private programs will offset the costs of our scheme, producing no change in a total accounting. Providers through whom the funds are redirected will, of course, perceive the matter otherwise, and, again, the appearance of inflation in health care costs will be inevitable. To the extent that such appearances rather than realities provide the basis for governing the country, we anticipate problems in selling our scheme.

Fourth, total perceived costs will depend on the contents of the list of compensable events. Undoubtedly cost considerations would enter into decisions not to list particular outcomes, although we would not regard this as appropriate for inclusion as an explicit criterion.

Fifth, the total dollar costs to providers might be reduced by allowing MAI insurers to pool the risks of "unavoidable" events and then providing subsidies to this insurance pool. These subsidies could appropriately come directly from the various health in-

surance plans, the same sources which would have paid them ultimately if they had instead been reflected first in MAI premiums and thence in higher provider charges. The subsidy would of course not be so large that MAI insurers would not still bear the full risks associated with departures from good quality. Premiums would continue to reflect providers' individual experiences, thereby preserving the incentives. The ideal subsidy arrangement would, however, theoretically enable the provider experiencing no avoidable events and only the average amount of unavoidable outcomes to pay only a zero premium, with the premiums of his less competent or less lucky competitors ranging upward from that figure. The point is simply that a subsidy to the insurance pool could permit the incentives in the system to operate without a funneling of too large a share of the nation's health care costs through the providers and into higher charges which merely reflect large MAI premiums paid by everyone.

Sixth, if the "unavoidable" portion of the cost could be removed as a burden on MAI by a subsidy, the remainder of the cost would theoretically be subject to reduction to zero by the providers' own efforts. It would therefore be inappropriate to estimate future MAI costs solely by reference to past experience. As an illustration, our "back-of-the-envelope" calculation of the aggregate cost of treating post-transfusion hepatitis as a compensable event, assuming no change in present practices or performance, is $175 million.[10] By accepting the current incidence of hepatitis among volunteer donors as the best attainable performance—roughly five infected units per thousand, a figure which could probably in fact be improved upon somewhat—and estimating that the number of units consumed could be reduced by 10 per cent, we further calculate that

[10]This figure was derived by using the following assumptions, some of which were obtained from the Ad Hoc Committee on Hepatitis-Associated Antigen (H.A.A.) Tests (1971) and the Committee on Plasma and Plasma Substitutes (1970): Approximately 2,000,000 Americans receive blood over the course of one year, of whom 1.5% (30,000) develop overt hepatitis which requires hospitalization. Of these, 10% (3,000) die from the acute episode. For those surviving, the average period of hospitalization is 28 days, with an additional month of convalescence. The costs for hospitalization are $100 per day, medical care and convalescence costs are $200, and lost wages average $100 a week. A conservative $25,000 is ascribed to costs associated with death.

the irreducible portion of the total is $42 million.[11] If a subsidy of this amount were arranged, MAI premiums would vary from a very low figure upward, and no provider would have reason to anticipate a burdensome rate unless it was failing in its quality-control obligations. Our expectation would be that the $133 million remaining in our calculations as the cost of "avoidable" events would fall substantially if MAI were inaugurated. We therefore regard that figure more as an estimate of maximum potential benefits than as an estimate of potential costs. (The figures themselves are of course not meant to be taken as accurate measures but only as indications of the magnitudes involved and of the statistical information useful in developing the system.)

The foregoing thoughts are meant to distinguish apparent costs from real ones and to suggest that very substantial gains can be anticipated from MAI with no significant new costs other than those of MAI administration. Nevertheless, there exists one different and very important basis for concern about MAI's effect on the actual total costs of medical care. This concern originates in the probable tendency of the incentives created by MAI to stimulate lavish expenditures by providers in pursuit of better outcomes. We of course expect our system to produce numerous valuable quality improvements, many of which can undoubtedly be obtained quite cheaply. Nevertheless, our plan provides no control on expenditures made

[11]Franklin, (1972:441,445), using the best available (but very possibly unreliable) data, breaks down the blood supply as follows:

4,300,000 units of volunteer blood @ .005 infection rate	=	21,500
1,700,000 units of paid-donor blood @ .05 infection rate	=	85,000
Total infected units	=	106,500

If the 1,700,000 commercial units could be obtained at the .005 infection rate, roughly 76,500 infected units would be eliminated. If the same 75 per cent reduction as in the total infected units could also be expected in the estimated number of serious, transfusion-related hepatitis cases, there would be a reduction from 30,000 to 7,500 per year. Next, assuming that a 10% reduction in transfusions would be reflected in the incidence of cases, we reach 6,750, to which we add about 200 cases of serious infectious hepatitis likely to be contracted interpersonally by the roughly 1,000,000 recipients of blood in any six-month period (using a national annual incidence rate of .00019). The total of roughly 7,000 cases, at an average cost of about $6,000 under MAI, gives $42 million as the irreducible amount.

in seeking quality improvements. We recognize that beyond some point the further cost increases induced would outstrip the value of the resulting quality gains. We choose to address this very real inflationary threat in the following section under a heading derived from the name given to a similar tendency allegedly generated in the present system by the threat of malpractice claims—"defensive medicine."

The Inflationary Threat from "Defensive Medicine"

Legal scholars are coming to expect liability rules (i.e., those affecting risk bearing) to produce "optimizing" tendencies—that is, to induce private decisions reflecting appropriate cost-benefit tradeoffs between increased safety on the one hand and the cost of achieving it on the other (e.g., Calabresi, 1970). Thus, a manufacturer will add safety features to his rotary mower only as long as he can induce consumers through advertising to pay for them or can anticipate a reduction in damage payments which is at least as great as his outlays for safety devices. Aside from possible concerns about fairness (Blum and Kalven, 1967), well-designed liability rules which require no fault-finding are thought to offer the best opportunities for properly ordering incentives and achieving the "correct" level of safety through a self-optimizing system (Calabresi, 1968). Circumstances will conspire, however, to disappoint any hope that medical adversity insurance would produce a system with such optimizing tendencies. Because of a series of phenomena which are reflected in the practice of "defensive medicine," MAI will be of only slight assistance in minimizing the social costs represented by the sum of expenditures on accident avoidance (i.e., improved "quality" in medical care) and the costs of accidents themselves (i.e., technically avoidable adverse medical outcomes).

The problem of "defensive medicine," the name given to those nonproductive practices of physicians which are widely alleged to result from fear of malpractice suits, can be broken down in several ways (Duke Law Journal, 1971). First of all, the patient's ignorance allows the physician a substantial amount of discretion about what should and should not be done, and there are few occasions for the patient to exercise meaningful choice about whether particular diagnostic tests should be done or therapeutic steps taken. Second, the prevalence of third-party payment for the care given re-

moves the patient's direct financial stake and frees the physician from any fiduciary responsibility to the patient for holding down the total bill. In its most extreme manifestations, defensive medicine reflects an unfortunate conflict of interests on the part of the physician, who may be tempted to use the resources of others for the primary purpose of protecting himself from a possible malpractice claim. Some instances of "defensive medicine" are almost completely nonproductive, such as redundant diagnostic tests and X-rays, record making for possible litigation purposes, refusal to accept patients perceived to be litigious, and hesitation in embracing proven new techniques. In other cases, some medical benefit may in fact accrue to the patient, but there is no check to determine whether the benefit was great enough to be worth the cost of achieving it or whether the probability of a benefit justified the expenditure.

Because MAI would do nothing about changing the physician's dominant decision-making role or the financing of health care, physicians and hospitals would continue to have relatively free hands in spending money in pursuit of better outcomes. Indeed, the incentives created would probably encourage choice of expensive treatment modes and stimulate inflationary pressures. One could, however, have some confidence that such inflation was contributing something to obtaining better outcomes and that the system was not stimulating the nonproductive kinds of defensive medicine or excessive use of those measures which carry a significant risk of compensable iatrogenic disease.

We would be content to leave cost controls in medical care to other mechanisms. Cost control can take many forms, including (1) direct regulatory controls, through peer review or other oversight of physicians' activities in treating particular conditions and through limiting hospitals' service capabilities by "certificate-of-need" requirements; (2) giving providers a fixed budget with which to produce the best possible outcomes for an enrolled population; or (3) a market-oriented system, with less reliance on automatic third-party payments of costs and charges and featuring encouragement of prepaid HMOs as a potentially strong competitive check on the insured-fee-for-service sector's tendency to absorb resources (Havighurst, 1970b). Clearly quality and cost are ultimately in conflict, and some mechanism for expressing the limit of society's or individuals' willingness to devote resources to health care must be

found. We believe, however, that creation of incentives for improved outcomes is an extremely important building block in the health care system of the future and that it might prove undesirable for quality controls to be tied in too directly with cost constraints.

Although we would be quite satisfied to see the necessary cost controls introduced independently, with providers left free to maximize the quality of outcomes within the limits externally imposed, we would anticipate substantial interaction between cost and quality assurance. We would expect, for example, that some decisions against listing an event as compensable will be influenced by a fear about inducing very expensive but insufficiently productive counter-measures. Although we have not suggested such cost considerations as an explicit criterion for decision making, we would not wish to exclude them altogether. Quite possibly the listing of a compensable event might be accompanied by a recommendation to funding agencies concerning the appropriateness of paying providers for certain costly tests or precautions.

The Hazards of Undervaluing Damages

The lack of any immediate prospect for obtaining optimizing behavior by health care providers may appear to reduce the importance of imposing on them the "full" costs of the adverse outcomes which they experience. For example, it might be asked whether the proposed subsidies to the MAI system could not appropriately exceed the value of so-called "unavoidable" events, since, given the weakness of cost constraints, there should be little concern that the quality induced would be suboptimal; under this reasoning, moreover, it might seem not only permissible but desirable to allow a larger subsidy for events the listing of which seemed likely to induce excessive expenditures. Nevertheless, acceptance of larger subsidies would threaten the system's integrity and potential benefits in several ways. For one thing, health maintenance organizations are an exception to the system's nonoptimizing characteristic, since they have no opportunity to pass on the cost of "excessive" quality to third-party payers. Rather, they will wish to find the most marketable combination of quality and price. To impose on them less than the full cost of avoidable adverse outcomes might be to induce poor quality. But to impose less substantial costs on their competitors would create a competitive disadvantage for HMOs. Moreover, as cost-conscious HMOs begin to appear in the marketplace, their

competition will lead other providers to recognize cost constraints. In these circumstances, it would be important that the cost of poor-quality care delivered not be greatly understated. The shortcomings of workmen's compensation should be a warning that inadequate quality incentives—in the form of out-of-date benefit schedules—can produce suboptimal performance (National Commission on State Workmen's Compensation Laws, 1972).

These thoughts lead us to a recognition that our system already understates true damages somewhat by ignoring some wage losses and "noneconomic" damages and by using insurance to some extent to spread costs. If cost constraints become appreciably stronger in the future, it may become necessary to increase the compensation paid under MAI in order that appropriate incentives for good quality be maintained. In recognition of the possibility of change in the economic pressures acting within the system, we would wish any legislative prescription of MAI to include a requirement for periodic reexamination of the strength of the incentives provided and of their sufficiency to induce care of no less than optimal quality. For the moment, we are persuaded that providers' orientations, consumers' expectations, and market forces are such that the quality of care resulting from the incentives generated by MAI would be in keeping with society's reasonable expectations. Although MAI should produce substantial quality gains in the present system, we would not want it ultimately to become, like workmen's compensation, a primary cause of suboptimal performance.

IV. Medical Adversity Insurance and Other Quality-Assurance Mechanisms

Strong pressures exist for strengthened regulation of the quality of medical care. Physicians are apprehensive about attempts to regulate in this area for many reasons. Among them are a fear of bureaucratic intrusions and an appreciation of the elusiveness of quality and the difficulty of formulating and applying standards to measure or attain it. We regard medical adversity insurance as an attractive, nonregulatory alternative to other quality-control efforts, although its adoption would not foreclose, or necessitate dismantling, other programs.

Present regulatory measures designed to assure quality look to the control of the inputs into medical care, either by excluding such

things as personnel lacking required credentials, unproved drugs, and unapproved facilities or by mandating the presence of other personnel or equipment (Carlson, 1970). Institutional quality control and evaluation usually depend on methods—e.g., the "medical audit"—in which processes are reviewed by peers to see if "good medical practice" has been followed (Donabedian, 1968). Such process-oriented quality-assurance techniques are also being adapted for regulatory purposes in utilization review and other peer-review mechanisms (including Professional Standards Review Organizations), though they promise to be quite expensive to operate and highly dependent on the reviewers' good will and providers' willingness to cooperate.

Eschewing specification of either inputs or processes, MAI looks only to outcomes. This makes it at least potentially the most effective and efficient quality-assurance mechanism, since it is concerned only with ends and inspires providers to find the means most appropriate to achieving the demonstrably desirable results (Ellwood *et al.*, 1972; Williamson, 1970). Of course, regulation of inputs and processes is also directed at obtaining better outcomes, and, when properly administered, these approaches reflect attempts to find reliable proxies for good over-all performance. But the difficulty of relating inputs and processes to outcomes is very great, and the danger, realized over and over again, is that adherence to forms and possession of credentials will be too quickly equated with quality itself. Because MAI would create ubiquitous incentives for improved *performance* rather than merely compelling *compliance* with some prescribed minimum level of achievement, it is the ideal technique for quality assurance in medicine—if it can, as we think, be made to work administratively for a wide variety of outcomes. We would argue, for example, that compensating adverse transfusion reactions under MAI could reasonably be expected to do much more to prevent them than the emerging regulatory efforts being directed at this problem (e.g., U.S. Food and Drug Administration, 1972); it would also do as well as or better than the return to altruism in blood collection desired by Titmuss (1971).

As a quality-assurance device, the law of malpractice has to some extent focused attention on outcomes, since for the most part a claim arises only where a disappointing outcome occurs. Nevertheless, the standard of care employed, looking to negligence or de-

parture from accepted practice, necessitates an extensive and often inconclusive process-related inquiry. Only in cases falling under the doctrine of *res ipsa loquitur* has a true outcome orientation been achieved. But the necessity for attributing fault in those cases has prevented extension of the principle so as to make outcomes the paramount concern in a wide area. Of course, if physicians have in fact concerned themselves more actively with achieving better outcomes as the best means of avoiding lawsuits, then desirable, outcome-oriented incentives have indeed flowed from malpractice law. Our view, however, is that the law's blessings in this regard have been so mixed with less desirable effects—reflected not only in high administrative costs and nonproductive kinds of defensive medicine but also in deteriorating doctor-patient relationships and in physician distrust of law and its processes—that the tort law approach must be accounted a failure. Even assuming some net beneficial effect on the quality of care, we think doctors should not be terrorized by the potential stigma and emotional trauma of a malpractice suit. True quality will be best promoted by systematically directing the doctor's attention to the outcomes he is achieving and by using the quality-related information and the incentives generated by medical adversity insurance to direct professional attention to those places where substantial improvements can be achieved.

Nothing in MAI is fundamentally incompatible with work now being done on quality assessment or improvement. Indeed, the market demand for quality-control techniques which are effective in terms of outcomes would increase if MAI took hold. Moreover, all kinds of research directed to improving outcomes—including basic biomedical research into causation, detection, and prevention of disease as well as improved treatments—would receive an important stimulus. The data generated by MAI would facilitate both epidemiological evaluations of various treatment modes (see Cochrane, 1972) and emerging efforts at applying probabilistic decision analysis to medical care situations (see Ginsburg and Offensend, 1968). Most important, physician interest in the findings of such research and the demand for continuing medical education would increase, with a direct and immediate effect on quality.

With MAI added to the mix of quality-assurance mechanisms, regulatory measures concerned with the quality of care would be of substantially reduced importance, although they might continue to

exist side by side with MAI, particularly for the purpose of covering portions of the field not immediately reducible to compensable events. The incentives produced by MAI might obviate regulation of inputs altogether, particularly personnel licensure, or at least allow a shift to institutional licensure, covering only hospitals and HMOs and allowing greater flexibility of manpower use in such enterprises (Tancredi and Woods, 1972; Carlson, 1970). Also, hospitals might be influenced, either directly or by their medical staffs or their MAI carrier, to invest their resources more often in quality-promoting facilities and equipment rather than in the frequently wasteful ways which have prompted so-called "certificate-of-need" laws governing health facilities construction. Although many arguments for more intensive hospital regulation would remain, quality issues would loom less large. Accreditation and licensing efforts could look more to human values and fiscal responsibility. The chief source of concern about the quality of care rendered by HMOs, particularly proprietary ones, would be largely eliminated by MAI, allowing the adoption of less restrictive policies and thus promoting quicker realization of HMOs' promise as a competitive, cost-conscious alternative to insured-fee-for-service medicine.

The medical profession has consistently looked to "peer review" as the preferred means of controlling physicians' impact on medical care costs, utilization, and quality. Clearly, physicians are more competent than anyone else to oversee medical care. Nevertheless, experience with peer review and with the profession's other self-regulatory efforts has been spotty. In our view, these mechanisms will not be sufficiently dependable as long as the regulators and the regulated are motivated to make them work only by a variable sense of professional responsibility and by fear of regulatory intrusion by government. MAI could provide a more consistently felt incentive for diligence in peer review by putting all doctors at some degree of risk for bad outcomes. Once such an incentive was introduced, the public could be sufficiently assured that peer review and professional self-regulation protected them against poor-quality care rather than doctors against criticism. While MAI would rely strongly on peer review to accomplish many quality improvements, it would be a more aggressive kind of peer review than is usually found today. Nevertheless, it appears to us that medical practitioners stand to gain a great deal from MAI in the way of noninterven-

tion in their decision making and in the physician-patient relationship.

Conclusion

Current discussions of liability (cost-bearing) rules among legal scholars focus largely on the need to design such rules to order the incentives bearing on actors who are capable of affecting performance of an economic system. Health care providers' incentives are difficult to order correctly, but there should be no argument about the desirability of increasing providers' stake in the quality of the outcomes they are achieving. This is not to say that providers are motivated by economic incentives alone, for dedication to patient welfare and professional excellence are prominent characteristics of most individual practitioners and most health care institutions. Nevertheless, we believe major quality improvements would flow from arranging things so that financial interests and professional responsibilities closely coincide. Perhaps a more important influence than the mere desire to keep premium costs down would be the challenge which recorded outcomes experience would provide to professional pride and excessive self-confidence. The financial impact will be the critical factor only among those providers, a distinct minority, for whom professionalism is a weak control.

Medical adversity insurance is designed to create correct quality-inducing incentives by means of a systems-engineering approach to the incentives operating in highly complex medical problem areas. We have tried to specify the MAI system in enough detail to permit a preliminary judgment to be made about its potential value. We believe it has special attractions both as an escape from the dysfunctional malpractice tort and insurance system and as a nonregulatory attack on the problem of obtaining higher quality medical care.

The next step in developing MAI would be to launch some sophisticated professional efforts at specifying compensable events for particular areas of medical practice and developing the necessary MAI policies and experience-rating formulas. If it turns out that this can be done to the satisfaction of responsible medical experts and other interested observers, the system and the list of events should then be tested for manageability in a "dry" run against the experience over a period of time of several hospitals and perhaps

even an entire county medical society. Experience gained in these simulated studies, though giving only an inadequate indication of the quality gains possible, might pave the way for a run using real money, perhaps initiated by a state legislature in cooperation with a far-sighted Professional Standards Review Organization or foundation for medical care.

In view of the need for prompt attention to quality issues, expeditious action on MAI and some willingness to plunge forward without complete assurance would seem to be indicated. In addition to promising very great quality dividends, the system would feature enough flexibility and would be sufficiently under professional control that no major harm could occur. Nevertheless, its complexity is such that only a major effort could bring it into being in time to assist in the preservation of a pluralistic, unregimented medical care system. Without the support of major elements of the medical profession, however, such an effort is unlikely to be launched. While we expect reaction of professional groups to be favorable on balance—if still not finally convinced— we await their responses with interest. As challenging as MAI has been to us as an academic exercise, we do not offer it as such.

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References

Ad Hoc Committee on Hepatitis-Associated Antigen (H.A.A.) Tests, Committee on Plasma and Plasma Substitutes, National Academy of Sciences—National Research Council

1971 "Statement concerning the use of hepatitis-associated antigen tests for donor select screening in blood banks." Transfusion 11 (January–February):1.

Allen, J. F., and W. A. Sayman

1962 "Serum hepatitis from transfusions of blood." Journal of the American Medical Association 180 (June 30): 1079–1085.

Blum, W. J., and H. J. Kalven

1967 "The empty cabinet of Dr. Calabresi." University of Chicago Law Review 34 (Winter):239–273.

Calabresi, G.

1968 "Does the fault system optimally control primary accident costs?" Law and Contemporary Problems 33 (Summer):429–479.

1970 The Costs of Accidents: A Legal and Economic Analysis. New Haven: Yale University Press.

Calabresi, G., and K. Bass III

1970 "Right approach, wrong implications: a critique of McKean on products liability." University of Chicago Law Review 38 (Winter): 74–91.

Carlson, R. J.

1970 "Health manpower licensing and emerging institutional responsibility for the quality of care." Law and Contemporary Problems 35 (Autumn):849–878.

Chalmers, T. C., R. S. Koff, and G. F. Grady

1965 "A note of fatality in serum hepatitis." Gastroenterology 49 (July):22–26.

Clark, D. W., and B. Mahon

1967 Preventive Medicine. Boston: Little, Brown.

Coase, R. H.

1960 "The problem of social cost." Journal of Law and Economics 3 (October):1–44.

Cochrane, A. L.

1972 Effectiveness and Efficiency—Random Reflections on Health Services. London: Burgess and Son, Ltd.

Committee on Plasma and Plasma Substitutes, National Academy of Sciences—National Research Council

1970 "Statement on laboratory screening tests for identifying carriers of viral hepatitis in blood banking and transfusion services." Transfusion 10 (January–February):1.

Conard, A. F., J. Morgan, R. Pratt, C. Voltz, and R. Bombaugh

1964 Automobile Accident Costs and Payments—Studies in the Economics of Injury Reparation. Ann Arbor. University of Michigan Press.

Donabedian, A.

1968 "Promoting quality through evaluating the process of patient care." Medical Care 6 (May–June):181–202.

Duke Law Journal

1971 "Project: the medical malpractice threat: a study of defensive medicine." Duke Law Journal 5: 948–993.

Ehrenzweig, A.

1964 "Compulsory 'hospital-accident' insurance—a needed first step toward the displacement of liability for 'medical malpractice'." University of Chicago Law Review 31 (Winter):279–291.

Ellwood, P. M., Jr., W. McClure, R. J. Carlson, and P. O'Donoghue

1972 Testimony. Pp. 363–531 in Hearings Before the Subcommittee on Public Health and Environment of the Committee on Interstate and Foreign Commerce, House of Representatives, on H.R. 5615 and H.R. 11728. Washington: Government Printing Office.

Erichson, R., and H. Laufman

1970 "Complications of blood transfusion." Pp. 85–92 in Laufman, Harold, and Richard Erichson (eds.), Hematologic Problems in Surgery. Philadelphia: W. B. Saunders.

Fleming, R.

1966 "The collateral source rule and allocation in tort law." California Law Review 54 (October):1478–1549.

Franklin, M. A.

1967 "Replacing the negligence lottery: compensation and selective reimbursement." University of Virginia Law Review 53 (May):774–814.

1972 "Tort liability for hepatitis: an analysis and a proposal." Stanford Law Journal 24 (February):439–480.

Ginsburg, A., and F. Offensend

1968 "An application of decision theory to a medical diagnosis-treatment program." IEEE Transactions on Systems Science and Cybernetics 4 (September):355–368.

Havighurst, C. C.

1970a "Compensating persons injured in human experimentation." Science 169 (July 10):153–157.

1970b "Health maintenance organizations and the market for health services." Law and Contemporary Problems 35 (Autumn):716–795.

Illinois

1970 47 Ill. 2d 443, 226 N. E. 2d 897.

1971 Annotated Statutes, Chapter 91, Section 181 (Smith-Hurd Supp.)

International Conference on Adverse Reactions Reporting Systems

1971 Influence of Legal Barriers on Adequate Reporting of Adverse Reactions to Drugs. Washington: National Academy of Sciences.

Keeton, R.

1973 "Compensation for medical accidents." University of Pennsylvania Law Review 121 (January): 590–617.

Keeton, R., and J. O'Connell

1965 Basic Protection for the Traffic Victim. Boston: Little, Brown.

Koff, R. S., and K. J. Isselbacher

1970 "Acute hepatitis." Pp. 1535–1544 in Wintrobe, Maxwell M., *et al.* (eds.), Harrison's Principles of Internal Medicine (Sixth Edition). New York: McGraw-Hill.

McDonald, D. (ed.)

1971 Medical Malpractice. A Center Occasional Paper. Santa Barbara: Center for the Study of Democratic Institutions.

Medical World News

1972 "Arbitration of medical malpractice cases: many trials but no verdict yet." Medical World News 28 (September 22):18–21.

National Commission on State Workmen's Compensation Laws

1972 Report. Washington: Government Printing Office.

New York State Insurance Department

1970 Automobile Insurance . . . For Whose Benefit? New York: State of New York Publication.

O'Connell, J., and R. Simon

1972 Payment for Pain and Suffering: Who Wants What, When and Why? Santa Monica: Insurors Press, Inc.

Rubsamen, D. S.

1972 "No-fault liability for adverse medical results." California Medicine 117 (July):78–93.

Schwartz, S. I.
1969 Principles of Surgery. New York: McGraw-Hill.

Secretary's Commission on Medical Malpractice
1973 Report. Washington: Department of Health, Education, and Welfare.

Tancredi, L., and J. Woods
1972 "The social control of medical practice: Licensure versus output monitoring." Milbank Memorial Fund Quarterly 50 (January):99–125.

Tisdale, W. D., and K. J. Isselbacher
1970 "Cirrhosis." Pp. 1546–1559 in Wintrobe, Maxwell M., *et al.* (eds.), Harrison's Principles of Internal Medicine (Sixth Edition). New York: McGraw-Hill.

Titmuss, R. M.
1971 The Gift Relationship: From Human Blood to Social Policy. New York: Pantheon Books.

U. S. Food and Drug Administration
1972 "Proposed registration of blood banks, and other firms collecting, manufacturing, preparing or processing." Federal Register 37 (August 26):17419.

U. S. Senate
1973 S. 14: Proposed "Health Maintenance Organization and Resources Development Act of 1973." Washington: Government Printing Office.

U.S. Senate, Subcommittee on Executive Reorganization and Government Research, Committee on Government Operations
1969 Medical Malpractice—The Patient Versus the Physician. Washington: Government Printing Office.

Williamson, J. W.
1970 "Outcomes of health care: key to health improvement." Pp. 75–101 in Hopkins, Carl E. (ed.), Methodology of Identifying, Measuring and Evaluating Outcomes of Health Service Programs, Systems and Subsystems. Washington: Government Printing Office.

Wintrobe, M. M., and J. Foerster
1970 "Blood transfusions and reactions." Pp. 1637–1640 in Wintrobe, Maxwell M., *et al.* (eds.), Harrison's Principles of Internal Medicine (Sixth Edition). New York: McGraw-Hill.