

Goal Analysis versus Institutional Analysis of Toxic Compensation Systems

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I. INTRODUCTION

How to compensate individuals for exposure to toxic substances has been hotly debated in legal circles recently.¹ Most of the debate has been based on an assumption that is usually taken for granted: that reform must be accomplished by tinkering with the legal doctrines courts apply in toxic tort cases.²

The immediate purpose of this article is to question that assumption. Its thesis is that many of the problems that now afflict toxic compensation law cannot be solved as long as the issue is formulated in terms of modifying the legal doctrines applied by courts in toxic tort cases. Rather than debating about how to modify traditional tort law doctrines to accommodate toxic tort cases, we should be focusing on the problems of toxics in the environment from the standpoint of the legal system as a whole. From this perspective, the correct way to formulate the inquiry is in terms of two separate but related questions: (1) what role compensation through the legal system should play in an overall social strategy for dealing with toxic substances in the environment; and (2) which of a variety of institutions available to the legal system is best suited to dealing with toxic compensation problems.

Although the immediate focus in what follows is on problems of toxic compensation law, the analytic approach outlined here has broader ramifications. A central premise for the analysis is that much of contemporary thinking in the law schools is still the prisoner of outdated habits of thought inherited from the common law. These habitual modes of analysis, which may be termed "Goal Analysis," have served well in a number of areas of law, such as torts, contracts, constitutional law, and antitrust. In these fields, courts arguably function as the dominant lawmaking institutions. Today, however, fewer and fewer areas of law are characterized by a structure in which courts act on their own to make law in relative isolation. Even where courts are still a significant factor in the total lawmaking process, their role has changed as the result of the rise of a variety of

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1. *E.g.*, SUPERFUND SECTION 301(E) STUDY GROUP, 97TH CONG., 2D SESS., INJURIES AND DAMAGES FROM HAZARDOUS WASTES—ANALYSIS AND IMPROVEMENT OF LEGAL REMEDIES; A REPORT TO CONGRESS IN COMPLIANCE WITH SECTION 301(E) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (Comm. Print 1982); Black & Lilienfeld, *Epidemiologic Proof in Toxic Tort Litigation*, 52 FORDHAM L. REV. 732 (1984); Robinson, *Probabilistic Causation and Compensation for Tortious Risk*, 14 J. LEGAL STUD. (1985) (forthcoming); Rosenberg, *The Causal Connection in Mass Exposure Cases: A "Public Law" Vision of the Tort System*, 97 HARV. L. REV. 849 (1984).

2. Robinson, *supra* note 1; *see also* Black & Lilienfeld, *supra* note 1, at 733-34 (many reforms in toxic tort litigation would require institutional innovation).

For a refreshing departure from the usual assumption that courts must be the central institutions involved in toxic compensation law, see Huber, *The Bhopalization of U.S. Tort Law*, ISSUES IN SCIENCE AND TECHNOLOGY, Fall, 1985, at 73. *See also* Huber, *Safety and the Second Best: The Hazards of Public Risk Management in the Courts*, 85 COLUM. L. REV. 277 (1985).

other active lawmaking institutions.³

The traditional techniques of Goal Analysis are fundamentally inadequate to cope with the modern reality in which a broad variety of lawmaking institutions created by statute are available to the legal system, and in which the predominant lawmaking structure combines courts, administrative agencies, and legislatures into a composite lawmaking system. If legal scholarship is to continue to make a significant contribution to efforts to reform the law, we must develop techniques and modes of analysis that will allow us to do more than simply analyze the effects of modifications in the legal doctrines applied by courts. The alternative approach proposed in this article, which is called "Institutional Analysis," is an attempt to take a first step in the direction of analyzing a policy problem from the standpoint of the modern legal system as a whole.⁴

If it were up to me to design a regime to regulate risks from toxic substances in the environment and to compensate people for injuries as the result of exposures, here is what I would do:

(1) *Criminal prosecution* would be the principal instrument for deterring corporations from exposing people to unreasonable risks of serious bodily harm due to risks that were known or knowable at the time the exposure occurred. Substances known to cause harm could be placed on a list through an administrative process as evidence accumulates, in much the same way that the Attorney General is now authorized to add substances to the list of "controlled substances" whose abuse is punishable by law.⁵

One of the principal distortions in current tort law is that civil jury verdicts are being used not simply to compensate victims who have been injured by the wrongful act of another, but also as a substitute for regulations and the criminal law.⁶ If responsible officers of a corporation really have intentionally exposed

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The growth of a vast administrative bureaucracy with lawmaking powers is not a mere additive change to the structure of government. Inevitably it has transformed the nature and functions of existing institutions as well. . . . No longer are the courts the primary expositors of the law as they were in the nineteenth century. Instead, they review law made by others. Federal courts have become part of a composite lawmaking system, in which they function in conjunction with legislatures and administrative decisionmakers so that the law is the joint product of all three.

Elliott, *INS v. Chadha: The Administrative Constitution, The Constitution, And The Legislative Veto*, 1983 SUP. CT. REV. 125, 167. *But cf.* Monaghan, *Marbury and the Administrative State*, 83 COLUM. L. REV. 1 (1983).

4. For an example of work in another area that uses an approach somewhat similar to that identified here as Institutional Analysis, see Bush, *Dispute Resolution Alternatives and the Goals of Civil Justice: Jurisdictional Principles for Process Choice*, 1984 WISC. L. REV. 893.

5. 21 U.S.C. § 811(a) (1982).

6. A classic statement of the (in my view, misguided) position that case-by-case tort litigation, rather than regulation and the criminal law, is the best way to ban deadly products is Brodeur, *Annals of Law: The Asbestos Industry on Trial (pt. IV, Bankruptcy)*, THE NEW YORKER, Jul. 1, 1985, at 36, 78-80. Brodeur overlooks the effect of administratively established regulations in reducing the use of asbestos. More fundamentally, however, he is a prisoner of the status quo (and of the plaintiffs' trial lawyers that he interviewed) in that he confuses what did happen with what should have happened. Even assuming that Brodeur is correct historically that tort litigation eventually produced a "triumph of justice," *id.* at 78, because civil verdicts eventually became too expensive for asbestos manufacturers, resulting in a virtual ban on the use of asbestos, Brodeur overlooks the fact that according to his own account it took the tort system 50 years to accomplish the ban after the scientific evidence appeared. *See generally id. (pt. I, A Failure to Warn)*, THE NEW YORKER, June 10, 1985, at 49. Moreover, for the first 40 years, most claim-

other human beings to an unreasonable risk of death, prosecuting them for murder—not punitive damages against the corporation in a tort case—is the appropriate legal remedy to express the community's sense of moral outrage and to deter similar misconduct in the future.⁷ On the other hand, it should be an absolute defense that the defendant complied with applicable regulatory standards. When responsible regulatory officials have struck a balance between safety and other competing considerations, after a full review of the relevant scientific information,⁸ a lay jury should not be able to strike a different balance between competing social values in an individual case after the fact.⁹

(2) *Regulation*, in the form of minimum health and safety standards set by administrative agencies, would be used to limit risks to socially acceptable levels. Standards would be precautionary, aimed at keeping risks as low as reasonably achievable,¹⁰ based on a balancing of the strength of the scientific evidence that a substance may cause harm, the seriousness of the potential harm involved, and the cost of compliance. In appropriate cases, economic incentives (marketable permits, regulatory taxes) might be used in lieu of "command and control" regulation to implement standards, but the level of risk that is socially acceptable should be determined through an administrative process.¹¹

(3) A *compensation fund* would reimburse claimants for out-of-pocket medical expenses and losses of earnings. Individuals would be eligible if they suffered greater than de minimis injuries of a type that some credible scientific evidence suggests may be causally related to exposures to a chemical substance, but for which evidence does not permit matching of particular illnesses to particular exposures.

The compensation fund could be administered either by government or

ants seeking compensation through the tort system left the courtroom empty-handed. See generally *id.* (pt. III, *Judgment*), THE NEW YORKER, June 24, 1985, at 45.

7. See N.Y. Times, Jul. 2, 1985, at A11, cols. 5-7 (describing sentencing of executives of film recovery company that used cyanide without adequate precautions, resulting in death of worker); Brodeur (pt. IV, *Bankruptcy*), *supra* note 6, at 78.

8. It might be objected that if regulatory standards had preclusive effect, polluters would have increased incentives to withhold information from regulators on the true extent of risks. That problem can be dealt with directly, however, by creating an affirmative obligation to report new information suggesting that a substance may be harmful (or more harmful than previously thought). See Toxic Substances Control Act § 8(e), 15 U.S.C. § 2607(e) (1982) (manufacturers, processors, and distributors of chemical substances or mixtures who obtain information that such substances or mixtures present substantial risk of injury to health or environment shall immediately report this); see also Atkeson, *Toxics Regulation and Products Liability: Decreasing Exposure in the Workplace, Increasing Exposure in the Courts*, 13 ENVTL. L. REP. (ENVTL. L. INST.) 10,418 (1983) (reviewing regulatory requirements that industry generate and report information on possible hazards of substances).

9. Because they are lay decision makers who decide individual cases after the fact and are not required to state reasons for their decisions, civil juries are inherently ill-suited to develop comprehensive regulatory policies. See G. CALABRESI & P. BOBBITT, TRAGIC CHOICES 57 (1976) (describing characteristics of civil juries).

10. Cf. 10 C.F.R. § 20.1(c) (1985) (exposures to radiation from NRC-licensed activities should be kept "as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to the utilization of atomic energy in the public interest.").

11. See Mashaw, *Pro-Delegation: Why Administrators Should Make Political Decisions*, 1 YALE J.L., ECON. & ORG. 81 (1985); see also B. ACKERMAN & W. HASSLER, CLEAN COAL/DIRTY AIR 116-28 (1981) (proposing that Congress set ultimate goals but leave to agencies the task of devising particular strategies to achieve the objectives).

private bodies.¹² Contributions would be assessed administratively, based on an estimate of the percentage of the total costs of a malady attributable to exposure to a particular substance. The cost that cannot reasonably be attributed to any substance—probably a large proportion¹³—would have to be distributed externally as a cost to be borne by a broader community.¹⁴

(4) *Tort cases* would be available—if at all—only if the plaintiff could prove, based on the evidence available at the time of trial, that it was more probable than not that particular injuries were caused by exposure to particular substances. In addition to medical expenses and loss of earnings, the successful tort plaintiff could recover additional elements of damages, such as decreases in property values and pain and suffering. However, compliance with an administrative standard would be an absolute defense to a tort action.

Punitive damages could be available only if the plaintiff proved both that the defendant acted with reckless disregard of information available at the time of exposure *and* that government had defaulted in its duty to regulate and prosecute criminally.

These suggestions are not particularly innovative; in many respects, they approximate existing laws, or reforms that have already been proposed in the literature. Nor am I totally confident that my proposals draw the lines between remedies in the right places; others might reasonably conclude that I have put too much faith in criminal sanctions and the administrative process,¹⁵ while giving too little credit to civil actions before common law courts.

What I do think is significant about the approach I have suggested, however,

12. One method of administering a compensation fund privately is insurance. *See generally* Abraham, *Cost Internalization, Insurance and Toxic Tort Compensation Funds*, 2 VA. J. NAT. RESOURCES L. 123 (1982). Another interesting approach involves submitting claims directly to entities that may be responsible, who would pay them and then seek adjustments from other potentially responsible parties. *Cf.* O'Connell, *Foreclosing Claims for Personal Injury from Toxic Substances by Defendants' Tender of Claimants' Net Economic Losses*, 2 VA. J. NAT. RESOURCES L. 203 (1982). This general approach has recently been discussed as a possible element in federal product liability legislation. Title II, Staff Working Draft, A Bill to Regulation Interstate Commerce by Providing for a Uniform Product Liability Law, and for Other Purposes (July 15, 1985) (unpublished draft of a bill on file with the *Georgetown Law Journal*). One advantage of a system that relies on direct processing of claims by private parties is that it may have lower administrative costs for some categories of cases than case-by-case litigation through the judicial system.

13. *See* L. COX & J. FIKSEL, A CRITICAL REVIEW OF THE PROBABILITY OF CAUSATION METHOD 28-33 (Arthur D. Little Report No. 50,041) (1984) (describing difficulties in attributing risk shares to chemical carcinogens).

14. The most obvious way to distribute costs more broadly is through a general tax, but that technique may not be politically acceptable. Other approaches are available, however, which have much the same effect. For example, if the known contributors to the risk are made liable for the entire cost (including that which they did not cause), they will bear a portion of the costs directly, and pass a portion of these increased costs along to their customers in the form of higher prices. Economically, the effect is the same as a tax, which falls in part on the known contributors to the risk and in part on their customers.

15. Perhaps the weightiest objection to enhanced reliance on regulation and the criminal law is that government officials may be susceptible to political influence and may regulate too leniently or inappropriately decline to bring criminal cases. Admittedly, these problems exist, but they also exist in many other areas of law and are not generally thought to require the preservation of a general right to sue for civil damages. If private initiation of legal action is deemed essential, however, it would be better to use the courts to force the government to act, *see generally* Stewart & Sunstein, *Public Programs and Private Rights*, 95 HARV. L. REV. 1195 (1982), rather than undermine its actions by enunciating a different standard through tort cases.

is that it is offered as a package in which all the major techniques the legal system uses to regulate chemicals in the environment are applied in a systematic, coordinated way to deal with various kinds of toxics problems. The coordinating principle behind this division of responsibility is the availability of scientific knowledge about the causal relationship between exposures and disease or other maladies, as I will explain in more detail at the end of the article. For the moment, however, the important thing is not the particular principle, but rather that there *is* a coordinating principle—that a self-conscious attempt has been made to organize the various techniques the law brings to bear on toxics problems.

Much of the prevailing confusion about how the legal system should handle toxics results from inappropriate applications of legal mechanisms to situations for which they are ill-suited. Because we have failed to develop ways to select, coordinate, and limit the domains of various legal remedies, we are trying to accomplish all of our social goals simultaneously through regulation, litigation, compensation, and prosecution. We end up with a legal mishmash that cannot do anything very well.

One symptom of this problem is the judicial confusion about the purposes of products liability law. Judges can no longer figure out the nature of the enterprise. Are they there to compensate victims regardless of fault? To regulate the safety of products? To punish morally culpable manufacturers? To internalize social costs in the interest of economic efficiency? I believe that the root of the mess is the balkanization of law into arbitrary “fields.” As a result, tort lawyers know little about criminal law; criminal lawyers know little about tort law; neither knows anything about taxes or insurance; and nobody really tries to understand the nature of the scientific information that underlies the problems.

The single most important thing that we could do to improve the way that the legal system deals with toxic substances is to coordinate various “fields,” so that appropriate legal techniques can be matched to the structure of particular toxics problems.¹⁶ The mode of analysis I am proposing, in which legal institutions and techniques are “matched” to the structure of particular problems, contrasts sharply with the conventional approach used by lawyers to analyze problems of tort law in general and the reform of “toxic torts” in particular. The usual approach takes as given a single field of law with its attendant institutions—for example, products liability cases before judges and juries. One then asks how the rules in that field of law might be modified to reflect the balance among society’s goals. Essentially ignored by conventional Goal Analysis are other mechanisms available to the legal system for accomplishing similar objectives. In addition, the conventional approach forces the would-be reformer to confront extremely difficult (perhaps intractable) issues of social policy, as one is asked to determine how to trade-off deterrence against administrative costs, victim compensation against economic efficiency, and so on.

In what follows, I will first illustrate how conventional legal Goal Analysis deals with problems of causation in tort law. I also suggest why if we proceed in the conventional manner, we cannot hope to get very far in reforming the legal

16. Cf. S. Breyer, REGULATION AND ITS REFORM 191-284 (1982) (analyzing “mismatches” of regulatory techniques to particular problems).

system to deal with toxic substances in the environment. In the second section, I outline a different approach, adapted from Stephen Breyer's theory of regulatory "mismatches."¹⁷ I call this alternative approach "Institutional Analysis." In the final section, I apply Institutional Analysis to justify the package approach to toxics I proposed at the beginning of the article.

The Institutional Analysis approach to toxic law reform that I am suggesting differs from Goal Analysis in two principal ways. First, the institutional analyst takes the legal system as a whole as the relevant domain for analysis, not a narrow, arbitrary field such as product liability law or the design of regulatory taxes under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("Superfund").¹⁸ Second, the institutional analyst does not assume that legal doctrine is infinitely plastic, and then ask how to redesign it to accommodate competing social goals; rather, she assumes that most legal doctrines are relatively inelastic because they are limited by the information-processing capabilities of the institutions that apply them. Therefore, the range of results that can be achieved by modifying doctrine alone is relatively narrow. As a consequence, the primary concern of the institutional analyst is "matching" legal techniques and institutions to problems by asking, for example, whether the problem of cigarette smoking is more appropriately attacked by a warning label, a regulatory tax, or a series of verdicts by common law juries. In short, while the goal analyst focuses exclusively on the doctrinal "software" applied by one part of the legal system, the institutional analyst is concerned with the choice of institutional "hardware." While the goal analyst asks how to modify the legal doctrines applied by courts to reflect a balance among society's goals, the institutional analyst regards the legal system as a package of a dozen or so relatively fixed techniques that might be applied to a problem, and asks which of them seems most likely to work well for that particular problem.

This mode of analysis adapts to legal analysis Nobel Prize-winning economist Herbert Simon's insight that human beings and their institutions have only limited capability to perform elaborate optimizing calculations; therefore, we must make decisions by applying a few standardized routines or "standard operating procedures" and determining whether the results are satisfactory.¹⁹ Before the goal analyst can tell us how to modify legal doctrine, she needs a comprehensive specification of the optimal tradeoffs among competing social goals. But this is precisely the kind of elaborate, optimizing calculation that, according to Simon, human beings cannot perform. Institutional Analysis, on the other hand, attempts to reformulate the questions relevant to legal reform so that they come closer to the kinds of questions that human beings can actually answer. Rather than requiring a comprehensive specification of the optimal tradeoffs among social goals, the institutional analyst assumes only that there is a rough working consensus on what we want from the legal system, which is sufficient to permit

17. *Id.* Stephen Breyer now serves on the United States Court of Appeals for the First Circuit.

18. 42 U.S.C. §§ 9601-9657 (1982).

19. See generally H. SIMON, ADMINISTRATIVE BEHAVIOR: A STUDY OF DECISION-MAKING PROCESSES IN ADMINISTRATIVE ORGANIZATIONS (3d ed. 1976); see also Latin, *Problem-Solving Behavior and Theories of Tort Liability*, 73 CALIF. L. REV. 677, 693-95 (1985) (applying Simon's theories to suggest modifications of tort law doctrines). Latin uses Simon's work to inform traditional Goal Analysis, while I believe its implications are more fundamental.

us to distinguish satisfactory institutional arrangements from unsatisfactory ones:

- (1) We want risks from toxics in the environment to be kept as low as is reasonably achievable, given the limitations of scientific knowledge and economic resources.
- (2) We want to compensate those who suffer catastrophic losses, in spite of our best efforts to protect them, by spreading the costs of the loss.
- (3) We want to punish those who have behaved in a morally reprehensible fashion by risking the lives of others for their own private purposes.

We may differ as to how the balance should be struck in particular cases and we certainly would find it difficult to specify the optimum balance among goals in the abstract (what economists call constructing the social "objective function"). But there is enough of a working consensus to let us distinguish satisfactory "matches" of legal institutions to problems from unsatisfactory "mismatches." The task of reform will be far easier if we reformulate the inquiry to ask not how to modify the doctrines of tort law to accommodate toxics cases, but which of the available legal techniques would stand the best chance of achieving our shared goals, considering the nature of toxics problems.

II. CONVENTIONAL GOAL ANALYSIS AND CAUSATION

The Goal Analysis approach to tort law that I am opposing goes back at least to the writing of Oliver Wendell Holmes, Jr. in the late nineteenth century. Holmes argued that in a "doubtful case," with plausible legal arguments on either side, judges must have social ends "articulately in their minds."²⁰

In our own day, the leading school of Goal Analysis has been the "law and economics" movement. Two alternative moves are available to Goal Analysis for dealing with the fact that many different social goals underlie law. The two moves are illustrated by the work of the two leading tort scholars of the law and economics persuasion during our time, Richard Posner and Guido Calabresi. In my opinion, neither successfully resolves the problem of how to trade-off competing social goals.

Posner dissolves the problem of balancing competing social goals by assuming that a common metric exists—"efficiency" or "wealth," measured in dollars. It follows from this assumption that tort law (and indeed, every other aspect of the law) has only a single goal: to maximize wealth.²¹ In many areas, antitrust law, for example, these assumptions work tolerably well, and law and economics is a powerful tool for the policy analyst or would-be reformer. In toxics law, however, where one inevitably faces conflicts between life and health on the one hand, and economic costs on the other, law and economics is less acceptable as a

20. Holmes, *Law in Science and Science in Law*, 12 HARV. L. REV. 443, 460 (1899). For a discussion of the "instrumentalism" in Holmes' approach to law, see Gordon, *Holmes' Common Law as Legal and Social Science*, 10 HOFSTRA L. REV. 719 (1982).

21. See generally Posner, *The Ethical and Political Basis of the Efficiency Norm in Common Law Adjudication*, 8 HOFSTRA L. REV. 487 (1980) (arguing that "wealth maximization" is an ethically attractive norm in common law adjudication).

method of analysis—and is, therefore, less useful to the would-be reformer.²²

At least two standard objections to Posner's position inhibit its usefulness in the toxics area. First, many people do not share—indeed, they find abhorrent—the assumption that dollars are an adequate way to measure, say, the suffering of a worker who will die a slow, painful death from asbestosis.²³ A second argument against the Posnerian approach is that terms like “wealth” and “efficiency” are simply names for the aggregation of individuals' goals, and that using them obscures rather than illuminates their content.²⁴

Calabresi's approach, on the other hand, avoids the problem of assuming that all values are fungible and can be measured in a common unit, by identifying competing goals but making no attempt to suggest how they should be traded-off against one another.²⁵ Again, this approach is highly useful for some purposes, such as provoking students to think critically about the interests underlying traditional tort law, but Calabresi's mode of analysis is also only marginally helpful to the would-be reformer of toxic compensation law.

Consider, for example, Calabresi's classic analysis of causation doctrine in tort law in his famous article, *For Harry Kalven*.²⁶ Traditional doctrines of causation in tort law require a plaintiff to prove that the defendant's conduct was more probably than not both the “but-for cause in fact” and the “proximate cause” of the plaintiff's injuries.²⁷ Many lawyers who write about toxic torts from the conventional Goal Analysis perspective conclude that causation doctrine is one of the key elements that would have to be modified in order to adapt traditional tort law to facilitate recovery in toxic tort cases.²⁸ In my opinion, however, Calabresi's brilliant exegesis of the role of causation doctrine in traditional tort law is of little or no help to the would-be reformer in deciding how to redesign the system. While Calabresi identifies a mix of goals that can be thought of as underlying the doctrines of existing tort law, he offers no guidance about how to balance the goals or to modify the system.

Calabresi begins his article by identifying the approach to legal analysis that I have been calling “Goal Analysis” as the “functional approach [that] has come to dominate American tort scholarship.”²⁹ As a self-proclaimed functional analyst, Calabresi's project is to consider “the role causation [doctrine] should play when tort law is examined in terms of deterrence, spreading, and distributional goals.”³⁰ He distinguishes between three different concepts of causation, which

22. See S. KELMAN, *WHAT PRICE INCENTIVES?* (1981) (critique of economists who propose use of economic incentives rather than pollution standards in environmental policy).

23. *Id.* at 47-48; see also Doniger, *Federal Regulation of Vinyl Chloride*, 7 *ECOL. L.Q.* 497, 521 (1978) (“That some must die so that all can eat is one thing; that some must die so that all can have see-through food packaging is another.”).

24. See Leff, *Economic Analysis of Law: Some Realism About Nominalism*, 60 *VA. L. REV.* 451, 477-82 (1974).

25. See Calabresi, *About Law and Economics: A Letter to Ronald Dworkin*, 8 *HOFSTRA L. REV.* 553, 557-59 (1980).

26. Calabresi, *Concerning Cause and the Law of Torts: An Essay for Harry Kalven, Jr.*, 43 *U. CHI. L. REV.* 69 (1975).

27. See W. PAGE KEETON, *PROSSER & KEETON ON THE LAW OF TORTS* § 41 (5th ed. 1984).

28. E.g., Ginsburg & Weiss, *Common Law Liability for Toxic Torts: A Phantom Remedy*, 9 *HOFSTRA L. REV.* 859, 922-23 (1981).

29. Calabresi, *supra* note 26, at 70.

30. *Id.*

he calls "causal link," "*but for* cause," and "proximate cause."³¹ By a "causal link," Calabresi means something similar to what a scientist might mean by a weak causal association: "the recurrence of [an] act or activity will increase the chances that the injury will also occur."³² "*But for* cause," on the other hand, is the law's traditional requirement—reputed to cause much trouble in toxics cases³³—that to be the legal cause of an injury, an act must be among the "acts or activities without which a particular injury would not have occurred."³⁴ Finally, Calabresi defines "proximate cause" in the conclusory sense of that set of causally linked, and "usually (but by no means always) *but for* causes" to which "a particular legal system wishes to assign at least partial responsibility for an accident."³⁵

Calabresi then analyzes causal link, *but for* cause, and proximate cause in relation to what he takes to be the four instrumental goals of tort law: "two 'compensation goals,' specific or collective deterrence, and two 'deterrence goals,' general and market deterrence."³⁶ In each instance, he concludes that no single goal of tort law is sufficient to explain the prevailing legal concepts; rather, tort law "is a system that responds to mixed goals."³⁷

For example, Calabresi points out that "[i]f spreading of injury losses were the only goal of tort law, there would be no point at all in requiring, as a prerequisite to liability, a causal link between an act or activity and the injury."³⁸ "If spreading were the only goal of tort law, a social insurance fund, raised through taxes on a per capita basis, would be the optimal mechanism for achieving it."³⁹ Similarly, Calabresi argues that "[i]f market deterrence were the only goal of tort law, then all causation problems would be reduced to a search for the cheapest cost avoider,"⁴⁰ the person (not necessarily a party to the case) who can for the least expense either prevent the accident or bear the costs of it. Here again, however, Calabresi concludes that tort law has not grown in response to any single goal, but instead represents an amalgam or compromise among multiple social goals that may pull in different directions.

However, where multiple goals such as deterrence, compensation, and punishment of reprehensible conduct are involved, the legal system will usually accomplish all of them in a more satisfactory way if it differentiates separate institutions (e.g., regulation, insurance, criminal law) to perform separate functions. Each institution can then be tailored with a particular goal in mind, as opposed to trying to accomplish all of the law's goals at once through a single institution. Calabresi himself recognizes that sometimes there are dangers in trying to pursue multiple goals through a single body of law.⁴¹

31. *Id.* at 71.

32. *Id.*

33. See Ginsburg & Weiss, *supra* note 28, at 923-24.

34. Calabresi, *supra* note 26, at 72.

35. *Id.*

36. *Id.* at 73. For an elaboration of these goals, see G. CALABRESI, *THE COSTS OF ACCIDENTS: A LEGAL AND ECONOMIC ANALYSIS* (1970).

37. Calabresi, *supra* note 26, at 100-01.

38. *Id.* at 73.

39. *Id.* at 74.

40. *Id.* at 100.

41. See *id.* at 101-02 ("I do not think it is desirable to mix collective and market deterrence goals in one

There is another reason why this kind of Goal Analysis is unavailing as a tool for reformers. Implicit in the work of goal analysts like Holmes and Calabresi is the assumption that all the goals society wants to pursue are to be achieved through the common law. To put the point another way, the common law method presumes that the common law is the only game in town. The classic image of the process of common law lawmaking is that judges determine the just result in a series of individual cases and gradually abstract principles from the pattern of results that have been reached.⁴² But the notion that judges can use their common sense to derive general principles of law depends on there being no other lawmaking institutions operating simultaneously in related areas. To take a concrete example, suppose that the traditional rules of causation in tort law were built up reflecting judges' sense of the appropriate balance between compensation goals and deterrence goals. But suppose in the meantime another institution, such as government safety regulation or employer-supplied medical insurance, develops and serves to perform part of the function that was performed by tort law at its inception. Is there any reason to be confident that the common sense of judges will change to reflect the new social reality? Or will they simply continue to focus on the equities of the individual cases before them, in splendid isolation?⁴³

III. INSTITUTIONAL ANALYSIS

The institutional analyst approaches toxics problems from a different direction. Rather than taking certain legal institutions (namely, courts) for granted and concentrating attention on goals and doctrine, the institutional analyst reverses the process: social goals and legal doctrines are taken more or less for granted while attention is concentrated on the structure of the particular problem and on selecting legal mechanisms and institutions appropriate to it.

At the outset, the institutional analyst faces an apparent paradox. How is one to know which features of problems are significant unless one already has some sense of the strengths and weaknesses of available institutions? At the same time, however, how is one to know which features of institutions are important unless one already has some sense of the nature of the problem? This difficulty is easier to resolve in practice than it is in concept. The institutional analyst must

system. Results like *The Wagon Mound* which hamper market deterrence, but do not go far enough to achieve adequate collective deterrence, seem all too likely.") (footnotes omitted).

Calabresi's preference for a system like the tort system, which responds to mixed goals, appears to be based principally on his belief that in areas where "tragic choices" must be made that adversely affect the lives and well-being of some citizens, government should not make clear to the public the basis for its actions. *Id.* at 100 n.48; see generally G. CALABRESI & P. BOBBITT, TRAGIC CHOICES (1978).

42. See, e.g., E. LEVI, AN INTRODUCTION TO LEGAL REASONING (1949).

43. Granted, tort law does recognize a number of technical rules that allow judges to consider the existence of other institutions, such as insurance or government safety regulation. In general, however, the substance of these rules denies that the existence of the parallel institution in any way alters the inquiry the common law court is to follow. Thus, the "collateral source rule" holds that the plaintiff's compensation for his medical expenses by insurance in no way affects his right to recover tort damages, which are, by hypothesis, predicated in part on a compensation goal. See RESTATEMENT (SECOND) OF TORTS § 920A(2) (1979). Similarly, the existence of government safety regulations normally does not preclude a jury from holding liable an injurer who had complied fully with the measures determined by the "expert" agency to strike the optimal social balance between risk and the cost of precautions. See *Silkwood v. Kerr-McGee Corp.*, 104 S. Ct. 615, 626 (1984) (state-authorized punitive damages assessed against nuclear power facility did not conflict with federal nuclear regulations).

proceed repetitiously, by successive approximations, looking first to institutions, then to the problem, then back to institutions, and so on until the fit seems satisfactory.

We will begin, then, with a brief description of certain key features of legal institutions, which might be relevant to toxics problems. Next, we analyze the structure of toxics problems in the light of these institutional features. Finally, we return to institutions, with the nature of toxics problems more clearly in mind, to propose matches of institutions to particular toxics problems.

A. A TYPOLOGY OF LEGAL INSTITUTIONS

Obviously, the various legal techniques and institutions made available by the prevailing legal culture differ in many ways. Which differences turn out to be significant? There are no absolute answers, for a variety of differences between institutions may be important. In general, however, one should pay particular attention to the differences in the ways that legal institutions process information. At base, all legal institutions are simply packages of instructions about how to process information. Institutions differ in what kinds of information they process and in how they process it. Thus, courts use judges and juries to process information through precedents and testimony, while administrative agencies such as EPA use more bureaucratic methods and typically consider only written materials, not oral testimony.

One must next consider what kinds of information processing skills are important for a particular policy problem. Toxics problems differ from traditional tort cases in that they generally involve highly technical issues of toxicology and epidemiology. Consequently, one might suspect that differences in the ways various legal institutions process scientific and technical information might be important. Those differences may be summarized as follows:

- (1) Whether the legal technique requires a *strong causal association* as a condition for action or *little or no causal association*.
- (2) Whether the legal technique operates on *broad categories* or *case-by-case adjudication*.
- (3) Whether the applicable legal institutions employ *lay* or *expert decision makers*.
- (4) Whether the institution relies on information available in advance (*ex ante*) or considers information that became available after the fact (*ex post*).

Using these categories, we can construct a typology of various legal techniques and institutions, as shown in Figure 1.

FIGURE 1

<u>Institution</u>	<u>Technique</u>	<u>Causal Association</u>	<u>Decision Maker</u>	<u>Category Affected</u>	<u>Information</u>
Legislature	Tax	None	Lay	Broad	Ex Ante
Legislature	Statute	Weak	Lay	Broad	Ex Ante
Administrative	Compensation	Moderate	Expert	Narrow/ Broad ⁴⁴	Ex Post
Administrative	Rule	Moderate	Expert	Narrow/ Broad	Ex Ante
Court	Civil	Strong	Lay	Narrow	Ex Post
Court	Criminal	Very strong	Lay	Narrow	Ex Ante

Admittedly, actual institutions can be modified in order to deviate from the ideal types reflected in Figure 1. For example, class actions⁴⁵ and expert masters⁴⁶ in civil litigation may be seen as attempts to ameliorate the effects of case-by-case adjudication before lay decision makers. Similarly, under certain circumstances, a legislature may delegate to administrative experts the power to fix particular tax rates in light of new information,⁴⁷ thereby altering somewhat the lay and *ex ante* character of regulatory taxes. Such hybrid techniques blur the distinctions between actual institutions, so that they are not as sharp as may be suggested by the chart. Nonetheless, I believe that the chart captures the core tendencies of institutions.

For example, procedural rules allowing court cases to be brought as class actions⁴⁸ do broaden the range of parties affected by an adjudication. The central defining feature remains, however, that courts adjudicate "cases" between identifiable groups of plaintiffs and defendants. This fact has strong implications for the kind of proof of causal association that courts require. The project of adjudicating a "case" between identifiable plaintiffs and identifiable defendants inherently implies (1) associating the plaintiffs' maladies with the defendants' conduct, which is distinct from the rest of the world's, and (2) making this association based on evidence that can be made comprehensible to a lay decision maker.

44. One of the defining features of administrative systems is that they can be designed in a very plastic way to affect either a narrow category or a broad category. For example, the typical worker's compensation system deals with a very narrow category, namely, an individual worker. On the other hand, it is equally possible to design a compensation system like the black lung fund, which affects broad categories. See Elliott, *Why Courts?: Comment on Robinson*, 14 J. LEGAL. STUD. (forthcoming).

45. See Rosenberg, *supra* note 1, at 908-16 (1984) (discussing class treatment of mass exposure claims).

46. See McGovern, *Management of Multiparty Toxic Tort Litigation: Case Law and Trends Affecting Management*, 19 FORUM 1, 14 (1983) (discussing use of magistrates, special masters, experts, and expert panels).

47. See *J.R. Hampton, Jr. & Co. v. United States*, 276 U.S. 394 (1928) (Tariff Act of 1922 authorizing President to regulate customs duties not invalid delegation of Congress' taxing power because Congress declared "intelligible principle" and merely gave President and advisory commission authority to execute it).

48. See FED. R. CIV. P. 23.

B. THE TOXICS PROBLEM

The first thing the institutional analyst discovers by attending to the structure of "the toxics problem" is that there is not one "toxics problem" but many. The word "toxics" is not a scientific term. It has little precise meaning beyond a layperson's vague sense of "some nasty stuff in the environment that might kill us." The substances that lawyers group together under the label "toxics" vary in a number of different ways, including:

- (1) the length of the typical latency period from exposure to the onset of disease;
- (2) the typical exposure route;
- (3) the state of scientific knowledge about the causal relationships between exposure and disease;
- (4) whether the disease involved is rare or common;
- (5) whether the disease involved has one primary cause or many;
- (6) the value of the substance for economic purposes and the availability of substitutes;
- (7) the availability of remedial therapies and/or control technologies.

Any of these factors can be important for selecting appropriate legal mechanisms and institutions. Their very existence implies that the best match of legal institutions to one toxics problem will not necessarily be appropriate for different substances with different characteristics.

A few examples will illustrate how toxics problems differ in ways that affect the selection of appropriate legal mechanisms. In some instances, it is easy to associate particular diseases with exposures to particular substances. This is typically true when the disease has a relatively short latency period, virtually no other causes of the symptoms are known, and exposure routes are clear. For example, if children who live nextdoor to a lead smelter begin to exhibit the physical symptoms characteristic of acute lead poisoning, it is easy to surmise what is probably responsible.⁴⁹ Similarly, even though the latency period is longer, if workers in asbestos processing plants suffer the symptoms of asbestosis or mesothelioma—two relatively rare diseases that epidemiological studies have shown to be associated with exposure to airborne asbestos⁵⁰—the causal relationship may be more difficult to infer, but it is still relatively easy for a lay decision maker to associate particular injuries to particular persons with exposure to a particular substance.⁵¹

The characteristics I have been describing (a rare disease, relatively few known causes, and a clear exposure route) allow us to fit these cases into the pattern required by civil cases for damages in court. We can satisfy the requirement of causal association that a lay decision maker can infer between a particular plaintiff's injuries and the conduct of particular defendants.

In the abstract, the inference of a causal association between particular inju-

49. Cf. *R.L. Renken v. Harvey Aluminum, Inc.*, 226 F. Supp. 169 (D. Or. 1963) (nuisance suit by owner of adjoining orchard to restrain emissions of fluorine from production of aluminum).

50. S. EPSTEIN, *THE POLITICS OF CANCER* 80-83 (rev. ed. 1979)

51. See *Borel v. Fibreboard Paper Prods. Corp.*, 493 F.2d 1076, 1090-93 (5th Cir. 1973) (upholding jury finding that insulation worker's exposure to insulation material that generated asbestos dust was proximate cause of worker's asbestosis), *cert. denied*, 419 U.S. 869 (1974).

ries and particular conduct can be based on any information available at the time of the trial, without regard to whether the information existed when the defendant's conduct took place. Indeed, some courts have held that in civil cases, where only monetary damages are at stake, the necessary inference may be made *ex post*, that is, based on information that has only become available since the exposure occurred.⁵² If, however, information about risks of serious bodily harm had been available at the time the exposures occurred (that is, *ex ante*), it would be possible to satisfy the traditional "willfulness" requirement for criminal, as well as civil, remedies against the defendants.⁵³

An example from the other end of the spectrum is the sulfur oxides produced by combustion of fossil fuels like coal. Relatively strong epidemiological evidence tells us that chronic exposure to elevated levels of sulfur oxides in the air increases the risk of several common diseases, including heart attacks and emphysema.⁵⁴ It is impossible, however, to associate any particular heart attack with sulfur oxide pollution, rather than cigarette smoking, lack of exercise, diet, or a host of other factors that can be shown to contribute to an individual's risk of dying from a heart attack. Indeed, in a world in which every victim is in fact exposed to multiple factors that tend to increase risks, the question of which one "really caused" the event may not be meaningful.

Assuming that we could get past the philosophical issue and could attribute particular deaths to sulfur oxides pollution in some meaningful sense, the legal system would still face virtually insurmountable difficulties in holding particular actors responsible. Tens of thousands of separate sources, some thousands of miles away, all contribute to the polluted air that an individual breathes during a lifetime. Even with sophisticated computer modeling techniques, we cannot estimate the relative contributions of individual sources except for a few major sources located within a radius of about fifty kilometers.⁵⁵ But in some instances, a substantial proportion of the sulfur oxides to which an individual is exposed originate beyond the range within which current technology allows us to estimate relative contributions.

We cannot expect, however, that improvements in technology will make it easier to hold particular actors responsible. As a thought experiment, imagine that suddenly a perfect technology of culpability analysis is invented—an imaginary machine that would somehow magically determine the precise contribution that each polluter had made to each individual victim's risk of suffering a heart attack. The practical, administrative problems for the legal system would increase, not decrease. With perfect knowledge would come the realization that

52. *E.g.*, *Beshada v. Johns-Manville Prods. Corp.*, 90 N.J. 191, 447 A.2d 539 (1982) (defendants in product liability case based on strict liability for failure to warn may not raise "state of the art" defense).

Imposing liability *ex post* remains controversial among tort lawyers. This controversy exists in large part because of the confused mixture of goals that currently engulfs product liability law. *See supra* text pt. I.

53. For a discussion of possible logical and empirical justifications for imposing criminal liability on product manufacturers, see Wheeler, *The Use of Criminal Statutes to Regulate Product Safety*, 13 J. LEGAL STUD. 593 (1984).

54. *See generally* NATIONAL ACADEMY OF SCIENCES, *SULFUR OXIDES* 180-209 (1978); *see also* L. LAVE & E. SESKIN, *AIR POLLUTION AND HUMAN HEALTH* 235-44 (1977) (examining causal association between air pollution and mortality rates).

55. EPA, *GUIDELINES ON AIR QUALITY MODELS* 10 (1978).

each person's risk profile is unique—that a steel mill a thousand miles away in Gary, Indiana was responsible for the pollution that contributed .00083 percent of the total risk of Jones's heart attack in Hartford, Connecticut, but only .00075 percent of Smith's, who lives down the street where a hill creates an eddy in the prevailing winds that bring in sulfur oxide pollution from out of state.

Sometimes we would get lucky: there would be a single, identifiable cause which by itself accounts for fifty percent—or maybe even only fifteen to twenty percent—of the risk. If so, we could declare the one source or group of sources that “sticks out like a sore thumb” to be the “proximate” cause, and forget about all the rest, even though collectively they might account for eighty percent. But suppose that there is no single source or group of sources that “sticks out like a sore thumb.” Suppose instead that there are many contributing causes and that the contribution by each of them is very small? The administrative costs of working with individual culpability analysis profiles for each case of illness would simply be too great.⁵⁶ At some point—probably long before we got to Smith and Jones—we would either have to deny liability altogether, or begin to work with larger categories and to ignore the differences among the individual sources within the categories. One could, for example, impose a tax based on the sulfur content of fuels, overlooking the effects of distance, terrain, and a host of other features in apportioning costs. The reason for doing so is not that the actual effect of the other features is unknowable—remember, by hypothesis we have a magical machine that would tell us—but that the costs of administering the system would simply be too great for it to be worthwhile to assess ten thousand sources *pro rata* for their unique, individual contributions to the risk of Smith's heart attack. The game of individualized adjudication to associate particular injuries with the conduct of particular defendants simply would not be worth the candle.

Which factual distinctions to bother making, and which to ignore (that is, how broadly to form the applicable legal categories) varies with the circumstances. How broadly or narrowly to cast the legal categories applied to a particular problem is a function of what information is available, administrative costs, and the value of making the distinctions. These are obviously matters of degree, but where thousands of small sources contribute to a problem, regulation plus compensation funds fed by taxes are probably the legal mechanism of choice.

Somewhere between the two poles represented by acute lead poisoning on one hand and sulfur oxide pollution on the other are substances that have been shown statistically to increase the incidence of cancer. Often the only evidence available is the results of tests in animals, and therefore the scientific uncertainties are relatively large. Even in the best possible circumstances, however, when plenty of good epidemiological data is available for human populations, it will be very difficult to associate particular maladies with particular exposures to particular toxic substances.

By definition, epidemiology speaks to the incidence of disease in groups, not individual cases.⁵⁷ Whether one is willing to draw inferences from epidemiologi-

56. Cf. Robinson, *supra* note 1.

57. See generally S. EPSTEIN, *supra* note 50, at 38-46 (discussing techniques of epidemiological research); see also Landes & Posner, *Tort Law as a Regulatory Regime for Catastrophic Personal Injuries*, 13

cal evidence to individual cases depends not only on the amount and quality of the epidemiological data available, but also on the rarity of the disease involved, the number of other potential causes, and the confidence level required (that is, how important one considers an error in one direction as opposed to an error in the other).

For relatively rare cancers, such as angiosarcoma of the liver among workers in vinyl chloride plants,⁵⁸ it is possible to draw causal inferences with enough confidence to permit administrative agencies to support regulatory standards;⁵⁹ it would be more difficult to use the same evidence to draw the necessary inferences in wrongful death suits against the employer;⁶⁰ and criminal prosecutions would be out of the question (even if other requirements such as "willfulness" could be met).

Other carcinogens present even more difficult problems of associating individual victim's illnesses with the actions of individual defendants. Suppose that exposure to a particular substance contributes to the risk of a common cancer, but that the respective contributions by it and all other causes are all very small. An example might be low levels of ionizing radiation and leukemia.⁶¹ Virtually every leukemia victim has been exposed to small amounts of radiation that increase the statistical risk of contracting the disease by a very small amount. Nonetheless, it is very difficult for a leukemia victim to demonstrate a causal connection sufficient to recover in a tort suit based on exposure to radiation.⁶² The problem is not simply "scientific uncertainty." Rather it is the sheer number of small contributors to the total risk, which makes it impractical to match particular exposures to the disease suffered by particular victims.

C. MAKING MATCHES

Legal institutions differ in a large number of ways that might be important for making matches between legal institutions and particular problems. For example, economist Steven Shavell has proposed four factors, which can be assimilated under the general rubric of "transaction costs," and which he maintains underlie the social decision for administrative regulations as opposed to tort liability.⁶³ Even if one assumes, however, that Shavell has described the relevant

J. LEGAL STUD. 417, 423 (1984) ("[U]ncertainty over causation exists at the individual but not aggregate level."). *But cf.* Black & Lilienfeld, *supra* note 1 (proposing statistical tests to determine whether epidemiological evidence satisfies traditional tort law standard of proof).

58. *See* S. EPSTEIN, *supra* note 50, at 102-17 (case study on vinyl chloride as carcinogen).

59. *See* Society of Plastic Indus. v. OSHA, 509 F.2d 1301 (2d Cir.) (upholding OSHA standard for vinyl chloride), *cert. denied*, 421 U.S. 992 (1975).

60. *See* Black & Lilienfeld, *supra* note 1, at 777 ("A clear distinction currently exists between the standard of proof used in regulation and the standard used in determining tort liability."); Ethyl Corp. v. EPA, 541 F.2d 1, 13-20 (D.C. Cir.) (en banc) (precautionary standard of evidence sufficient to support administrative regulation), *cert. denied*, 426 U.S. 941 (1976).

61. *See generally* NATIONAL ACADEMY OF SCIENCES, THE BIOLOGICAL EFFECTS OF IONIZING RADIATION (1980).

62. *But cf.* Prescott v. United States, 523 F. Supp. 918, 923 (D. Nev. 1981) (discussing Nevada workers' compensation statute that creates conclusive presumption that cancers occurring within specified number of years after employment were caused by exposure to radiation during employment), *aff'd*, 731 F.2d 1388 (9th Cir. 1984).

63. Shavell, *Liability for Harm Versus Regulation of Safety*, 13 J. LEGAL STUD. 357 (1984). Shavell's four factors are: (1) "difference in knowledge about risky activities"; (2) "private parties might be incapa-

factors correctly, at present his schema is of relatively little use to the would-be reformer.

There is very little good empirical data that would permit the would-be reformer to compare the costs of different legal institutions in the categories Shavell identifies. We do know that the administrative costs of case-by-case litigation through the tort system are extremely high—exceeding sixty percent of total costs in one study of asbestos cases (primarily for attorney's fees).⁶⁴ Proponents of alternatives to the tort system have seized on figures showing that the costs of case-by-case litigation are extremely high, in order to assert that litigation is inefficient and therefore that "the full social loss . . . could be lowered by turning to some other method of controlling accident costs and compensating victims."⁶⁵ Unfortunately, the argument is not so easily won. In the first place, no persuasive data is yet available demonstrating conclusively that the administrative costs of alternatives to the tort system are substantially lower. (To be sure, most of us have a strong intuition one way or the other; the point is, however, that the intuitions go both ways.) Moreover, even if it could be proved that the administrative costs of litigation are higher, their proponents would still argue that other features of courts (for example, private initiation and control of proceedings) are "worth" the extra administrative costs.

In the absence of comprehensive comparative cost data, the institutional analyst must turn elsewhere for a principle to inform the matching of legal institutions to toxics problems. Toxics problems differ in a number of ways, but the one that is of most importance for matching them to legal institutions and techniques is informational. At base, all legal institutions are information processing systems.⁶⁶ They differ in the methods they use to process information, and therefore, in their costs and the kinds of information to which they are differentially sensitive.

It is helpful to think of the available legal techniques for regulating toxics and for compensating victims as arrayed along a spectrum. The spectrum ranges from taxes imposed by legislatures through criminal penalties in courts. At an intermediate position are administrative regulations and compensation systems. The character and specificity of the causal information required as a condition for legal action is what defines the spectrum.

The legal technique that least demands information associating particular injuries with the conduct of particular persons is a tax. The legislature may tax an activity without any showing whatsoever that the activity causes the harm on which the funds raised will be spent.⁶⁷ The next technique along the spectrum is direct legislation. If, for example, Congress passes a statute requiring employers

ble of paying for the full magnitude of harm done"; (3) "parties would not face the threat of suit for harm done"; and (4) "administrative costs incurred by private parties and by the public."

64. J. KAKALIK, P. EBENER, W. FELSTINER & M. SHANLEY, COSTS OF ASBESTOS LITIGATION vii, table S.2 (Rand Inst. for Civil Justice 1983) (victims receive only 37% of total costs paid by defendants and insurers).

65. Oi, *Tort Law as a Regulatory Regime: A Comment on Landes and Posner*, 13 J. LEGAL STUD. 435, 439 (1984).

66. See generally Elliott, *Holmes and Evolution: Legal Process as Artificial Intelligence*, 13 J. LEGAL STUD. 113 (1984).

67. See *New York Rapid Transit Corp. v. City of New York*, 303 U.S. 573, 584-87 (1938) (Constitution does not require any special relationship between class taxed and purposes for which proceeds spent).

to compensate employees for certain injuries, several different clauses of the Constitution converge to require a minimal showing of some at least vaguely plausible relationship between the legislation and a legitimate governmental purpose.⁶⁸ In practice, however, this is not a very demanding standard, since the courts are extremely tolerant of the legislature's discretion to define both the category of beneficiaries⁶⁹ and the class charged with the costs.⁷⁰

The evidentiary requirements for administrative action are more demanding than those for legislation, but less demanding than those for case-by-case litigation in court. The standards of proof required under various statutes differ, but as a general matter, administrative action must be supported by some evidence on the record.⁷¹ There is no requirement, however, that the evidence supporting the agency's position be stronger than the evidence against it, only that the agency's interpretation of the evidence be "reasonable."⁷² Moreover, a reviewing court is required to defer to the agency's putative expertise in evaluating scientific and technical evidence, and administrative rules designed to protect health and safety may be set on a "precautionary" basis based on evidence that would not "stand up in court" in a civil suit.⁷³ Finally, administrative regulations generally address classes of activities, rather than matching particular injuries to particular actions. Thus, for example, a regulation may affect an entire industry, or even more broadly, all users of a substance such as benzene, on the theory that workers as a group will be safer (statistical lives will be saved), even though it is impossible to identify any particular person who has been, or will be injured, by exposure to the substance.

Case-by-case litigation in courts is at the most demanding end of the spectrum. Of all the legal techniques available for regulating and compensating victims of toxic substance poisoning, litigation in the courts requires the most information to establish a causal association between injuries to particular plaintiffs and conduct of particular defendants. Two central features define litigation in courts. First, courts as institutions depend on factfinding by lay judges and juries. Second, courts adjudicate "cases" between identifiable groups of plaintiffs and defendants. This implies (even in a class action) that information must exist that permits a lay decision maker to match one group's injuries to another group's actions. But such information does not always exist, and in such instances, the tort system "leaves the loss where it falls."

The differences among legal techniques in the nature of the causal information

68. See generally Sunstein, *Naked Preferences and the Constitution*, 84 COLUM. L. REV. 1689 (1984) (discussing means-ends test under dormant commerce, privileges and immunities, equal protection, due process, contract, and eminent domain clauses).

69. See *United States Railroad Retirement Board v. Fritz*, 449 U.S. 166, 176-79 (1980) (upholding withdrawal of retirement benefits from certain employees).

70. See *Usery v. Turner Elkhorn Mining Co.*, 428 U.S. 1, 15-20 (1976) (upholding imposition of liability on mining companies for pneumoconiosis of former employees and sustaining "irrebuttable presumption" that death was due to pneumoconiosis based on specified clinical evidence).

71. See generally Administrative Procedure Act, 5 U.S.C. § 706 (1982).

72. *Consolo v. Federal Maritime Comm.*, 383 U.S. 607, 618-20 (1966); B. SCHWARTZ, ADMINISTRATIVE LAW §§ 10.8-.9 (1984).

73. *Ethyl Corp. v. EPA*, 541 F.2d 1, 33-37 (D.C. Cir.) (en banc), cert. denied, 426 U.S. 941 (1976); see also *American Textile Mfrs. Ass'n v. Donovan*, 452 U.S. 490, 522-36 (1981) (upholding OSHA adoption of Cotton Dust Standard after agency determined on basis of economic and technical data that standard was "economically feasible").

they demand can provide a consistent basis for matching legal techniques to toxics problems. Where little or no information exists that will permit injuries to be associated with particular activities, broadly based taxes can nonetheless be used to spread losses. As more information develops, and there is some reason to believe that particular activities cause more than their fair share of illness and disease, they might be subjected to correspondingly higher taxes, set either by the legislature or, more likely, in administrative proceedings. Adjusting the amounts that a particular activity is charged makes sense only when there is enough information to allow us to estimate the relative contribution to the total harm attributable to that class of activity. As better and better information develops, it may become possible to match particular injuries to the actions of individual defendants or groups of defendants. If, but only if, that type of information exists, it *may* be advantageous to use case-by-case litigation as the method of allocating charges to particular defendants. If the available information makes it *possible* to associate particular harms with the conduct of identifiable groups of defendants, it does not follow that it will necessarily be worthwhile to do so. That will depend on whether the benefits, either moral or economic, of particularizing the charges outweigh the costs of the process. However, in the absence of information permitting the association of particular illnesses to the actions of particular groups of defendants, litigation is mismatched to the structure of toxics problems.

We can imagine a legal system in which a central, coordinating authority would constantly review the available information base for thousands of toxic and potentially toxic substances and issue edicts—subject to judicial review, of course—about which legal technique is most appropriate. Such a system would be cumbersome and inefficient. A better way to coordinate the application of various legal techniques is through a system of rules internal to each of the techniques themselves. These rules would define the domain or jurisdiction of each technique in relation to the others.

The key principle that should underlie the jurisdictional rules is that the application of a technique based on more refined and specific information should preempt the applicability of cruder legal mechanisms. For example, when an administrative body determines that enough information exists to enable it to establish charges proportional to the harm caused by an activity, its action should preempt the broadly based taxes imposed in its absence. (Alternatively, the administrative charges could be superimposed as surcharges or rebates on top of a constant, broadly based tax.) Similarly, once enough is known to prescribe administrative rules, enforced through criminal penalties, to regulate the risk from particular substances, that should preempt tort cases, in which juries are free to strike their own balance between costs and benefits.

The proposals outlined at the beginning of this paper are an attempt to implement these principles in order to coordinate legal techniques in light of available information.

IV. CONCLUSION

Perhaps the most provocative and interesting part of Calabresi's *For Harry Kalven* is an insight he proposes at the end. Calabresi suggests that what the law

considers “the cause” of a malady will change as the technology available for controlling it changes.

[M]any seemingly significant philosophical questions concerning cause become irrelevant to the use of that term in law. To amplify: so far as legal language is concerned, the “cause” of a disease would depend on how, at any given time, it could be most easily controlled. From this point of view, in the nineteenth century it would have been appropriate to speak of the “cause” of tuberculosis as the absence of sun and the presence of bad living conditions. . . . With the identification of the Koch bacillus all that changed. At first potentially, and subsequently in practice, efforts directed at *this* causally linked element seemed most likely to control the disease. . . . More recently, the prospect of genetic engineering has again changed the causal language appropriate to this disease. Now one can, in a meaningful way, speak of genetic predisposition as a “cause” of tuberculosis.⁷⁴

Calabresi’s insight that changes in scientific information may affect which factors a court considers to be the legal “cause” of a malady is profound. But he does not carry the insight to its logical conclusion: namely, that changes in scientific information may also affect which technologies of justice are appropriate to particular problems.

74. Calabresi, *supra* note 26, at 105-06.