CHAPTER 5

Toward a Culture of Persistent Regulatory Experimentation and Evaluation[1]

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> *The country needs and, unless I mistake its temper, the country demands bold, persistent experimentation. It is common sense to take a method and try it: If it fails, admit it frankly and try another. But above all, try something.*
>
> —Franklin Delano Roosevelt, Address at Oglethorpe University, May 22, 1932

> *The question we ask today is not whether our government is too big or too small, but whether it works—whether it helps families find jobs at a decent wage, care they can afford, a retirement that is dignified. Where the answer is yes, we intend to move forward. Where the answer is no, programs will end.*
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> —Barack Obama, Inaugural Address, January 20, 2009

American government, at every level, regulates a dizzyingly broad swath of social and economic life. Regulatory policy determines the drugs we can buy, the pollutants in the air we breathe, the quality of the water we drink, the speed at which we can drive, the materials we use to construct our homes, the cars we buy, the rules that govern our employment contracts, the loans we can take out, the investments we make, and so much more. In making decisions about regulations, public officials must choose which areas of our lives merit government rules, as well as how stringent those rules should be. The essence of regulation is that it requires the regulated to take actions that they would not otherwise take, actions that often increase their costs, reduce their utility, or in some other way harm them. When faced with this incredible array of complex and often uncertain trade-offs, what is a well-intentioned government to do?

The current system for making these choices is broken. It is largely based on faith, rather than evidence. The efficacy of many regulations is never assessed. Many others are only evaluated *before* they are implemented—the point when

we know the least about them. The result is that our regulatory system all too frequently takes shots in the dark and we all too infrequently fail to find out if we have hit anything—or even worse, we only find out when things have gone horribly wrong.

But it doesn't have to be this way. We already have an example of scientifically based regulation in our approach to determining which foods and drugs are safe via the Food and Drug Administration (FDA). The FDA-led double-blind testing of pharmaceutical drugs has led to a revolution in medicine, and drugs are now safer than they have ever been before. The basis of the FDA's system is the recognition that it is impossible to know whether a drug is beneficial in advance of its use.

Why should we choose the regulations that govern our society less carefully than the foods we eat and drugs we ingest?

I. A New Era in Regulatory Reform

This essay is a call to move toward a culture of persistent regulatory experimentation and evaluation. Our goal should be to rigorously evaluate every regulation in order to expand upon the ones that work and weed out the ones that fail to improve our well-being (or worse, harm it). At the heart of such reform is the recognition that we cannot know a regulation's benefits and costs until it has been tested. The rewards for such testing are better regulations, which can improve our lives, our children's lives, and those of our children's children.

In many respects, a culture of regulatory experimentation and evaluation is the logical next phase of the American regulatory project. We have now followed two paths and found both to be lacking. The first push for regulation came out of the New Deal and the Great Society and simply emphasized doing something to correct abuses and other social ills. In many instances, the mere act of trying to do something seemed to be the goal, and evaluation and follow-up were not emphasized.

Eventually, this age of regulation was supplanted by a second era, which emphasized the failures of the first. This second phase, which was broadly associated with the Reagan years, introduced a faith in the free market to produce desired societal outcomes.

A culture of persistent regulatory experimentation and evaluation would build upon both of these great ages and propel us into a third era of regulatory reform. This culture would meld together the wish to establish national policies that enhance the well-being of our citizens and the insistence that this be done credibly and cost-effectively, given fiscal constraints. The tools of experimentation necessary to achieve this goal are available and are already being used in a variety

of other contexts. Used widely, they will lead us to a new era of effective regulatory policy.

II. Credible Cost-Benefit Analysis

The only humane approach to regulation is to require that every rule and policy be subject to a credible cost-benefit analysis. The most important task in the reforming of our system of regulation is to determine which regulations work and which do not. Cost-benefit analysis provides a rational, quantitative method for determining how well individual regulations are working. All regulations have expected benefits (for example, lives saved, illnesses prevented) and expected costs (investments required to scrub smokestacks, expenditures on monitoring pollution emissions). Government's task is to identify and implement regulations whose benefits exceed their costs; cost-benefit analysis is the tool that makes this possible.

Cost-benefit analysis requires that all of the disparate costs and benefits of a particular regulation be converted to a common unit, nearly always money. By converting all costs and benefits to the same unit, government can avoid irrational combinations of policies that fail to maximize our well-being. The costs and benefits for one person under one policy are treated no differently than the costs and benefits for another person under another policy.

The current regulatory problem is not a lack of cost-benefit analysis.[2] Some form of cost-benefit analysis already underlies most regulatory decisions. Rather, the problem is the poor quality of the evidence underlying many applications. Indeed, critics of cost-benefit analysis have argued that it can be twisted to produce desired results. One major reason for these criticisms is that most cost-benefit analyses are not performed in a credible manner.

The single greatest problem with the current system is that most regulations are subject to a cost-benefit analysis only in advance of their implementation. This is the point when the least is known and any analysis must rest on many unverifiable and potentially controversial assumptions. There is a place for such prospective analyses in providing a first pass at assessing regulations. Even if regulators are well intentioned, however, the problem remains that it is not possible to know the causal impact of a policy in advance.

How can regulators determine the true effect of policies? The first step is to admit that it is generally impossible to assess regulations prospectively. Under the current system, regulations are typically evaluated *before* they are implemented and rarely examined again once they have been put in place. Since the regulations have not yet been enforced, these prospective evaluations involve an unhealthy dose of blind faith. Whatever its origins, it is an approach to choosing effective regulations that involves the government tying at least one hand behind its back.

Indeed, it is nearly impossible to imagine this approach being used in other contexts where people's lives are on the line. For example, I am confident that there would be a deafening uproar of protest if the FDA announced that it would approve drugs without testing them in advance. Yet, this is largely what we do with regulations that affect our health and well-being.

The second step is to adopt a culture of regulatory experimentation and evaluation. I will outline below a specific plan to introduce such a system. However, at its core, this reform is simple. It involves rigorously testing all regulations and then expanding upon the regulations that work and dropping the ones that do not.

The FDA's drug approval process is a good example of a system of experimentation and evaluation. Each new drug is subjected to four phases of testing, slowly ramping up from small randomized trials of fifteen to thirty people to widespread use. After clinical trials are completed, all of the evaluations are reviewed by the Center for Drug Evaluation and Research (CDER). The CDER employs doctors, pharmacologists, chemists, statisticians, and other relevant professionals. In the review process, these professionals scrutinize each aspect of the new drug's application. If the burden of evidence has been met that the drug is safe and effective, it can be distributed to the public. Such a system could easily be adapted for regulation.

III. The Case for Credible Estimates of Costs and Benefits

A. Too Much Money Spent Saving Too Few Lives

We should experiment more in regulation, because the body of evidence regarding the costs and benefits of regulation is sparse. The paucity of evidence is partly explained by the impossibility of knowing beforehand whether a regulation will pass a cost-benefit test. Proponents of a new regulation inevitably argue that its benefits are substantial, while opponents inevitably argue that the costs are too high. The difficulty is that the evidence needed to assess such claims is almost always unavailable.

The result is that all too often regulatory decisions are based on rhetoric. This means that we almost surely devote too many resources to regulations that have small net benefits and not enough to regulations with big net benefits.

For example, there is a wide range of cost-effectiveness even under already established rules. One study (Morrall 2003) collected estimates of the cost per statistical life saved from agency Regulatory Impact Analyses (RIAs), and found significant variation in the efficiency of regulations. Restrictions that lighters be manufactured so that they are childproof saves lives for about $100,000 per life, as do OSHA's respiratory protection rules. On the other hand, so few lives are

saved relative to the cost of the EPA's Solid Waste Disposal Facility Criteria that every statistical life saved costs an estimated $100 billion.

If these numbers are taken literally, they imply that the amount of money required to save *one life* with the Solid Waste Disposal regulation would save *one million lives* with the respiratory protection rules. Although the estimates in the Morrall study are unlikely to be credible, since they are derived from prospective RIAs, the point is that our current regulatory regime causes us to pass up opportunities to save lives without incurring any extra costs. This is not a humane approach to regulation.

Another example of regulatory decision making based on poor evidence is the debate that surrounded the catalytic converter (McCarthy 2007). In the 1970s, automobiles were the target of a wide variety of new pollution standards in the United States. In particularly, new fuel emissions standards meant that the installation of catalytic converters was required on automobiles for the first time. These converters use chemical reactions to reduce the amounts of pollutants released in automobile exhaust. The car industry and its interest groups lobbied strongly against these regulations, leading the public to believe that requiring converters would lead to all sorts of dire consequences. At the time, it was common to claim that the direct cost of the converters would be as much as $300 per car, when it in fact turned out to be closer to $165 per car. Similarly, the Big Three automakers said that fuel economy would fall by as much as 20 percent after installing converters and switching to unleaded gasoline. However, the first model of car to have the required converter had a 13.5 percent *higher* fuel economy, on average, than the previous model. Finally, it was thought that catalytic converters would have to be replaced every 25,000 miles, when in fact they still ran at a reasonable level of efficiency after even 50,000 miles. Estimates before regulations are actually undertaken can be distorted by interested parties—or just plain wrong.

These examples illustrate that the inefficiencies in the current regulatory system mean that we are passing up opportunities to save lives and money. This is not a humane situation, yet it arises over and over again in our broken regulatory system. The introduction of a culture of experimentation into our regulatory system is the only humane solution.

B. The Evaluation Problem

The development of reliable estimates of the costs and benefits of regulations begins with the specification of a causal hypothesis or hypotheses. The key features of a causal hypothesis are that it contains a manipulable treatment that can be applied to a subject and an outcome that may or may not respond to the treatment. For example, we may hypothesize that a regulation aiming to reduce

air pollution in a city will reduce mortality rates among residents. For a causal hypothesis to have any practical relevance, we must be able to subject it to a meaningful test. Such a test requires that all other determinants of the outcome be held constant so that the effect of the treatment can be isolated.

Ideally it would be feasible to observe simultaneously the same subjects in two different states: one in which the regulation is applied, and one in which it is not. This would guarantee that all other factors are held constant. Of course, it is impossible to observe both states simultaneously. For example, the regulation to reduce air pollution cannot simultaneously be administered to *and* withheld from the same city. This impossibility is labeled the *fundamental problem of causal inference*.

This problem is relevant for cost-benefit analysis in at least two different ways. First, many regulations are implemented for an entire population, which makes it impossible to develop a valid counterfactual case for what would have happened in the absence of a regulation's implementation. In the absence of a counterfactual, it is impossible to know the policy's causal impacts.

The second problem occurs when a regulation is applied to some people or places and not to others, while these two differ in important ways. This is called *selection bias* and it occurs when there is a control group, but the regulated or treatment group differs from the control group. For example, suppose we want to evaluate the effects of a job-training program. One way to structure the analysis would be to compare people who sign up for the program with others who are similar, according to observable characteristics. The problem is that the people who sign up may differ from those who do not in an unobserved way. The result is that a comparison of the two sets of people will confound the impact of the program with these pre-existing differences. Indeed, Ashenfelter (1978) and Ashenfelter and Card (1985) demonstrate that this is a real problem in the context of a job-training program.

The point is that credible cost-benefit analysis requires the identification of a solution to the fundamental problem of causal inference.

C. Experiments and Quasi Experiments Solve the Evaluation Problem

The gold standard for estimating the causal impact of a regulation is the *randomized trial*. This approach starts with a population of people, businesses, or places that could potentially be subject to the regulation. Among this population, some are randomly assigned to the *treatment group* and the regulation is applied to them. The others are randomly assigned to the *control group* and receive no regulation. Because of this random assignment, the treatment and control groups should be statistically identical in all dimensions except exposure to the regulation; thus, any differences in outcomes can be ascribed to the regulation. Put

another way, with a randomized experiment, it is valid to assume that a comparison of outcomes among the treatment and control groups yields an estimate of the causal effect of the regulation.

The use of randomized experiments outside medicine is growing rapidly, so there is a precedent for the application of this strategy to testing government regulations. Randomized trials have been used to assess the impacts of job-training programs, policies to reduce student-teacher ratios in elementary schools, the impacts of indoor air pollution on human health in developing countries, and even the impacts of maternal smoking on infant health (some mothers in the trial were given additional encouragement to quit smoking). It is becoming evident that this approach can be applied successfully in a wider variety of settings than has previously been thought.

It is worth noting that some consider randomized experiments unethical, because they relegate a significant number of people to the control group when there are nonexperimental reasons to believe that the treatment or regulation will prove beneficial. In many regulatory contexts, however, some people or places will not receive the treatment because of cost or budgetary concerns. In this case, I argue that the most ethical assignment rule is to assign the regulations randomly, because this approach is transparent and free of political considerations. Further, in most cases a regulation's benefits are truly unknown in advance and would remain so without a credible evaluation. Thus, the experiences of the few in the control and treatment groups can be used to benefit society as a whole.

The second potentially credible form of evaluation is the *quasi experiment.* In a quasi experiment, the causal effect is also given by the difference in outcomes between a treatment group and a control group. However, in quasi experiments the assignment of individual subjects to the treatment or control group is determined by nature, politics, an accident, or some other factor. Despite the nonrandom assignment of treatment status, it may still be possible to draw valid inferences from the differences in outcomes between the treatment and control groups. The validity of the inference rests on the assumption that assignment to the treatment and control groups is not related to other determinants of the outcomes.

An example of a quasi experiment comes from a recent paper that aims to estimate the impact of Superfund sponsored cleanups of hazardous waste sites on nearby property values (Greenstone and Gallagher 2008). The difficulty for causal inference is to understand what would have happened to property values in the absence of the cleanup.

The paper's quasi-experimental solution is based on knowledge of the selection rule that the Environmental Protection Agency (EPA) used to develop the

first set of sites to be cleaned up after Superfund became law in 1980. The EPA was only allocated enough money to conduct four hundred cleanups. After cutting the list of candidate sites from 15,000 to 690, the EPA invented and implemented the Hazardous Ranking System (HRS) that assigned each site a score from 0 to 100 based on the risk it posed, with 100 being the most dangerous. The four hundred sites with the highest HRS scores (those exceeding 28.5) were placed on the initial list of sites eligible for Superfund remedial cleanups. The paper then compares the evolution of housing market outcomes between 1980 and 2000 in areas near sites that had initial HRS scores above and below the 28.5 threshold. It also compares sites that nearly missed eligibility with sites that just qualified for the cleanups.

Both randomized trial experiments and quasi experiments can be used to solve the fundamental problem of causal inference. The missing step is their implementation.

IV. Regulatory Reform in Four Simple Steps

The key to reforming the regulatory system is to instill a culture of experimentation and evaluation. This can be established in four simple steps.

A. Experiment, Experiment, Experiment!

1. Structure Regulations so that Evaluations are Feasible

The first step toward a culture of regulatory experimentation and evaluation is to write the statutes governing regulatory programs so that the regulations are implemented in ways that they lend themselves to experimental or quasi experimental evaluation. This can be achieved in at least two different ways.

If possible, regulations should be launched on a small scale before being applied to a large population. This approach has several advantages. First, it allow for experimentation. Small-scale implementation leaves the space to create randomly assigned treatment and control groups. Second, it allows different forms of the regulation to be tested. Third, it limits the damage if the regulation is found to fail a cost-benefit test.

The second way to experiment is to allow states to implement different regulations. In particular, the American federal system provides an opportunity to implement regulations on a small scale before expanding them to a larger scale. States can try out regulations (for example, Massachusetts's health care program or California's history of stringent environmental regulations) on a small scale, and if they succeed, it is frequently possible to scale them up to the federal level. Supreme Court Justice Louis Brandeis is often quoted as saying that states are

the laboratories of democracy. Certainly states can become quite literally laboratories for regulatory experiments.

In cases where a true randomized experiment is infeasible, it is still possible to structure regulations that are amenable to evaluation. This can be done by using quasi-experimental assignment techniques. One technique that has proven quite effective is to assign the treatment to places or people based on an objective score or criterion. Indeed, this is the basis for the quasi experiment used to evaluate the impact of Superfund cleanups of hazardous waste sites that I have described above.

The key point, though, is that new regulations should be implemented so that evaluations of their impacts are possible. If this easy step is not taken, then it will never be possible to know any regulation's true costs and benefits.

2. Fund Evaluations, Collect Data, and Publicly Release the Data

Clearly, it is not sufficient merely to devise regulations in such a way that they are intrinsically testable; we have to fund the evaluations of new regulations also. An easy way to achieve this would be for the president to sign an executive order mandating that all new regulations must include provisions for collecting data that allow for evaluations of their effectiveness.

The funds devoted to such research should be used for evaluations by independent research groups (for example, academics or private companies) and should adhere to the highest standards in research design and data analysis. Although high-quality evaluations can be costly, the costs usually pale in comparison to the costs imposed by regulations that have small benefits.

Further, the public's confidence in government can be increased by releasing de-identified data generated in these evaluations on government Web sites.[3] This will enhance the credibility of the evaluations by making them transparent. If the official evaluators reach conclusions that the data contradict, the public will be able to highlight this. Indeed, the potential for replication and exposing mistakes will serve as an incentive for those performing the analyses to get it correct the first time.

B. Create a Regulatory Review Board

Washington is filled with reports and evaluations. Indeed, many agencies already provide evaluations of the regulations that they oversee and administer. However, history is not kind to organizations that only engage in self-evaluation. It is very difficult for people and organizations to conclude that despite their best efforts their policies or programs are ineffective. Moreover, those who are deeply involved in the implementation of a particular regulation are likely to see the benefits of such a project far more clearly than the costs.

A solution to this problem is to create an independent regulatory review board that has the authority to assess the effectiveness of regulations. The board would review all available studies and could fund additional studies. They would then use the available evidence to assess whether a regulation passes a cost-benefit analysis.

Based on these assessments, this board must have the power to repeal regulations that are deemed ineffective. This may sound radical, but similar powers are granted to bureaucracies in other contexts. For example, the FDA has the right to prevent drugs from being sold on the open market. Ideally, this power to repeal a regulation would be explicit in the wording of the regulation itself. Of course, Congress and the president would have the right to overrule such a review board, but the default procedure should to permit the review board's rulings stand.

Furthermore, the regulatory review board should consist of well-respected professionals and academics who have the technical ability to review evaluations critically *and* do not have a stake in whether a regulation remains on the books. The appointment of top-notch, impartial people is crucial because it will help to insulate the regulatory review board from claims of bias. The key is to make the board nonideological and technocratic.

While a regulatory review board may seem like a big departure from current policies, there are plenty of precedents for providing review boards with power. The FDA is an obvious example. Additionally, funding organizations such as the National Institutes of Health (NIH) and the National Science Foundation (NSF) use independent review boards to determine which grant proposals should be funded. These boards consist of as few as three and as many as thirty members. Typically at least one member of the board is a full-time employee of the organization and the remaining members are drawn from the academic community. A few members of the board are selected to read each proposal and present it to the board with a rating for its scientific merit. This sort of board structure would also work well in regulation. After an evaluation of a regulation has been conducted, a board could convene that would study the evaluation and reach a conclusion.

It is noteworthy that there already exists a part of the executive branch that aims to undertake some of the functions that I have outlined for a regulatory review board. The Office of Information and Regulatory Affairs (OIRA) is a subdivision of the Office of Management and Budget (OMB) in the White House. The executive order that determines OIRA's role specifically calls for centralized review and cost-benefit analysis of all regulations, as advocated here.

However, OIRA lacks a few of the key elements discussed above. First, there is no requirement that cost-benefit analyses be credible in the ways that

I have proposed. Second, most reviews of regulations are prospective instead of retrospective. Without actual evidence for what regulations have done, rather than theoretical estimates of what they might do, the resulting estimates of costs and benefits are unlikely to be credible. Again, it is preposterous to imagine the FDA using this type of evaluation technique. Third, OIRA can review regulations directly, but it is not an independent review board. It is headed by political appointees and is subject to the constraints that such organizations have.

The idea of the regulatory review board is to take some of the functions of OIRA and transfer them to an independent, bipartisan commission created for this purpose. This commission would identify opportunities for evaluating regulation, find and assign evaluators to these cases, and convene independent review boards to consider evaluations and pass final judgment on them. As much as possible, these functions should be removed from political control and placed in independent hands.

C. Automatic Sunset and Expansion Provisions

The third step in reforming our regulatory system is to require that all regulations contain rules specifying the date by which the regulatory review board has to assess their costs and benefits. If the regulatory review board fails to meet one of these deadlines, then the regulation should be repealed by default. The purpose of this sunset provision is to ensure that all regulations are evaluated carefully and do not stay on the books just because they have been on the books in the past.

Of at least equal importance is that regulations that are shown to pass a cost-benefit test should become part of our regulatory portfolio and potentially expanded. Indeed, every regulation should detail how it may be expanded if it is shown to be effective. For example, if a given regulation was originally enacted only in a small-scale trial form, its scope should be widened to include all relevant actors. Thus, a judgment by the regulatory review board that a regulation is effective should automatically lead to its expansion to any parts of the economy where it does not yet apply.

Of course, there will be situations in which political goals will be more important. In these cases, lawmakers have the power to exempt a regulation from this process. However, the purpose of the automatic sunset and expansion provisions is to ensure that the default procedure should be for credible evidence on regulations' effectiveness to translate into action.

D. Develop and Apply a Code of Ethics

People frequently have a visceral reaction against experiments that involve humans, even though the FDA and other organizations use them out of necessity. At

least some of this reaction is due to such drastic breaches of medical ethics as the horrific and immoral Tuskegee syphilis and Nazi medical experiments. These experiments were unethical because they failed to treat people with a disease and exposed people to life-threatening and unnecessary interventions, respectively.

By contrast, experimentation with regulation is concerned with testing solutions to problems, not with observing the problems themselves. Much like FDA testing of new medicines, it is safer and more humane to test new regulations on small groups of people before extending their scope.

Nevertheless, an important component of a culture of persistent regulatory experimentation and evaluation involves the creation of a code of research ethics that ensures the safety of humans and the appointment of a board to ensure that regulatory experiments are ethical. The Nuremberg Code was adopted in medicine after the Nazi medical experiments and it may provide a good starting point for a code of ethics that governs regulatory experimentation. One model for the development of boards to prevent ethical violations comes from university institutional review boards, which ensure that experiments by their faculty are conducted in an ethical manner.

V. Getting There from Here

The implementation of the call for reform of the regulatory system that I have detailed here would require many changes to the current system. Several of these changes would require the passage of new legislation. However, it is possible almost immediately to begin laying the foundation for a full-scale adoption of a culture of experimentation and evaluation.

A useful first step would be to instill a culture of experimentation at OIRA itself. OIRA's guidance regarding the use of cost-benefit analysis in the construction and evaluation of regulation is encapsulated in its Circular A-4. Although this document emphasizes the importance of cost-benefit analysis, it provides little guidance on how to determine whether evidence is credible. It would be straightforward for OIRA to release a supplement to Circular A-4 detailing the virtues of experimental and quasi-experiment evaluations and setting out guidelines for the implementation of such evaluations.

Such a supplement could part ways from current guidance in a few respects. First, it could make clear that cost-benefit evaluations (especially prospective ones) are not enough to guarantee approval of a regulation. Rather, there must be a credible analysis following a trial period of small-scale implementation, or the promise of a credible future analysis, for approval to be granted. Second, the supplement could require that regulations be evaluated retrospectively, as well as prospectively. Third, it could encourage regulatory agencies to structure new regulations to allow for experimental or quasi-experimental evaluations.

VI. Will Experimentation and Evaluation Solve All Regulatory Problems?

Of course, the answer to this question is no. My proposal is best suited to addressing environmental, health, labor market, and safety regulations. However, the approach I have described is applicable in other areas as well. For example, Greenstone, Oyer, and Vissing-Jorgensen (2006) assess the benefits of mandatory disclosure regulations in financial markets. Similarly, Doidge, Karolyi, and Stulz (2008) provide evidence on the effects of the Sarbanes-Oxley Act, which regulates firms selling shares in the United States.

This proposal does not directly tackle issues of regulatory omission. However, it may have an indirect effect in this area. A system of regulatory experimentation and evaluation should provide lawmakers with enough confidence to try a wider range of potential regulations. With the assurance that ineffective regulations will be repealed, rather than lingering on the books for decades, lawmakers should feel more confident about experimenting.

Further, an occasional complaint about cost-benefit analysis is that the methodology is flawed. In particular, some critics argue that analysts have too much discretion in the calculations. I agree that the current approach offers too many opportunities for abuse. Experimentation will go a long way toward addressing this problem. With credible evaluations, it would be much more difficult to adjust cost-benefit analyses to fit ideological parameters.

VII. Conclusions

The current system of evaluating regulations prospectively means that we evaluate them when we know the least about their effectiveness. Real reform of regulation means introducing a culture of regulatory experimentation and evaluation. This essay has outlined a method to reform our system of regulation. It involves the four following simple steps.

1. **Experiment, Experiment, Experiment!** The key to a system of regulatory experimentation and evaluation is a process that accumulates credible evidence on regulations' costs and benefits. Such a system demands that regulations be structured at the outset so that they can be evaluated and that evaluations be fully funded.
2. **Create a Regulatory Review Board.** The board's task would be to assess the effectiveness of regulations and to repeal the ineffective ones.
3. **Automatic Sunset and Expansion Provisions.** The purpose of these provisions is to ensure that ineffective regulations are removed and that society fully benefits from the effective ones.

4. **Develop and Apply a Code of Ethics.** It is crucial to develop a code of ethics for regulatory experiments involving humans that ensures the subject's safety. Further, the federal government should create a board to ensure that all regulatory experiments are conducted ethically.

These four reforms have the potential to fundamentally alter the operation of our regulatory system. Just as we rely on the FDA to ensure that our foods and drugs pose no dangers, we should implement a regulatory system that yields safe and effective regulations.

We are entering a period where many of government's functions are being reconsidered. Such opportunities have appeared infrequently in American history. We must seize this opportunity to reform our regulatory system. In the process, we can improve our lives, our children's lives, and those of our children's children.

Notes

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2 There are several standard criticisms of cost-benefit analysis. They include the objections that it immorally commodifies objects (such as human life) that are beyond valuation, gives a false sense of scientific certainty, and unfairly benefits the rich. Several commentators, including Revesz and Livermore (2008) and Sunstein (2004), provide powerful responses to these criticisms. A rehashing of these arguments is beyond the scope of this paper, the primary argument of which is not that we should use cost-benefit analysis but that we should do it better and then follow its implications. For an excellent argument in favor of cost-benefit analysis, see Arrow *et al* (1996); this article includes eight principles on the appropriate use of benefit-cost analysis.

3 The term *de-identified data* refers to data from which all identifying information of subjects has been removed. It is crucial to protect the confidentiality of those who are selected to participate in any studies of regulatory effectiveness.

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