DEVELOPING STANDARDS FOR BENEFIT-COST ANALYSIS

BENEFIT-COST ANALYSIS CENTER CONFERENCE

OCTOBER 18-19, 2010

WASHINGTON COURT HOTEL | WASHINGTON, D.C.

SPONSORED BY

EVANS SCHOOL OF PUBLIC AFFAIRS
UNIVERSITY of WASHINGTON
Benefit-Cost Analysis Center

MACARTHUR
The John D. and Catherine T. MacArthur Foundation

Welcome from the Benefit-Cost Analysis Center

I would like to take this opportunity to thank Michael Stegman and the John D. and Catherine T. MacArthur Foundation for making this conference possible. This conference is part of a multi-year effort funded by the MacArthur Foundation to improve the standing of benefit-cost analysis and its use for evaluating the effectiveness of social programs.

This effort is only one of the exciting projects going on at the Benefit-Cost Analysis Center (the "Center"), also generously supported by the MacArthur Foundation. The Center continues to support the Society for Benefit-Cost Analysis, and is proud to announce the publication of the first issue of the *Journal of Benefit-Cost Analysis*, with Editor Scott Farrow from the University of Maryland—Baltimore County (UMBC). With MacArthur Foundation support, the Center is also in the process of finalizing the Principles and Standards for Social BCA report. In conjunction with a series of white papers commissioned for the report, this project will lead to the establishment of principles and standards for use in benefit-cost analysis of social policies.

Thank you all for joining us in this conference exploring the use of benefit-cost analysis for evaluating social programs.

Richard O. Zerbe, Jr.
Director, Benefit-Cost Analysis Center
Daniel J. Evans Distinguished Professor
Evans School of Public Affairs
University of Washington

October 18, 2010
Washington, D.C.

Welcome from The John D. and Catherine T. MacArthur Foundation

Michael Stegman, Director of Policy & Housing

Welcome, everyone, to this conference on improving benefit-cost analysis for social programs. Thank you to Dr. Zerbe, Katie Ward, and Julie Klein for making this conference possible and for putting together a great program. Before the first panel starts, I want to give a little background about why the MacArthur Foundation is involved in this project.

This conference—as well as last year's and the planned 2011 conference—bring together thought leaders in benefit-cost analysis with practitioners, government officials, and policymakers. The intent is for this gathering to discuss the role, potential, challenges, and opportunities of using benefit-cost analysis to strengthen social policymaking.

This project has its origins in the MacArthur Foundation's $35-million multi-year effort on the Power of Measuring Social Benefits, which seeks to strengthen the case for social policymaking by firmly grounding initiatives in evidence both of effectiveness and benefits to recipients and society. This effort attempts to put to rigorous test the shared hypothesis that motivates areas of domestic grantmaking at the MacArthur Foundation. We believe that there is a coincidence of interest in people in need or at risk in greater society, and programs that invest in these people benefit the individuals, benefit the larger economy, and provide tax benefits to society that last long after the program has ended. We seek to challenge the widely-held belief that social spending is largely wasteful and ineffective.

The MacArthur Foundation is pursuing a three-part strategy to test this hypothesis. Our first strategy is to expand the number of high-quality, complex benefit-cost analyses of effective social programs. To do this, we support 25 major studies, many piggybacking on evaluations of programs funded by the National Institutes of Health and other government agencies. For example, we are conducting a benefit-cost analysis in partnership with the Robert Wood Johnson Foundation on the Health Insurance Experiment in Oregon, which expands Medicaid programs. We're pursuing studies trying to determine the value-added of programs, measure direct and indirect benefits of social programs, without just focusing on what narrow interests currently exist.

The second strategy the MacArthur Foundation is pursuing is making a commitment to support benefit-cost analysis efforts writ large. This includes supporting the Benefit-Cost Analysis Center at the University of Washington, and working to meet the need for a high-quality publication outlet through supporting the creation of the *Journal of Benefit-Cost Analysis*. We are also committed to supporting the principles and standards effort, while also doing work in shadow-price estimation and other projects that will benefit MacArthur Foundation interests and benefit the broader benefit-cost community.

The third strategy we pursue is supporting organizations that take research and bring it to the policy process. All of these strategies come together in these periodic annual meetings. We welcome all of your participation and look forward to the ideas generated here.

Michael A. Stegman, Ph.D.
Director of Policy and Housing
The John D. and Catherine T. MacArthur Foundation

October 18, 2010
Washington, D.C.

Table of Contents

About the Conference

This national policy forum examined the development and current state of benefit-cost analysis for social programs, and highlighted new frontier practices and future research directions. The conference also aimed to develop strategies for making benefit-cost analysis more consistent, pragmatic, and usable within the social policy fields. Leading scholars, practitioners, lawyers, and policymakers shared ideas about the implementation of benefit-cost analysis techniques and procedures. Conference participants offered advice about strategies to improve the quality of social BCA and increase its use to strengthen social policies and programs at all levels of government.

This summary was prepared by Benefit-Cost Analysis Center staff based on notes taken during the conference. It is intended to reflect the tenor and salient points of the conference rather than to serve as a complete transcript of events and proceedings.

The conference was sponsored by the Benefit-Cost Analysis Center at the Evans School of Public Affairs at the University of Washington, and funded by The John D. and Catherine T. MacArthur Foundation

Panel I: Government Use of Benefit-Cost Analysis: Present and Future.

Susan Dudley
George Washington University

Neil R. Eisner
US Department of Transportation

Michael Fitzpatrick
US Office of Information and Regulatory Affairs

Joseph W. Glauber
US Department of Agriculture

Panel convened by ***Carol Bray,*** *Senior Economist, US Government Accounting Office*

Setting the stage for the panel discussion, panel chair **Carol Bray** discussed the usage of benefit-cost analysis (BCA) within her own agency, the Government Accounting Office (GAO). Dr. Bray found that between 2000 and 2010, the GAO produced about 1,000 products a year. Of these, 177 products mentioned benefit-cost analysis. Half of these were reports, testimonies, and correspondents, with most reports being done after 2006. Typically, BCA was mentioned in the context of Congress asking GAO if it had been done on a project, with GAO then furnishing such information or going to appropriate sources.

Susan Dudley presented on how BCA is used in making and implementing regulations. She first noted, in contrast to Dr. Bray's word-search of GAO products, that a similar search for benefit-cost language within regulatory documents would have yielded thousands upon thousands of hits. BCA has a long tradition in regulatory decision-making in the last 30 years. Presidents have asked agencies, to the extent allowable by law, to understand the benefits and cost of alternative policy approaches, and to maximize the net benefits of a policy. The vehicle for that is regulatory impact analysis (RIA). She noted that one would think that with all this history that regulatory agencies would have BCA down pat, but in reality this is far from the case.

Dudley identified five significant constraints that hinder better implementation of BCA in regulations. First, independent agencies are not covered by executive orders that require BCA; as a result, they are less likely to conduct a rigorous assessment. Second, statutory conditions prevent comprehensive analyses that include all benefits and costs. Statues often say "you cannot consider certain costs," or "you cannot make this tradeoff," where we pretend that a cutoff can be made purely based upon science without consideration of other tradeoffs. For instance, the Drinking Water Act, which is designed to be a BCA-based statute, constrains BCA. Third, there are moral objections. People question the need and utility of conducting BCA when they contend that we already know what we should or need to do. The fourth constraint, institutional objection, is related to the previous constraint; lawyers and engineers often design policy having already decided what the correct solution is. Thus, BCA is often done after the fact—once the correct solution has already been decided upon. BCA is then only done to meet to rule-making requirements. Finally, BCA is just plain hard. It is highly difficult to conduct a sound, comprehensive BCA, especially given all of the complexity.

Collecting necessary data and conducting analyses is often very expensive and resource intensive, and even if extensive data are already available, conducting BCA is still hard to do correctly and sufficiently. A more fundamental question though, is if we could sweep away all of these constraints, and if we were blessed with unlimited time and money with which to do BCA of regulations, would BCA be a silver bullet? Sometimes in our zeal to better quantify everything we lose sight of some of the more fundamental issues, primarily whether the problem we seek to address is appropriately addressed by regulation. Regulators often do not appreciate the fact that, however well intentioned and well-structured, government intervention will not be as flexible and dynamic as the framework of individual choices and market forces. It is easy for regulators to fall prey to the "planner's paradox," in which planned solutions always look far better on paper than do unplanned ones, because the planner only sees his data, his biases, and his assumptions. All of the unseen difficulties with the planned solution are invisible. We have to be careful to avoid this problem at the outset, asking whether the problem at hand demands a collective solution or is best left to individuals.

There are a couple trends in BCA that Dudley finds troubling. One is that in the response to criticism that BCA is immoral, there is a drive to incorporate moral values in BCA. She thinks we may be asking too much of BCA. BCA should be one part of a broader regulatory analysis framework. It might be a mistake to incorporate subjective, less-quantifiable factors into BCA rather than laying these factors out in a transparent way for the public and policymakers to hash out. There are also valid criticisms of BCAs as "black boxes" that hide uncertainty and subsume real-world complexity, and a danger that new trends aimed to better quantify benefits and costs portend to make analyses even more opaque.

A second concern is in the application of behavioral sciences. Using choice architecture and information to improve planning decisions is certainly a positive. However, Dudley finds the assumption that people are irrational to be highly objectionable. Traditional welfare economics begins with a respect for individual sovereignty. We cannot get inside people's heads, so all we know about what human's value is what we observe about their behavior. So traditionally, if behavior does not match up to the model, then the model is wrong. But if we assume that people are not rational, then the implication is that we can make them better off by forcing them to do things that they would not otherwise do on their own; in this framework, if behavior does not match what the model predicts, then the people are wrong. We see an example of this in the bipartisan support for fuel economy and appliance efficiency standards, which is driven by a desire to conserve energy and save consumers money. This does not appreciate other factors that consumers might value, such as convenience.

By looking at average prices and usage and applying a discount factor, regulators reach a paradoxical assumption that by taking away consumer choice, you are making consumers better off. If you look at the BCAs for such standards, the large net benefits derive not from the externalities, such as reduced pollution or improved energy security, but purely from private, internally accruing benefits. These benefits are obtained because consumers are assumed to be making the wrong choices, and so we increase their net benefits by making choices for them.

Thus, Dudley feels that the biggest challenge for BCA now is that if we are not scrupulously asking whether each problem calls for collective action rather than private action, and taking care to respect individual sovereignty and the diversity of preferences, we will greatly harm both public welfare and the discipline of regulatory impact analysis.

Next, **Neil Eisner** discussed his job at the Department of Transportation (DOT), where he is tasked with overseeing the regulatory process in the agency. He finds that the rulemaking process has been greatly enhanced by economic analysis, and even the simple data provided by the analysis proves hugely beneficial for decision-making. Recognizing this value, the DOT has embedded economic analysis into every level of its decision-making framework. Even at the lowest state, the DOT requires decision-makers to sign off that decisions are of minimal economic impact (and thus no further analysis is necessary). The DOT also uses BCA when Congress mandates an action, and the agency does not even have a choice, in order to see what the impacts are.

There are, however, many remaining issues. First, how do we consider such things as expertise versus data? For example, in the aviation area, we have very, very few accidents, so we work with what is dubbed a "tombstone mentality": someone dies, we identify a problem, and we fix it. This differs from an instance where we have a senior pilot, who identifies a problem area and says "if we do not fix this, there is going to be a future accident and deaths in the future." How do we weigh data points against expert opinions in decision-making?

Second, risk presents a difficult issue. We do not do a very good job of comparing risks, especially relative risks. Should we regulate every risk above a certain point? Drinking while driving is highly dangerous, and we regulate this. Cell phone usage proves equally impairing, and so we have begun to take action on this issue as well. And yet, data shows that arguing with your spouse while driving is just as dangerous as driving while intoxicated or while using a cell phone; should we regulate arguing? Of course not!

The issue of direct versus indirect effects is also very big right now. How far down the chain of causes and effects does an analysis need to go? Do US government agencies need to take account of foreign effects, such as the impact of domestic aviation regulations on foreign carriers or the impact of fare increases on foreign tourist destinations? Does an initiative to clean up the Potomac need to factor in the impact of the potential subsequent reduction of trips to the ocean?

Next, there are the myriad issues surrounding the concept of the value of a statistical life (VSL). First, many people do not agree with placing a value on life at all, holding that we cannot or should not place a value on it. There is also the issue of determining relative value, such as whether kids should be worth more than adults. Moreover, we have to weigh future lives and determine whether or not future lives should be discounted. Finally, there is the issue of non-quantifiable benefits and how much they should be considered. We understand that sometimes we simply cannot include everything. But how much should we consider them, and how should they be weighed against quantifiable costs and benefits? In this, we must stress that BCA is not the decision-maker!

There are still many other problems, first among them acceptance. For example, the DOT is overseen in some respects by the National Transportation Safety Board (NTSB). The NTSB makes recommendations regarding safety standards, but is not expected to look at the benefits and costs of these recommendations. Once the NTSB makes a recommendation, the DOT is largely constrained by this recommendation, as otherwise the DOT must justify to the public why the recommendation of an independent organization as a way to fix a given problem is not in fact a good solution. Enforcement is of issue as well. No matter how "good" and cost-benefit efficient a rule is, when people are unwilling to understand or address the problem it cannot be effectively enforced. BCA often faces the issue of justification, where a policymaker makes a decision, and then seeks to use BCA simply to justify that decision. This is far too common! Necessity also comes into play here. It is often asked, "If the White House said to do something, why do we need to do a BCA?" And yet, often when analysts are forced to go back and calculate benefits and costs anyways, it turns out that a regulation costs far more than was expected, or produces far less benefit than was assumed; this in turn changes the decision-making calculus. The problem is that regulators do not typically default to conducting BCA in such instances. Expense and time are of course always an issue. Also, project timing can matter greatly. A huge project that imposes lots of immediate costs but accrues huge benefits in the future simply will not be able to gain traction in an election year; political concerns often simply obviate BCA. Similarly, in a poor economy, it might not matter how much benefits are to be gained in the future. All of these issues prevent fuller implementation of BCA.

On a more basic level though, it is important to note that in the world of BCA for regulatory decision-making, key questions often simply do not get asked. Eisner is amazed how often people simply do not answer, "What is the problem?" Too often, we craft policies without answering this question. It is often unclear whether a given action will fix the problem; where the decision has already been made and BCA is sought simply to justify a decision, this question is often unexamined. The sensibility of an action also often goes unexamined. For instance, the DOT once received a great proposal for airport restrooms with increased accessibility for disabled persons; however, the restrooms were on the second floor, which was inaccessible for disabled persons. When data and analysis does not support a decision, this is often overlooked. Decisions are often made in spite BCA results. Assumptions are often not vetted for reasonability. Analyses fail to consider reasonable alternatives, and policies often take on a tone of "do what we recommend or else people will die!" Unintended consequences are often not included. If the problem persists, will the decision-maker be able to explain why the project was thought to be a good decision?

What potential improvements could address these issues? Eisner states that first, data presentation needs to be simplified. For instance, the DOT could take injuries and convert to fatalities to provide one summary statistic. Sensitivity analysis often obviates concerns, showing that a perceived issue is not in fact a problem. We need to do more of this. We need to improve our prognoses, collecting data when we sense a problem, so that we have it before we find we need to make a new rule. We need to make more acceptable surveys, so we can better track impacts and outcomes after a rule is implemented. Analyses need to be simplified; as it stands now, there are too many executive orders, too many statues, and too many agency requirements, such that even agency experts do not even know what the relevant quantities are. Finally, Eisner spoke to the need for better education so that the data we have can actually be used to improve decision-making.

Michael Fitzpatrick presented on the new approach to regulatory review undertaken by the Office of Information and Regulatory Affairs (OIRA). Fitzpatrick noted that though the new approach to regulatory review takes on several new features and approaches, it must be noted that the bedrock foundation has remained the same over the course of several presidential administrations.

The new approach seeks to incorporate behavioral approaches, approaching regulation from the belief that humans are rational, but not perfectly rational. Fitzpatrick holds that one should be careful about using an abstract, hyper-rational being as a proxy for actual people in evaluating regulatory impact. Thus, OIRA is seeking to infuse a science-based understanding of how the human brain works into regulatory analysis. Also, we are increasingly taking into account concern for distributional issues and future generations in terms of the spread of discount rates used. Finally, there is a huge emphasis on transparency. There is an extraordinary importance of taking advantage of the dispersed knowledge of the American people through public comment, and so OIRA spends a lot of time trying to make sure that agencies are taking advantage this. OIRA has and continues to work on a host of issues aimed to improve transparency and the use of public input. OIRA recognizes that regulations are policy decisions, not simply the construct of a BCA or RIA, but decisions that come from delegated political authority. But, it is important to improve our understanding of how people act, make decisions, and are likely to respond to a regulatory action. Of course, one also has to account for difficult-to-quantify considerations; it is unrealistic to completely quantify all benefits and costs. OIRA pushes agencies as hard as possible to quantify all values, but at the end of the day, there are certain moral and ethical values that simply cannot be quantified. Policy objectives can have intrinsic value.

Fitzpatrick characterizes OIRA's current priorities in three main concepts: (1) to continue to improve regulatory analysis; (2) improve disclosure policies, providing citizens with information they need to make rational decisions, which often provides huge benefits at very low costs; and (3) promoting open government, getting robust public feedback on all policy decisions. Simply put, regulatory review is important. Fitzpatrick contends that OIRA is the most important agency in Executive Branch; if it did not exist, every president would create it. It is hugely important to give a hard look at agency and executive rules. Agencies do not have the full breadth of perspective. Rules have a huge impact on other agencies, and OIRA review allows other groups to take a look at prospective rules. OIRA makes sure regulations that are consistent with law and makes sure regulations fit with administrative principles priorities. OIRA improves rules by solidifying the legal foundation. They take the mandate seriously to ensure that rules are legal. This improves the strength of the analysis, by ensuring that a final decision is good, well-vetted, and has solid analytical foundation if rule is challenged in court.

Most action for BCA occurs in economically significant rules. For these rules, OIRA is pushing agencies to (1) provide salient, clear, and concise information in a table at the front of report (we should not have to read to the end of a 700 page document to get the gist of a rule); (2) give policymakers a sense of costs and benefits and a description of non-quantifiable values in clear, concise, and direct fashion; (3) present reasonable alternatives; and (4) include a robust, candid discussion of uncertainties regarding a potential rule.

Over the years, OIRA's emphasis on using BCA has significantly improved rule-making. With BCA we can be more confident at the end of the day that we have made the right decision. For instance, since the implementation of EO 12866 under the Clinton Administration, the total accounting of economically significant rules has risen from -$400 million to $300 million; this increase is in large part to the usage and emphasis on BCA. OIRA's push for agencies to watch costs, ensure benefits are robust and accurately described, and increase disclosure efforts has paid large dividends.

Joseph Glauber presented on BCA from the perspective of the US Department of Agriculture (USDA). Though perhaps not to the level of the EPA when it comes to number of regulations, the USDA is a major regulatory agency. Typically, the USDA issues 45–65 significant regulations each year. The USDA has three major regulatory arms: (1) Farm Services Administration; (2) Animal and Plant Health Inspection Service; and (3) Food Safety Inspection Service. Regulations from these bodies are made in concert with the USDA's office of BCA and Risk Analysis. Glauber's presentation described the push and pull over time between the USDA and OIRA regarding RIA.

Typically, proposed USDA rules go through the USDA's internal analysis group, which largely acts like a mini-OIRA, and this economic analysis, along with comment on the impact of rules, is then sent to OIRA. The USDA often faces the "economic significance" question; rules are often very near the $100 million significance barrier. Thus, there is frequent debate over rule-designation. The role of the internal review program is often to point out that costs might be higher than stated, and thus make a rule "economically significant." The other major role of BCA and RIA within the USDA is risk-assessment. Something that is currently lacking is the integration of BCA and risk assessment; often BCA is done ex-post to justify a rule. Glauber's office is striving to have the USDA better merge the two so as to better quantify expected benefits.

Generally, Glauber's office has not actually done the BCA or risk assessment, instead reviewing the analysis conducted by the rule-making group. However, in recent years the Office of BCA and Risk Analysis has taken a more active role. One recent push has been the expansion of models and analyses to a much broader spatial and temporal scale. Increasingly, the office is using large-scale economic and climate models and looking further out at long term impacts (50 to 100 years).

Panel II: Using Benefit-Cost Analysis to Analyze Public Safety

Panel Chair **Scott Farrow** introduced the panel based around the issue of using benefit-cost analysis (BCA) to analyze issues of public safety. Public safety was treated broadly, with discussion of the environment, crime, education, etc.

John Lott kicked off the panel with an overview of the uses of benefit-cost analysis for crime. While there are a lot of crimes and criminal activity is high, criminal penalties are a new phenomenon, and unheard of in the US until the last few decades. The United States has the most extensive criminal penalties for corporations; it will have to add this on with high corporate income tax rates. Only a few papers discuss the issue of whether criminal penalties deter crime. There is a huge difference between simply seeing if you get the right sign compared with actually completing the benefit-cost analysis (BCA).

Chair: ***Scott Farrow***
University of Maryland – Baltimore County

John Lott
University of Maryland

Amy Sinden
Temple University

Steve Aos
Washington State Institute for Public Policy

The notion of optimal penalties is good in theory, but problematic in application and on the ground usage. A main consideration is what types of penalties are used (e.g., prison, fines, lost reputations, collateral penalties). Prison has high costs, and criminals have very high time rates, so an additional year to an already-long sentence may not mean much. Fines are efficient, but limitations (such as the inability to pay fines) exist. Dr. Lott also mentioned that criminals are not homogenous, and the impact of utility of penalties will vary greatly between criminals. Judges often take care of this qualitatively; mandatory sentencing guidelines now often increase the disparities of penalties.

Dr. Farrow next introduced **Amy Sinden** to discuss the use of BCA in environmental regulation. She opened by talking about the debate over what BCA is (formal, qualitative, etc.): both sides talk past each other. Critics of BCA talk of strict, deterministic formal BCA, while proponents talk of flexibility, qualitative considerations, and room for concerns other than efficiency.

Dr. Sinden used a recent Supreme Court case as a case study to illustrate the disconnect apparent between opponents and proponents of BCA. In "Entergy Corp. v. Riverkeeper" (129 S. Ct 1498, 2009), a case about water cooling systems (nuclear power plants), the EPA gave authorization to regulate construction, location, design, and capacity of water cooling structures to minimize environmental impact. The EPA did a standard feasibility assessment to determine the "best available technology." The EPA said "once through" was ok for some power plants, an interest group took it to court, and the court ruled that the Clean Water Act precluded BCA. Amicus briefings to court took either strongly hard or strongly soft views of BCA. Dr. Sinden asked what type of BCA that EPA did?

The EPA estimated fish, and then counted only 1.8% of the fish that would be caught by commercial and recreational fishermen. The EPA almost made the highly controversial move of estimating ecological values; their habitat replacement model was vehemently criticized, so the agency followed the trophy model. Non-use value turned out to be a huge headache. The EPA used a 1977 study that estimated non-use values given water improvement, but received criticism for being both too high and too low. At this, the EPA threw up its hands and refused to include non-use values, and acknowledged that its BCA was "incomplete." In its policy decision, the EPA simply gave a cost figure, with no caveats included. The largest issue at stake, Dr. Sinden concluded, is that we talk about nuance, caveats, and qualitative dimensions, but there is an inevitable pressure to give a number and quantify.

Steve Aos discussed potential ways to reduce crime and save money. Some of the results he looked at included programs for adults, juvenile offenders, and prevention programs. He located 27 reasonably rigorous studies of cognitive-behavior treatments to form the research base around which an investor can base expected return. In this case, there was only a 7% reduction in criminal recidivism.

Some major Washington legislative actions have stemmed from evidence-based policy decisions. One state prison was removed from the "build" list, based on expected reduction in criminal behavior. Prison sentences for drug offenses have been reduced with the expectation that crime rates will increase, but savings will also be created for other, more-efficient crime reduction efforts. The net benefit for the state will be less crime.

Dr. Aos touched on three evidence-based implementation issues revolving around a formal assessment process: to align participants to correct programs and to focus on higher risk populations (to increase return on investment), a state funded cost fidelity system, and funding formulas to match the right incentives. The key development, Dr. Aos concluded, is that Washington state now ties the official state budget to this program.

Scott Farrow concluded the panel by recommending principles and standards for the BCA of public safety. Public safety covers a huge variety of things: everything from security to natural hazards to consumer safety. Major benefit can be achieved through a reduction of just some risk. Due to time constraints Dr. Farrow was not able to walk through the full spate of recommended principles and standards.

However, he provided a sampling of the larger collection of principles and standards found in his commissioned white paper (co-authored with Kip Viscusi) written for the MacArthur Principles and Standards Project. The principles he suggested include:

1. Represent reality
2. Applied welfare economics is theoretical foundation
3. Don't let the ideal analysis be the enemy of the good analysis
4. Don't usurp the decision-makers
5. Don't let decision-makers usurp the analysis
6. Strive to report monetized outcomes
7. Assume statistical randomness
8. Avoid false accuracy

To conclude, Dr. Farrow mentioned that the white papers are being integrated into a large compilation of proposed principles and standards, and that he hopes to see this effort continue to grow and evolve.

Panel III: Education Policy and Benefit-Cost Analysis

Panel Chair **Lynn Karoly** introduced a panel of two professors and two doctoral candidates to present work revolving around the application of benefit-cost analysis to early childhood education policy.

Dr. Karoly announced that her presentation would stem from her work for the MacArthur Foundation Principles and Standards for Social BCA project, for which she authored a white paper on BCA of early childhood intervention policies. One of the main issues facing education analysis is that few comparable analyses are available, making cross-program comparisons very difficult. Policymakers want to know which programs should have further investment. Of 20 rigorously evaluated interventions, six that were demonstrated to be effective also had associated benefit-cost analyses (BCAs). The lack of standardization for BCAs of ECI (early childhood intervention) is hugely dependent upon how long benefits are tracked, the age to discount (e.g., a program starting at birth is a poor basis for comparison with a program starting at age 3). The task before us today is to bring about standardization, a task that will be easy for some circumstances and difficult for others.

Chair: ***Lynn Karoly***
RAND Corporation

Clive Belfield
Queens College
City University of New York

Paul T. Hill
University of Washington Bothell

Danny Yagan
Harvard University

Nate Hilger
Harvard University

Because there is no clear-cut discounting rate to be used, it is important to have a standard basis for measurement across the board. Using a 3% standard real rate with sensitivity analysis is considered standard. The age-to-discount-to should probably be the focal child's birth. Valuing all available outcomes (parent, children, siblings, and peers) is important to account for value of participant's time in the program.

Dr. Karoly concluded by touching on a set of issues her paper was not able to take on, and what the discipline faces as it moves forward: defining an appropriate baseline (e.g., a world of no preschool, versus a different preschool), outcomes measured, length of follow up, and shadow prices.

Clive Belfield presented a paper not necessarily intended for the Principles and Standards of Benefit-Cost Analysis. In education, ECIs have had the very best treatment from BCAs, and are at the cutting edge of benefit-cost analysis. Professor Belfield brought up four issues: distributional consequences, consumption value, discount rate, and option value. Distributional consequences are hugely important in education BCA. By weighting groups distributionally, often the net present value of the program is increased, as the targeted, disadvantaged recipients of a program typically accrue benefits in the future as the policy is implemented, whereas taxpayers (or other funders) typically bear more immediate costs. Since weighting is usually done to account for disadvantaged populations, this can serve to increase the net present value of the program. Also, there is generally a higher value of statistical life associated with younger population groups, which can cause distributional consequences as well. Such a higher value can raise the value of net benefits for these programs.

There are several other salient issues: First, our tax code could guide distributional weighting, as it reflects a value decision regarding distribution on the part of political authorities. Secondly, consumption value: Parents have consumption value for ECI, which should be incorporated from the private perspective. The public consumption value of education is high; the public places educational investments over infrastructure investments. Discounting is of course a controversial subject. A wide range of discount rates are advocated for. When in doubt, Belfield states, it is important to use a lower value for the discount rate. Belfield also discussed option value. Early education fields present an opportunity to learn about children; this information can then be used to make other choices for children. In evaluating social policies, and specifically early intervention programs, we should if possible incorporate these option values, and at the very least be mindful of the opportunity to gain information to better future decision-making.

The bottom line is that if we applied these four issues, we would probably get a higher net positive value than we currently see for early intervention BCAs. One going issue for all of this type of analysis remains how to measure and monetize gains. Dr. Belfield's general method is to devise an IQ scale, find the value of moving up that scale, and compare with later and earlier interventions since IQ gains are standardized. For example, Dr. Belfield cites the EPA's changes in lead exposure for children age 0–6 years. For ongoing policy evaluation, we need achievement metrics that are complete, stable over person and grade, yield monotonic transformation for economic outcomes through life—without labor market sorting based on comparative advantage. Currently, we do not really have such a metric. Metrics are often highly instable, giving significant within-child variation, and producing effect size gains in achievement are not linear across school years.

Dr. Belfield concludes that even mediocre ECIs are typically found to be cost-effective simply because NPVs are so high. Simply because the benefit in investing in early intervention pays dividends in so many different ways in the future, virtually any early intervention program will pass a simple benefit-cost test. Thus, it is important that we emphasize the development of ways to truly identify the most beneficial and effective programs. Currently, ECIs are held to a much higher standard than almost anything else, and we have a wide literature base for evaluation of such programs. It is important, however, that we work to better hone analysis, particularly by improving or developing shadow prices for some of the early interventions.

Paul Hill's discussion was focused on K–12 benefit-cost analysis. He noted that currently there is not much discussion of cost or benefits. While some small, useful examples of BCA-type projects exist, nothing tells us how decisions are made based on benefits and costs. One reason for this is that costs are incredibly opaque in K–12 education, making it difficult to determine what funding per pupil per school is (district aggregate is an incredible poor predictor of spending for any one pupil, with a range of up to 2/3 times for different students within the district). Dr. Hill brought up the example in high schools he's studied, where per pupil spending for core courses (e.g., algebra) is less than half of that spent on ceramics or cheerleading. How much is being spent on "this child in this classroom" is difficult to find out, and it is possible to miss important information, such as what a district spends on facilities or benefits.

The field of K–12 BCA research has focused on making the case for more money, so this field is not especially useful for BCA at this moment. Real spending is beginning to be the focus of study. A focus on benefit versus cost is emerging as school districts try and get out of the standard budget. There is reason for optimism in the field of K–12 BCA. These practices are starting to be forced on districts everywhere, and more and more administrators are embracing financial analyses. Because spending will not be increasing, and money to districts will not be increasing in the near future, the economic climate is forcing districts to think more about their choices. As a final note, Dr. Hill noted that interestingly, despite much funding and rhetoric, the federal government and foundations (such as the Gates Foundation) have had very little to do with this transition. Instead, much of this push is being driven by individual researchers. For instance Marguerite Rosa, at the Center on Reinventing Public Education at the University of Washington, has done and continues to do great work. Dr. Hill closed by remarking that he is hopeful that the necessities of the economy will drive more work in this area.

Ph.D. Candidates **Danny Yagan** and **Nate Hilger** presented work done using data from the Tennessee STAR (Student-Teacher Achievement Ratio)

Project, a four-year study conducted on class size in K–3 classrooms in public schools in the state of Tennessee. Specifically, they used project data to evaluate how kindergarten classroom factors affect a child's future earnings. Their interest in the long-term impacts of ECIs, of which there is limited evidence to date, proved a good match for the Tennessee STAR program data, which now corresponds to program recipients who are now adults in their 20s.

The study linked STAR records to tax records and wage earnings to W2 forms and 1080 forms. They discovered that the average student is now relatively poor. There is a huge correlation between kindergarten test scores and wage earnings, as well as between kindergarten test scores and college attendance. The correlation between small class size and college attendance is not strong, but attending college full-time directly after high school graduation is significantly different.

Hilger and Yagan also asked if a student's future earning would rise if randomly assigned to a more experienced kindergarten teacher; on average, students did earn more 20 years later (a large earnings gap opens at age 27), a relationship that is statistically significant. It is also possible, they note, that good teachers select longer careers and this is a result of good teacher, not necessarily the teacher's experience.

The STAR experiment does have some shortcomings. Since it randomly assigns students, it can't provide detailed information about race, sex, income or other indicators. More teacher and peer quality is not captured by teacher experience. Because of the statistically significant class effect we know that which kindergarten class you are in matters, but it is not clear why. Classes impact how you score on tests, and what you earn as an adult. The solution is to look for suspiciously high covariance of outcomes.

To conclude, Yagan and Hilger touched on the fade out effect, which is initially large but fades to insignificance by grade four. Although test scores fade out, the initial kindergarten effect reemerges in adult earnings. Although costs are very opaque, Hilger and Yagan conclude that one single digit increase in test scores gives a large increase in future wages.

Panel IV: The use of General-Equilibrium in Benefit Cost Analysis

Chair: **Roberton C. Williams III**
University of Maryland

Allen Klaiber
Pennsylvania State University

Richard Just
University of Maryland

Allen Klaiber opened the discussion by talking about the use of general-equilibrium models in the benefit-cost analysis (BCA) for social programs. The primary question he posed was, "How do we interpret social programs and changes in social programs?" It is difficult, he continued, to translate this into a price change. Social programs can differ significantly, and are targeted at a highly heterogeneous population. Given the current economic and political climate, social programs are on the line in many states. There is a pressing need for governments to determine which programs are the most vital and which are the most effective, as budget crises are forcing systematic cuts. For most voters, K–12 education is the first priority. However, in many states, Medicaid funding exceeds spending on K–12 education. A policy intervention in one market may influence the equality between marginal willingness to pay and marginal cost goods in other markets. Without general equilibrium (GE), we would miss such implications.

For social programs, it is particularly difficult to trace their full effects. We tend not to think of social programs as having effects in other areas, although they most certainly do. For social programs, it is more difficult to trace non-market goods. It is important to think about new strategies to measure general equilibrium values and counting effects in other markets. Unlike most partial equilibrium versus general equilibrium analyses, changes to social programs alter more than just marketed goods and services. It can alter quality, access, and amounts. Dr. Klaiber posed further questions: How does this distinction alter our PE/GE interpretation? How does the size matter? What does size mean in a non-market change? Market change is characterized by a tax or regulation leading to a subsequent price change, while with non-market goods, change is less straightforward, experienced often in ways that are highly difficult to measure or quantify.

As an example of general equilibrium modeling, Dr. Klaiber discussed how a carbon tax may increase the price of goods, while also reducing other air pollutants. The general equilibrium distinction is in whether or not we could link all of these impacts. Another example cited was preschool programs, which linked both to educational outcomes, and to decreased criminal behavior and teen pregnancy. If we improve educational quality in a school district with a fixed supply of housing, home prices and rents will increase. Do we need to consider more than just the education market when we think about changing benefits and costs as the result of a program? In this case, welfare losses occurred across all districts. Without the housing market, the worst districts would lose a lot, but small gains would be created for other districts. By ignoring the housing market, a very large difference in analysis outcome will result.

Roberton C. Williams spoke next, discussing his thoughts on including general equilibrium effects in cost-benefit analysis. General equilibrium effects can dramatically affect BCA, and often in a counterintuitive fashion. GE effects can be an order of magnitude (or more) larger than direct effects. Following the work of Goulder and Williams (2003), we can see that leaving out general equilibrium effects in instances where it might be thought appropriate to do so potentially creates an enormous difference.

The common view about when general equilibrium is needed is often incorrect. Two major myths exist. Myth 1: Including GE effects is more important for large policy changes. Actually, the opposite exists. Large policies usually have large direct effects, whereas in a small policy GE effects are often way larger than direct effects. Myth 2: The need for GE is based upon size of targeted market. Actually, no real correlation exists. Thus, as a general rule, BCA should at least consider including GE since we're often incorrect about whether GE effects are important or not. General equilibrium is inherently more difficult (the necessary parameters are harder to estimate, harder to control for confounding variables, necessary data may not exist, etc.). Prior literature contains far fewer GE effects estimates. The implications are that any GE should include a measure of uncertainty (which is often left out) such as a Monte Carlo. There is also a need for more empirical evidence.

Full GE is impossible in practice. For a perfect answer, one would have to include all markets. This is clearly a purely theoretical ideal. The best we can do is to include a relatively small number of related markets (while this is acceptable, some are far more important than others). If we include markets with the biggest effects, we come close to a full GE model. Theory can tell us which markets are going to be the most important. Dr. Williams noted at this point that the term "market" applies equally in this discussion to non-market goods. Factors that influence whether an ancillary market should be included are the size of market, cross elasticity between it and the targeted market, and highly distorted markets. In addition, theory could provide more practical tools. It is important to find practical, easily implementable formulas to use to incorporate GE effects without having to build a full GE model. To conclude, Dr. Williams noted that general equilibrium is more difficult, more uncertain than PE, but it is worth it to attempt GE work since it can greatly improve analysis as long as the analysts correct pick the markets to be included in the analysis.

Richard Just was the final speaker of the panel. He started by noting that general equilibrium BCA is one of the last frontiers along with behavioral welfare economics. For example, GE analysis shows that subsidized tuition to college students operating through related markets has a perverse effect of producing fewer college graduates. One of the challenges we have is giving policymakers the intuition behind general equilibrium results. Often this is simple; for examples, analysts understand that when a tax is imposed, the price of inputs will decrease. At this point Dr. Just led the audience through a slide show, illustrating equilibrium measurement with a single distortion. One must only measure effects in markets that are distorted, he continued. In cases where markets are distorted with taxes and subsidies, the important trick is to measure change in dollars.

Panel V: Implications of Behavioral Economics for Benefit-Cost Analysis

Lisa A. Robinson
Independent Consultant

James K. Hammitt
Harvard University

Eric Moore
Resources for the Future

Jack Knetsch
Simon Fraser University

Justin Wolfers
University of Pennsylvania

Panel convened by
Brigitte Madrian
Harvard University

Panel Chair **Brigitte Madrian** introduced **Lisa Robinson** and **James Hammitt**, co-authors of a white paper on the implications and use of behavioral economics for social policy BCA as part of the MacArthur Principles and Standards Project. Dr. Hammitt presented first. He began by discussing the limitations of models (imperfect assumptions, and they do not always account for behavior) for behavioral economics; behaviors often differ from standard economic models. BCA, he continued, has two broad steps: predicting consequences, and evaluating consequences. Using Portney's (1992) example of "Happyville," he discussed exogenous behavior and endogenous behavior (marked by rationalist, populist, and paternalistic behaviors). Broadly, he asks, what is the role of government? While a populist government consists of direct democracy and the will of the people, a paternalistic government consists of strong leadership, and leaving decisions to "wise men."

Lisa Robinson presented more specifically on the paper written for the Principles and Standards project. BCA, she states, should be designed to provide information about the preferences of people affected by a policy. It should not impose judgment on rationalist or accuracy of preferences, but it is important that preferences be well informed. To accurately account for preferences, a great deal of further research is necessary. For this paper, she focused on valuing psychological attributes of nonmarket outcomes. For applied analysis, it is typical to rely on WTP. These findings don't necessarily create problems for the analyst, but issues such as sensitivity to risk magnitude do matter. Discounting and time preferences are perhaps the most extensively researched areas. When estimating time preferences, high near-term rates are useful in predicting behavior; long-term rates are perhaps more appropriate for social policies. Behavioral economics separates private and social preferences; this is made difficult by the existence of many different motivations for other-regarding preferences such as difference aversion. Again, further research in this field is needed. It is also important to separate general feelings about programs from attitudes that have a differential affect on analysis. Analysts must determine whether they are catching self-regarding or other-regarding preferences.

Eric Moore based his presentation on a paper he co-authored with Kerry Smith, in which they proposed two modifications of BCA. Both Bernhaim and Rangel (2009) (reform framework underlying welfare analysis) and Sugden (2004; 2005; 2009) (using a market simulation approach to redefine surplus in a way that moves away from the assumption that individuals have coherent assumptions) discuss changes to BCA. While both are interesting in their current form, neither are currently implementable for practical BCA. Bernheim and Rangel do not observe people making repeated decisions relevant to policy choices. Similarly, Sugden also does not observe decision-making in a repeated, policy-type setting.

An alternative view of choice processes is needed. At this point, Dr. Moore presented a series of graphs walking through representations of constraints to determine how informative constraints are. Can we observe non-traditional preferences in competitive markets, he asked? Plott and Smitt (1978) worked in competitive markets consisting of just three buyers and three sellers and saw a variation in the number of "non-traditional" buyers. Dr. Moore again demonstrated his point with visual aids (a graph of the demand schedule and tables of experiment results). To summarize, he determined that non-traditional buyers affect market outcomes. The current proposals are not ready to alter BCA for practical policy analysis. If the current proposal is a reasonable strategy, then we have a way forward for testing one interpretation's seemingly incoherent choices.

Next, Dr. Madrian introduced **Jack Knetsch**. Dr. Knetsch recently spent time in Singapore talking to civil servants about how to incorporate behavioral economics. He notes that he takes a different approach than previous panelists in our ability to modify BCA—we should, he says, and we can. To open, Dr. Knetsch briefly touched on anchoring: focusing illusion, the power of free, the power of default, and loss versus foregone gain. To measure changes in economic welfare, typically gain is understood to be WTP, while loss is WTA. Since, in theory, WTP=WTA, we erroneously use this as a justification for just using WTP for everything, when in fact they are not even close. If WTA and WTP are very different, analysts are faced with a problem. It is important to measure positive change in reality (including the gain or lessening of a loss) and two measures for negatives change as well (foregoing a gain and a loss). There is a vast difference between WTA and WTP, and it is important to be clear which one is used. For example, when a roadway blockage occurs, loss incurred is the WTA to accept clearing the road, while eliminating loss is WTP to forego. For some circumstances (physical assault, oil spills, etc.), which to use can depend. By using WTP where WTA is warranted, we're systematically discriminating against things where there is a reduction in losses. This could have a huge implication for social policy.

Justin Wolfers was the final panelist to speak. The current Presidential Administration, he stated, actually has a large number of subjective preference researchers in policymaking. The spectrum runs from purely evaluative (how is life going?) to effective (closer to a point estimate of feeling). While using happiness for BCA could work (for example, it would be possible to run a regression using "happy" for the relationship between marriage and income), this would be difficult. Instead, analysts use revealed preferences. This creates deeper problems, because of the innate untrustworthiness of revealed preference. Given that we cannot fully trust either revealed preference or contingent valuation, it can make a lot of sense to use "happiness" as a metric.

Even some seemingly straightforward circumstances that are typically quantified using traditional methods, such as job loss, probably need "happiness" measures to truly reflect values and preferences because the happiness cost of unemployment is much larger than income. There are, of course, perils in making inferences. For instance, consider a regression of happiness with marital status and income. This would indicate that marriage increases happiness. However, as it turns out, it is not that marriage is incredible; it is actually that incredible people get married. Correlation versus causation and transitory versus permanent effects are also perilous. Problematic, but not quite as perilous are adaptation (evidence for adaptation is substantially weaker than believed) and relative comparisons (we do not think in terms of "how well off am I compared with other people?" If we did, other's gains would make us feel worse). Puzzles remain, including the paradox of happiness. Rush Limbaugh's interpretations (such as the women's movement being "bad for women") are unclear. Currently, we are continuing to learn about the shortcomings of using happiness metrics to evaluate social policy outcomes.

Panel VI: The Use of Benefit-Cost Analysis and Cost-Effectiveness Analysis for Health and Public Safety

Chair: ***Peter Neumann***
Tufts Medical Center

James K. Hammitt
Harvard University

Joseph Cook
University of Washington

David L. Weimer
University of Wisconsin

Peter Neumann opened the panel with an overview of the use of financial analyses in the field of health and public safety. Along with benefit-cost analysis (BCA), cost-effectiveness analysis (CEA) is a frequently employed evaluation tool used in this sector. CEA has been the preferred method in health economics for a long time, for several reasons. In the mid 1990s, the a US panel on cost effectiveness, a government-sponsored blue ribbon panel, concluded that analysts should conduct cost-per-QUALY (quality adjusted life year) analysis. Given challenges in monetizing health impacts, namely the distaste for monetizing health benefits and mixing money and health, the idea of cost-per-QUALY seemed to be a better option. In addition, there are certain aspects of tradition and culture that continue to reinforce this paradigm.

Thus, most all health economic studies produce estimates in terms of cost-per-QUALY ratios. These studies provide helpful results, for instance showing that universal screening for diabetes is not cost effective, whereas the cost-per-QUALY ratio goes up for screening of elderly people or high-risk populations. Such studies have taken off in recent decades, with up to 400 such articles a year now published. The applications are highly diverse, evaluating everything from surgery to pharmaceutical applications.

One striking finding is that despite conventional wisdom, prevention is not actually cost-effective in many cases. We hear politicians advocating for prevention-focused health care in many settings, yet cost-per-QUALY studies show that preventive programs often increase costs and decrease health. There is no systematic evidence that prevention is more cost effective than treatment, although it must be noted that across all studies, very few programs (whether prevention or treatment) lose money. In an important recent development, the recent health care measure states that the QUALY metric should not be used as a threshold to determine coverage reimbursement or incentive programs for Medicare; this essentially has outlawed cost-per-QUALY analysis. However, in reality this is not banning such analyses, it is banning thresholds, prohibiting the Secretary of Health and Human Services' (HHS) usage of cost-per QUALY thresholds (i.e., 100,000 per QUALY) in deciding what type of healthcare programs are cost effective and should be recommended. Cost-per-QUALY analyses can and should be continued, including other government agencies such as the National Institution of Health, just not HHS.

James Hammitt provided a comparison of BCA and CEA for public health programs. First, he discussed the idea of social choice. If we are thinking about social policy and attempts to improve people's lives, how do we know whether or not we are making someone's life better? The standard economic answer is the idea of consumer sovereignty. Sometimes, we talk about people's ability to maximize their own welfare. In public health, the objective is that people should live a long and healthy life, and other aspects of well-being get little attention. Distributional issues also come up; we can do more for people at the cost of harming others (or at least their foregoing of benefits), so the question becomes when is it okay to benefit some people at the expense of others? BCA and CEA answer these questions differently.

BCA measures all effects in money units. CEA (i.e., cost-per-QUALY) measures health in QUALYs and everything else in money. In BCA, we assume that money values are consistent with people's preferences. There is some argument whether QUALYs are consistent with people's preferences for health and health risks, but there is lots and lots of evidence that there is not consistency between the two. Thus, the argument to use QUALYs should not be that we are replicating people's preferences, but instead that we are doing something else that is good.

Regarding interpersonal tradeoffs, BCA treats an additional dollar as equally good regardless of who gets it, thus assuming that money is equally valued by all. CEA evaluates interpersonal tradeoffs differently for health effects (QUALYs) and other effects (money). BCA can be justified by the Kaldor-Hicks compensation test. CEA is typically justified in terms of maximizing health for a given expenditure or budget. While this might be okay in some instances, such as for a national health provider, but only if all of the costs actually come out of that budget. However, usually many of these costs are productivity effects, time inputs, and other things that do not come out of that budget. Thus, while a nice model, this is not actually relevant for the real world.

If QUALYs are a measure of individual preferences, this requires, for instance, that people's preferences for longevity have to be risk neutral. If we use discounted QUALYs, then people have to be risk-neutral on discounted QUALYs. However, survey evidence demonstrates that people have a wide range of risk preferences, being risk-averse, risk-seeking, or risk-neutral. Moreover, these preferences vary over period of life. Second, a major assumption of QUALYs is that the utility of a particular health state is independent of how long you are in a particular health state. Evidence shows that this is not really true; the amount of time people are willing to "give up" in order to improve health from a bad state to a better state is very small if you only have a short time left to live, but very large if you have a long time left to live. This violates the two key assumptions of QUALYs.

With regards to discounting, in BCA it is clear that all money values must be discounted at the same rate. However, for CEA, that is not logically necessary. There is no reason why one could not discount health at a different rate than you discount costs. It is important, however, to note that the discount rate for health, the discount rate for costs, and how the money value of health changes over time, must be related.

While BCA theory holds that, though we measure everything in money, we could measure by anything else and get this same result; this is not exactly true. You would not identify the same welfare maximizing point, just the same efficient frontier. This is important when we are jumping between effects measured in money or in other metrics (such as QUALYs). We can see using hypothetical examples how the choice of numerator, such as money versus QUALYs, dramatically affects the choice of a preferred outcome and the possibility of Pareto improvement.

Ideally, BCA measures welfare change, aiming for a potential Pareto improvement. CEA is motivated by the need to maximize health given a budget, but in reality this is not a very accurate story given that there are many exogenous costs in health programs. When doing either, it is crucial to recognize that the choice of a numerator (e.g., dollars versus QUALYs) has a significant effect on analyses outcomes, and can result in different policy choices.

Joseph Cook discussed the paper he authored for the MacArthur Principles and Standards for Social Policy BCA project on public health preparedness and pandemic mitigation. Policy decision-makers are often faced with difficult choices, such as how much Tamiflu or ventilators should be stockpiled in preparation for a potential pandemic. This raises difficult questions, such as what the ratio of preparedness should be. For instance, preparedness could be based upon historical pandemic data. A different financial way to think about this is in terms of a social willingness to swap income for micro risk changes.

There are three realms in which we think about such policies. The first way is mitigation, where the disease is already present and widespread in the US population. For this situation, you can target with a vaccine, distribute antivirals, or even employ social distancing policies. It is important to think about the costs of such distancing policies, such as closing schools or banning public gatherings. The second category is where the disease is present in foreign countries, but has not yet reached the US. In these cases, mitigation techniques involve things such as closing borders and grounding air travel. Finally, there is a third category, thinking about the optimal level of preparation. This is the area in which BCA is most useful. It can be used to evaluate disease monitoring programs, emergency action plans, and even educational programs on topics such as regarding hand washing.

What do we know about the macro-economic impacts of pandemics? In most models, the Spanish flu pandemic of 1918 is the worse-case scenario. There are a few studies, none published, that speak to the economic impact of pandemics. In determining the reduction in GDP caused by different outbreaks (e.g., last year's H1N1 virus), we can speak to the appropriate level of preparedness expenditure. These macroeconomic impacts include closing schools, sick-days from work, and avoidance behaviors. There are consumption impacts, especially in the retail and tourist sectors. These impacts are estimated to be anything from a 0.4% to 5.5% fall in GDP.

One salient element of this is what do we know about the behavior of parents when schools are closed? Very little. School closures force adults to miss work, because they either have to take care of children or have a school-related occupation. This can have huge economic impacts. School closures work well at mitigating pandemics, but are a hugely costly way of doing so. Proportional analysis is very important in this field. A local health department is not going to run a general equilibrium model, but they do need to think about the effect on parents, for instance, of a school closure or the long-term societal effects of social distancing policies. It might be the case that slower-moving pandemics have less macroeconomic impact because people can better adapt. We need more and better data to speak to these impacts. Hopefully, the H1N1 experience will furnish some of this data. One thing particularly lacking right now is data on disparate impacts by socioeconomic level; pandemic policies can have distributional effects, which we need to think about.

Discounting is not actually a very big issue in this area. Most of the benefits and the costs are very short lived (e.g., respirator stockpiling in the face of a potential pandemic that year), and most of the benefits and costs occur in the same period. Pandemic preparation and mitigation is an area where externalities are very important. For instance, consider the external benefit to others of vaccination. Also, the anti-microbial issue is an issue that is not yet well-quantified, but is important to include in modeling. Finally, there is the issue of giving agency to people living in other countries in evaluating a global pandemic.

David Weimer discussed the issues that come up in social BCA, particularly as related to health policy BCA. We are faced with a growing demand for high-quality BCA work for several reasons. Why is it desirable to do BCA? BCA gives standing to all who bear impacts, taking a broad social perspective that gives a more comprehensive evaluation. It takes into account all effects, including spillover effects to other social domains, such as school district's accounting not just for student test scores but also the value of keeping kids off the street and out of criminal activity.

However, social policy BCA faces big difficulties as well. To be comprehensive, we need to value a lot of effects. We need to derive lots of shadow prices, as we need to value many effects that are not traded in markets. This is very difficult to do. Monte Carlo simulation is essential for addressing this high degree of uncertainty. We are multiplying uncertain parameters by uncertain parameters, and so Monte Carlo simulations simply must be done. This should be standard for social policy BCA. This raises an issue though in trying to be so comprehensive. In going to the literature to find effects, often these effects are not statistically significant.

These effects should not be dismissed! The proper hypothesis is whether or not net benefits are positive. Rather than throw away an impact (and thus assume that it is zero and its standard error is zero), we are better off taking advantage of all the evidence at our disposal, which sometimes means using statistically insignificant coefficients. We should get all effects in their entirety, not just significant effects. Regarding parameters derived from published literature, we tend to filter out statistically insignificant parameters, but as referees and editors we tend to filter out studies that do not have statistically significant parameters. Weimer is not quite sure how to account for this yet, as we are not really sure of the implications of publication bias, but it needs to be kept in mind.

Additional issues exist regarding measurement. The use of behavioral models is important, as we should use models that best predict behavior. However, how to best determine value in the context of these behavioral effects is not clear. For example, it is unclear how we deal with addiction. There is a need to determine addictive demand schedules. A second issue is the interpretation of volunteer time, which is traditionally determined by the opportunity cost of time. Conversely, the fact that volunteers are actively volunteering means that they value the contribution more than the time, so the value should be set at zero. This is complicated by the finding of conscience goods, which indicate that people may not volunteer unless they are put in a social position asking them to volunteer. It is unclear what the correct approach is, and how volunteering should be interpreted. For now, it is probably best to bound this in Monte Carlo between zero and the opportunity cost of time.

A further issue is that we cannot expect people in the field to do BCA if they have to derive shadow prices themselves. Unless we provide menus of shadow prices, people in state and local government will not be able to do BCA. As a society, a significant contribution we can make is to come up with plausible shadow prices with bounds. These shadow prices fall in four categories. First, there are those that need updating and improvement. The marginal excess tax burden reflects old estimates and should be updated, and costs of crime are so essential to social policy that we need to greatly improve those investments. Second, we can do "horizontal linkages." For instance, we can measure productivity gains from educational achievement, but we also know that there are external effects we do not measure. Can we develop a rule of thumb for estimating these external social impacts? Third, shadow prices can be developed through vertical linkages. For example, we can do meta-analyses to find the impact of child abuse upon subsequent crime or educational achievement. Once we have this subsequent change, we can apply already familiar shadow prices. Finally, there is potential to extend BCA to include moral sentiments. This is highly difficult, and we need much more study to determine such values.

Panel VII: Legal Perspective of Changing Environment

Richard Revesz
New York University

Shi-Ling Hsu
University of British Columbia

Matthew Adler
University of Pennsylvania

Jonathan Nash
Emory University

Panel convened by
Daniel Cole
Indiana University School of Law

Panel chair **Dan Cole** introduced a panel comprised of four distinguished law professors. The general thrust of this panel was the incorporation of distributional issues into benefit-cost analysis (BCA). **Richard Revesz** warned that his presentation would be slightly depressing, in that there is certainly unanimity regarding the contention that distribution matters, but the question remains as to "how."

With regards to all regulations, given people are losers on some and winners on others. The thought is that perhaps we should try just to look at the aggregate, as a lot of distributional problems might cancel out. Where they do not even out, the thought is that we should not deal with this through regulation but through the tax system. Presumably, the tax system recognizes losers because they now have lower incomes and thus lower wealth, and addressing distribution through the tax system has less negative impact on efficiency.

In the environmental context, there are a couple problems with this. First, a lot of the environmental harms people are exposed to are latent harms. For instance, the income tax system is not going to recognize the 30 year latency period of someone who is exposed to a given harm that increases someone's probability of dying of cancer 30 years later. It is not easy to redistribute for latent harms through the tax system.

However the most serious set of problems comes from the structure of environmental laws. A lot of our environmental laws regulate medium by medium and pollutant by pollutant. They ask questions along the lines of, "Is a one-in-a-million probability of death from exposure to this one pollutant in that medium an acceptable level?" From a distributional perspective, you might want to know how many of these million chances a certain person is exposed to. There is nothing in the structure of these laws that makes it easy to regulate differentially based upon exposure.

For example, there are discrepancies in exposure in the US. In Louisiana, while it may well be the case that each chemical and petroleum plant between New Orleans and Baton Rouge is regulated pollutant-by-pollutant in a way that complies with all applicable laws, and it may well be the case that the standard applied to each plant is an appropriate national standard, nonetheless, people in the region are exposed to disproportionate risk. This is a vexing problem, because it is not enough just to regulate the initial siting of environmental harms since people move around. It is not enough just to place environmental "bads" such that it complies with some fairness standard. At the end of the day, people who can afford to do so will move away from environmental risks. This issue is especially problematic given possible discrimination in housing markets, which cause minorities to disproportionally end up in high-risk areas.

The EPA recently released a document addressing environmental justice in the evaluation of future actions. Revesz is skeptical that this will do a lot of good. First, there is already a skewed distribution of environmental harms and addressing future actions is not going to fix this. Also, focusing on the siting of an individual plant or facility does not address the market dynamics that will come later (and we cannot fight markets anyway).

We should not be doing anything on the distribution front on a regulation-by regulation or pollutant-by-pollutant basis; this would cause great economic efficiency harms. We do need to figure out what regions of the country suffer disproportionate environmental harms and programs to deal with those. But, these programs have to be something other than an EPA guidance document, for instance.

Since this is a BCA conference, Revesz finished with this thought: We can agree that EO 12866 on regulatory impact analysis has been a great success. There has also been an EO on environmental justice, but most would say it has not been highly successful. Why? There is a structural, institutional reason why this is the case. Think of what world would have been like if EO 12866 had not required Office of Information and Regulatory Affairs (OIRA) review of agency BCA, and agencies had prepared analyses independently without any oversight. Had this been the case, it is likely that the executive order would have been far less effective. OIRA became a body with vested interest in making sure analyses were taken seriously, and this provided an institutional mechanism that enforced the executive order. The environmental justice order took just such a tack, however, essentially pleading with agencies to do whatever they wanted to do in order to comply with the order. There is no outside mechanism to make sure it was being taken seriously, and this is why little has been accomplished on this issue and it is not taken very seriously. If the federal government is truly interested in environmental justice, we need to create institutional mechanisms to address it effectively. To this point, we have not done this.

Shi-Ling Hsu presented a profile of alternative perspective on BCA, addressing academic schools of thought on BCA that have not penetrated the policy world. It is important to pay attention to these, however, because they hold the keys to understanding the real nature of the opposition we see to BCA.

Particularly, we see opposition from two schools of thought: postmodernists and critical legal studies, or "crits." We must understand these two schools, because the criticisms of BCA in environmental law sound a lot like the critiques made by these scholars in other applications of law. In particular, the arguments we have as proponents of BCA often fall on methodological grounds. We should continue this research. However, postmodernist and crits critiques suggest that controversy is not really about the methodology but about the power that opponents perceive is created by BCA. They perceive that BCA creates a power imbalance that is not easy to fix.

Critical legal study has two fundamental tenets. First, that for any given conflict, there are two truths, or stories, that can be told about the situation. Second, that given the indeterminacy of legal rules, this duality is usually exploited by the more powerful side to impose their version of the truth. Crits complain that when there are these competing versions of the truth, the more-powerful interest always wins. In reality, this is not so different from our understanding of the political economy more broadly. However, while crits often know what they opposed, they struggle to produce a policy prescription.

Postmodernists argue that there are multiple truths that lead to legal indeterminacy. However, they add the element of language, saying that language by itself and as embodied by law leads to the exploitation of disadvantaged people. Postmodernist have also had the chutzpah to go after science. Foucault went after psychiatry and medicine for its false science, noting that what they often have posed as truth is really a subjective viewpoint.

So what sort of policy prescription do you put forward if there are multiple truths? If you are familiar with critiques of BCA, you can recognize themes similar to those critiques advanced by postmodernists and crits. For instance, we see the criticism that BCA explicitly avoids distributional issues and exacerbates the power imbalance because it is indeterminate and endlessly manipulable. Regarding language, we see criticism that the language of efficiency is simply a language for carrying on a political and economic discussion rather than discovering facts about the world that can then be addressed. Regarding climate change, we see that the developed world is speaking the language of efficiency while the developing world uses the language of justice. Finally, regarding the relationship between BCA and science, we see fervent criticism as BCA as false, expert-generated science that creates a power imbalance.

In order to address these criticisms, we need to try and make BCA more accessible. Of course, this entails distributional analysis. There needs to be procedural reforms, such as making government BCA more accessible and encouraging public participation throughout the process. Criticism and opposition to BCA is much broader than just a few law professors; in order to advance the use of BCA, we need to do a better job of addressing these critiques.

Matthew Adler discussed equity metrics in BCA. There is a need to refine BCA to take account of equity in a more systematic way. Even if the tax system can account for equity, there is still an informational value to equity analysis.

How should we think about projects and equity? It is often held that equity is a soft quality that cannot be measured and best addressed by the tax system or by the legislature, as it is an inherently political issue. Adler suggests that the opposite is true. There is a wide range of equity metrics already in existence; the difficulty is actually choosing from amongst these equity metrics.

The presentation discussed numerous policy evaluation metrics that are sensitive to equity: BCA with distributive weighting; social welfare functions; inequality metrics; poverty metrics; "social gradient" metrics; "incidence" analysis; and CEA with an equity weighting. BCA with distributive weighting involves weighting willingness-to-pay (WTP) and willingness-to-accept (WTA) to account for distribution. The social welfare function thinks of policies in terms of vectors of interpersonally comparable utilities, and then takes a social welfare function that ranks these different vectors. Inequality metrics are highly familiar to us. These include such things as the Gini coefficient, and are used typically not as policy metrics but as a way to characterize the status quo. However, they can be used as policy metrics by looking at the change in a given metric resultant from a policy. Poverty metrics look at the current state of poverty and compare this to the change resultant from a policy. Social gradient metrics examine the correlation between a given attribute, such as health, with some measure of social status.

Tax incidence metrics examine whether the tax burden increases or decreases as a function of income. Finally, CEA with equity weighting gives a weight to people who have lower QUALY values. The thing to stress is that all of these have large bodies of literature associated with them, are to some extent used by governments, and are sensitive to equity.

How does one choose from among these metrics? It is a political question; positive economics cannot say which one is best. However, we can still think about these metrics in systematic ways. First, how are each of them sensitive to equity? All of these metrics are based upon the Pigou-Dalton principle, but in what particular way do they satisfy the principles? Pigou-Dalton is the principle of transfer, which holds that a pure, non-leaky transfer between someone with more of an attribute to someone with less is an improvement (again as long as that transfer is perfect). This is the cornerstone of equity. Again, these metrics satisfy the Pigou-Dalton principle, but they all satisfy it in different ways. Why is that? The currency or attribute is different, depending upon whether they think about equity in terms of income, some non-income attribute (e.g., health or happiness), or utility. One could do a Gini coefficient based upon income, utility, or even a multi-attribute Gini.

Income tends to be easier to calculate, but it does not include non-monetary attributes. We can talk about health impacts, but that is also a limited way of measuring well being. So, it might be preferable to think in terms of multiple attributes. Note, however, that this does raise the potential problem of interaction between attributes; this gives rise to the use of utility. Again though, utility is hugely controversial to measure or define. One intermediate approach is to think about equity in terms of normalized incomes. The idea is to set, for any given policy outcome, all non-income attributes to a reference level and normalize income, and then apply the equity metric to that.

The cross-cutting issue is whether these metrics satisfy the Pigou-Dalton principle on a population wide or a restricted basis. What defines the difference between inequality metrics and poverty metrics is the poverty metrics have a threshold. In inequality metrics, any pure transfer from someone who is better off to someone who is worse off is "good." For poverty metrics, a transfer between two people above the poverty line is not picked up by the metric. Thus, while all of these metrics satisfy the basic principle of transfers, they all do so very differently. Right now in BCA, we distributionally weight as a function of income; thus we satisfy the transfer principle in terms of income inequality or poverty metrics.

In his own words, **Jonathan Nash** gave a more realpolitik presentation, using a recent statement by Cass Sunstein as a jumping off point for assessing how distributional concerns should inform benefit-cost analysis.

This provides a vehicle for discussing when distributional issues arise and what we should do when this happens. Sunstein understates the extent to which distributional concerns arise, and overstates the idea that we should jettison BCA.

Sensible regulation of course should not ignore distributional issues. However, what is often used as examples are instances where we repealed a statute that originally had a distributional impact, which then has a distributional impact. What we do not often look at is new policies that do not on the surface have distributional impacts, but in practice prove to have significant impacts down the road.

Distributional issues occur by population subgroup, spatial location, or temporal occurrence. If one does agree that there is a distributional problem, how ought one think about that in BCA? In discussing the repeal of the HIV reentry ban, Sunstein cites ethical and humanitarian distributional benefits that are important but difficult to quantify. Sunstein says that we should focus on human consequences in the most disciplined way possible and understand that monetary equivalents cannot tell us everything we need to know. To the first point, we definitely should try to measure as comprehensively and as accurately as possible. However, you could read this to be suggesting that we are throwing in the towel too quickly on BCA. Perhaps a better approach is to work distributional issues into BCA rather than just throwing it out? Even simply conducting ordinary BCA on distinct subpopulations and including this as part of the overall report could largely address this issue.

The big issue is first understating the problem in the first place and then overstating that the problem means that we should jettison large portions of BCA. This conflates many of the different problems that do in fact plague BCA.

Keynote Address: The Social Cost of Carbon, Cost-Benefit Analysis, and Rational Climate Change Policy

Dr. Greenstone opened his address by providing background on the potential usefulness of the social cost of carbon and the current state of carbon regulation and legislation, followed by emphasizing limitations and touching on current work.

Keynote Speaker
Michael Greenstone
MIT

It is clear that changes in emissions policy needs to occur, and equally clear that the United States cannot make this change alone. At the Copenhagen Accord, countries came forward with the goal of decreasing emissions; many, like the US, promised to decrease carbon dioxide emissions by a set percentage below 2005 levels. China and India, on the other hand, pledged to reduce carbon dioxide based on GDP, rather than emissions. This displayed several weaknesses of the Copenhagen Accord. Developing countries are more interested in increasing economies than decreasing emissions, the promised reductions in China and India are misleading, and monitoring emissions is not receiving enough attention. The same is true domestically. The Waxman-Markey Cap and Trade Bill made it through the House of Representatives, but since then the Senate has declined to pass the bill, and it remains stalled. The Clean Air Act determined that the EPA must regulate greenhouse gases.

The social cost of carbon is the monetized cost of damages associated with an incremental increase in carbon emissions in a year. This includes, but is not limited to, agriculture, human health, property damages, and the value of ecosystems services. Dr. Greenstone used three models, five socio-economic scenarios, one climate sensitivity distribution, and three discount rates to provide distributions resulting from each model and scenario. It is critical, Dr. Greenstone repeatedly emphasized, to ensure that policy in enacted in which the benefit exceeds the cost.

To conclude, Dr. Greenstone reiterated that the social cost of carbon offers a way to measure the economic value of emissions reductions, the use of social cost of carbon as a guide for greenhouse gas regulation offers the possibility of achieving regulation where benefit exceeds the cost, and even in the absence of some global agreement between all nations, the opportunity to have policy benefits exceed cost can exist. Further research is necessary, he believes, specifically with improvement in catastrophic impacts, focusing more attention with regards to how physical impacts translate to economic impacts, forming a more complete treatment of adaption, role of discount rate, and creating new methodology for valuing reductions in other greenhouse gases.

Appendix A: Conference Program

AGENDA

Monday, October 18

7:30 – 8:30 a.m. Registration/Check-In and Continental Breakfast
The Atrium Ballroom, foyer

8:30 – 9:00 a.m. Welcome Remarks
The Atrium Ballroom

Richard Zerbe, Director, Benefit-Cost Analysis Center
Michael Stegman, Director of Policy and Housing, The John D. and Catherine T. MacArthur Foundation

9:00 – 10:30 a.m. Panel 1: Government Use of Benefit-Cost Analysis: Present and Future
The Atrium Ballroom

- Chair: Carol Bray, Senior Economist, U.S. Government Accountability Office
- Susan Dudley, Director, GW Regulatory Studies Center and Research Professor of Public Policy and Public Administration, The George Washington University
- Neil R. Eisner, Assistant General Counsel, Office of Regulation and Enforcement, U.S. Department of Transportation
- Michael Fitzpatrick, Associate Administrator, Office of Information and Regulatory Affairs
- Joseph W. Glauber, Chief Economist, U.S. Department of Agriculture

10:30 – 10:45 a.m. Break
The Atrium Ballroom

10:45 a.m. – 12:15 p.m. Panel 2: Using Benefit-Cost Analysis to Analyze Public Safety
The Atrium Ballroom

- Chair: Scott Farrow, Professor and Chair of Economics, UMBC
- John Lott, Senior Research Scientist, University of Maryland, College Park

- Amy Sinden, Professor of Law, Temple University
- Steve Aos, Director, Washington State Institute for Public Policy

12:15 – 1:15 p.m.	Lunch The Atrium Ballroom
1:15 – 2:45 p.m.	Panel 3: Education Policy and Benefit-Cost Analysis The Atrium Ballroom

- Chair: Lynn Karoly, Senior Economist, RAND
- Clive Belfield, Associate Professor, Queens College, City University of New York
- Paul T. Hill, John and Marguerite Corbally Professor and Director, Center on Reinventing Public Education, University of Washington Bothell
- Danny Yagan, Ph.D. Candidate in Economics, Harvard University
- Nate Hilger, Ph.D. Candidate in Economics, Harvard University

2:45 – 3:00 p.m.	Break The Atrium Ballroom
3:00 – 4:30 p.m.	Panel 4: The Use of General Equilibrium in Benefit-Cost Analysis The Atrium Ballroom

- Chair: Roberton C. Williams III, Associate Professor, University of Maryland
- Glenn Harrison, C.V. Starr Chair of Risk Management and Insurance, and Director, Center for the Economic Analysis of Risk, Georgia State University
- Allen Klaiber, Assistant Professor, The Pennsylvania State University
- Richard Just, Distinguished University Professor, University of Maryland, College Park

This concludes the sessions for the day.

Please join us for a dinner at Zola at 6:30 p.m., located at 800 F Street NW

Tuesday, October 19

7:15 – 8:00 a.m. Check-In and Continental Breakfast
The Springwood Room, foyer

8:00 – 9:30 a.m. Panel 5: Implications of Behavioral Economics for Benefit-Cost Analysis
The Springwood Room

- Chair: Brigitte Madrian, Aetna Professor of Public Policy and Corporate Management, Harvard University
- Lisa A. Robinson, Independent Consultant
- James K. Hammitt, Professor of Economics and Decision Sciences, Harvard University
- Eric Moore, Research Assistant, Resources for the Future
- Jack Knetsch, Professor Emeritus, Simon Fraser University
- Justin Wolfers, Associate Professor of Business and Public Policy, University of Pennsylvania

9:35 – 11:05 a.m. Panel 6: The Use of Benefit-Cost Analysis and Cost-Effectiveness Analysis for Health and Public Safety
The Springwood Room

- Chair: Peter Neumann, Professor, Tufts Medical Center, and Director, Center for the Evaluation of Value and Risk in Health
- James K. Hammitt, Professor of Economics and Decision Sciences, Harvard University
- Joseph Cook, Assistant Professor of Public Affairs, University of Washington
- Dave L. Weimer, Professor of Public Affairs and Political Science, University of Wisconsin - Madison

11:05 – 11:15 a.m. Break
The Springwood Room, foyer

11:15 a.m. – 12:45 p.m. Panel 7: Legal Perspective of Changing Environment

	The Springwood Room
	• Chair: Dan Cole, R. Townsend Professor of Law, Indiana University - Indianapolis • Richard Revesz, Dean and Lawrence King Professor of Law, New York University • Shi-Ling Hsu, Associate Professor of Law, University of British Columbia • Matthew Adler, Leon Meltzer Professor of Law, University of Pennsylvania • Jonathan Nash, Professor of Law, Emory University
12:45 – 2:00 p.m.	Luncheon The Atrium Ballroom Keynote Speaker Michael Greenstone, 3M Professor of Economics, Massachusetts Institute of Technology and Former Chief Economist of the Council of Economic Advisors on "The Social Cost of Carbon, Cost-Benefit Analysis, and Rational Climate Change Policy"

Appendix B: Conference Participants

Ken Acks	Executive Managing Director, The Cost-Benefit Group, LLC
Matthew Adler	Leon Meltzer Professor, University of Pennsylvania Law School
Deborah Aiken	Supervisory Economist, CPSC
Paul Anton	Chief Economist, Anton Economics
Steve Aos	Director, Washington State Institute for Public Policy
Sandra O. Archibald	Dean and Professor, Evans School of Public Affairs, University of Washington
Jon Baron	President, Coalition for Evidence-Based Policy
Clive Belfield	Associate Professor, Queens College
Richard Belzer	President, Regulatory Checkbook
Beth Cessna	Recruiting Consultant, The Pew Charitable Trusts
Scott Bird	Legal Advisor, State of Washington
Glenn Blomquist	Professor of Economics and Public Policy, University of Kentucky
Ann Bostrom	Professor and Associate Dean of Research, Evans School of Public Affairs, University of
Sylvia Brandt	Washington Associate Professor, University of Massachusetts, Amherst
Carol Bray	Senior Economist, Government Accountability Office, GAO
Robert Brent	Professor of Economics, Fordham University
Silvia Calderon	Student Master of Public Administration, School of International and Public Affairs, Columbia University
Trudy Ann Cameron	R.F. Mikesell Professor, Department of Economics, University of Oregon
Dominick Caridi	Chief Economist, Director Regulatory Development & Economic Analysis, Transportation Security Administration, DHS
Deven Carlson	Ph.D. Candidate, University of Wisconsin - Madison
Michael Caudell-Feagan	Deputy Director, Pew Center on the States
Stephanie Cellini	Assistant Professor, The George Washington University
Valerie Chang	Program Officer, John D. and Catherine T. MacArthur Foundation
Daniel Cole	R. Bruce Townsend Professor of Law, Indiana University School of Law, Indianapolis
Joseph Cordes	Professor of Economics and Public Policy and Public Administration, Trachtenberg School of Public Policy and Public Administration, The George Washington University
Joe Cook	Assistant Professor, Evans School of Public Affairs, University of Washington
Maureen Cropper	Professor of Economics, University of Maryland
Daniel Crowley	Graduate Student, Pennsylvania State University
Dennis Culhane	Professor, University of Pennsylvania
Victoria Deitch	Technical Research Associate, MDRC
Mark Dickie	Professor of Economics, University of Central Florida
Susan Dudley	Director, GW Regulatory Studies Center
Eric Eisenstein	DBA, Duke Clinical Research Institute

Neil Eisner	Assistant General Counsel, U.S. Department of Transportation
Scott Farrow	Professor and Chair of Economics, UMBC
Adam M. Finkel	Executive Director, Penn Program on Regulation, University of Pennsylvania Law
Michael Fitzpatrick	Associate Administrator, Office of Information and Regulatory Affairs
Sarah Garner	Harkness Fellow, Tufts Medical Centre
Elyzabeth Gaumer	Director, Research, NYC Department of Housing Preservation and Development
Joseph Glauber	Chief Economist, United States Department of Agriculture
Elise Golan	Deputy Director, Food Economics, Economic Research Service, USDA
James Goodwin	Policy Analyst, Center for Progressive Reform
John D. Graham	Dean, School of Public & Environmental Affairs at Indiana University
David Greenberg	Professor Emeritus, University of Maryland, Baltimore County
Michael Greenstone	3M Professor of Economics, MIT, Department of Economics
Tim Guinane	Assistant Director, U.S. GAO
Fumie Griego	Economist, OMB
James K. Hammitt	Professor of Economics & Decision Sciences, Harvard University
Michael Hanemann	Chancellor's Professor, University of California, Berkeley
Kevin Haninger	AAAS Fellow, U.S. Environmental Protection Agency
Arnold C. Harberger	Distinguished Professor of Economics, UCLA
Glenn Harrison	C.V. Starr Chair of Risk Management & Insurance, Georgia State University
Jonathan Haughton	Professor, Suffolk University
Robert Haveman	Professor Emeritus, University of Wisconsin - Madison
Philip Hawkins	Senior Vice President, Kurchner-Hawkins Associates
Nathaniel Hilger	Ph.D. Candidate, Harvard University
Paul Hill	Professor, University of Washington
Sandra Hoffmann	Fellow, Resources for the Future
David Hsu	Assistant Professor, University of Pennsylvania
Shi-Ling Hsu	Associate Professor, University of British Columbia Faculty of Law
Dean T. Jamison	Professor of Global Health, University of Washington
Glenn P. Jenkins	Professor of Economics, Queen's University, Canada, Eastern Mediterranean University, Northern Cyprus
Amber Jessup	Economist, DHHS/Office of Assistant Secretary for Planning and Evaluation
Robert Johansson	Senior Economist, USDA, OCE-CCPO
Richard Just	Distinguished University Professor, University of Maryland
Lynn Karoly	Senior Economist, RAND Corporation
Mark Kipperman	Senior Cost Analyst, BAE Systems
Allen Klaiber	Assistant Professor, Pennsylvania State University
Jack Knetsch	Professor Emeritus, Simon Fraser University
Mary Kokoski	Managing Editor, Journal of Benefit-Cost Analysis, UMBC
Frederick Kuchler	Agricultural Economist, USDA/ERS/FED
John Lott	Senior Research Scientist, University of Maryland, College Park
Yang Lu	Research Assistant Professor, University of Southern California
Brigitte Madrian	Professor, Harvard University

Patricio Mansilla	Direcor, Chemonics International
Sheena McConnell	Senior Fellow, Mathematica
Albert McGartland	Director, Environmental Protection Agency, NCEE
Cristina McLaughlin	Senior Economist, US FDA
R. Gregory Michaels	Direct, Impact Measurement, Chemonics International
Ari Michelsen	Center Director, Texas A&M AgriLife Research
Wilhelmine Miller	Senior Fellow, NORC
Eric Moore	Research Assistant, Resources for the Future
John Morrall	Affiliated Senior Scholar, Mercatus Center, GMU
Jonathan Nash	Professor, Emory University School of Law
Charles Neighbors	Associate Director, Health & Treatment Research, The National Center on Addiction and Substance Abuse (CASA) at Columbia University
Peter Neumann	Director, Center for the Evaluation of Value and Risk in Health
Kevin Neyland	Deputy Administrator, OIRA
Susan Offutt	Chief Economist, US GAO
Richard Peck	Associate Professor, University of Illinois at Chicago
Peter Pecora	Managing Director Research, Casey Family Programs/University of Washington
Lisa Randall	Graduate Student, The George Washington University
Richard Revesz	Dean, NYU School of Law
Lisa A. Robinson	Independent Consultant
John Roman	Senior Research Associate, The Urban Institute
Dan Rosenbaum	Senior Economist, Office of Management and Budget
Jennifer Rosenberg	Legal Fellow, Institute for Policy Integrity at NYU Law
Elena Ryan	Chief Regulatory Economist, US Customs and Border Protection
Prachi Sanghavi	Ph.D. Candidate, Harvard University
Max Sawicky	Assistant Director, Government Accountability Office
Robert Scharff	Assistant Professor, The Ohio State University
Andrew Schmitz	Eminent Scholar, Ben Hill Griffin Endowed Chair, University of Florida, Food and Resource Economics Department
Jason Schwartz	Legal Fellow, Institute for Policy Integrity at NYU School of Law
Tyler Scott	Ph.D. Student, Evans School of Public Affairs, University of Washington
Stuart Shapiro	Associate Professor, Rutgers University
Nathalie Simon	Associate Director, USEPA - National Center for Environmental Economics
Amy Sinden	Professor, Temple University Beasley School of Law
Taylor Spears	Doctoral Student, University of Edinburgh
Michael Stegman	Director of Policy and Housing, John D. and Catherine T. MacArthur Foundation
Jon Strand	Senior Economist, World Bank
Laura Taylor	Professor, North Carolina State University
Judy Temple	Associate Professor of Public Affairs and Applied Economics, University of Minnesota
Kimberly Thompson	President, Kid Risk, Inc.
David van der Goes	Pfizer Post-Doctoral Fellow, University of Washington
Josephine van Zeben	Hauser Research Scholar, NYU
Jay Variyam	Agricultural Economist, USDA/ERS/FED
Sara Watson	Interim Director of the Cost Benefit Analysis Initiative, Pew Center on the States

David Weimer	Professor, University of Wisconsin - Madison
John Wells	Chief Economist, USDOT/Office of the Secretary
Barry White	Research Fellow, University of Minnesota
Franck Wiebe	Chief Economist, Millennium Challenge Corporation
Richard A. Williams	Director, Regulatory Studies, Mercatus Center at George Mason University
Roberton C. Williams III	Associate Professor, University of Maryland
Chris Williges	Principal, System Metrics Group, Inc.
Justin Wolfers	Associate Professor of Business and Public Policy, The Wharton School, University of Pennsylvania
Danny Yagan	Ph.D. Candidate, Harvard University
William Zamula	Economist, Consumer Product Safety Commission
Richard O. Zerbe	Distinguished Professor, Evans School of Public Affairs, University of Washington
David Zorn	Director of Social Sciences, FDA,CFSAN
Conference Staff	
Julie Klein	Event Coordinator, Evans School of Public Affairs, University of Washington
Katie Ward	Research Conference Coordinator, Evans School of Public Affairs, University of Washington