

**National Symposium on Risk and Disasters  
Lessons from Hurricane Katrina for American Life  
Rebuilding the Gulf: Case Study for the Future**

**REPORT OF CONFERENCE DISCUSSION**

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## **Introduction**

The 9/11 terrorist attacks made it clear that we are living in a new world of geopolitical risks, and Hurricane Katrina has shown us how vulnerable we are to natural disasters. A Category 3 hurricane that had been widely predicted led to a chain of events that left more than 1,300 people dead and hundreds of thousands displaced in New Orleans and throughout the southern part of four states. It was the most expensive natural disaster in the history of the United States, but its true cost to the region and the nation cannot be measured in dollars alone.

While there have been and will be much-needed investigations about specific failures in preparation and responses at local, state and national levels, the disaster raises a set of much deeper questions about how we address risk in our society. Could our current policies and infrastructure be as vulnerable in our complex modern world as the levees meant to protect New Orleans? What public and private initiatives will be needed to truly increase security and mitigate risk in an increasingly insecure and inherently risky world? As a catastrophic failure, Katrina presents an opportunity to look at the entire public-private systems for addressing risks, and perhaps build better ones. As Stanford Professor Paul Romer has said, “a crisis is a terrible thing to waste.”

The University of Pennsylvania recognized that this issue of risk and disasters has emerged as one of most significant challenges facing our society. We also recognized that Penn has distinctive capabilities and connections in tackling these challenges. In developing this symposium, we drew upon the policy expertise of the Fels Institute of Government and the business knowledge of Wharton’s Risk and Decision Processes Center. We also were pleased to join with The Communications Institute and Congressional Quarterly to create a national forum for this important discussion. It is clear that the most robust solutions will not come from either public sector or private sector alone, but rather from the two working together, along with other stakeholders.

Given the urgency of the topic, just 100 days after the sixth largest US storm on record devastated the southern coast of the United States, we convened a distinguished set of panels in Washington to consider the broader questions of risk and disasters. Using the Gulf as a case study, we drew upon the insights of academic researchers in diverse fields, political leaders, government representatives, business leaders and other experts. They explored questions about: the nature of risk, managing risk, strategies for the Gulf and sorting out public and private roles.

Rebuilding our systems and infrastructure, like rebuilding devastated local communities on the Gulf, will take time. It will require strong leadership and committed effort. But there are few more compelling tasks than ensuring safety and security for our families, communities and nation. While our one-day symposium may have offered as many questions as solutions, it highlighted critical issues that must be resolved for us to move forward. This is just the beginning. In addition to this report, we will be shortly publishing a book on this topic, presenting deeper and more rigorous responses to these

questions from authors in diverse disciplines. These include contributions from experts on risk assessment, risk perception and choice, risk and crisis management and public-private partnerships. It will be distributed to every member of Congress.

We expect that this will just be the start of a dialogue and honest debate. We hope it will play an important role in shaping creative solutions to these challenges in time to reduce the risks or better respond to the impacts of the next major disaster.

Ronald J. Daniels, Provost, University of Pennsylvania

Donald F. Kettl, Director, Fels Institute of Government, University of Pennsylvania

Howard C. Kunreuther, Co-Director, Risk Management and Decision Processes Center,  
The Wharton School, University of Pennsylvania

## **Summary Highlights**

The discussions by panelists and responses to questions from the audience were wide-ranging. Among the points made during each panel were:

### **Risk: How We See and Deal with Risk**

- Cost-benefit analysis can help to assess investments before disasters strike, but often a “political cost-benefit analysis” means the conclusions will not be implemented.
- Benefits of prevention and remediation are local but costs are often national, which may distort individual decisions.
- There are many sources of uncertainty, including the risks themselves, political systems, and legal actions in response to disasters.

### **Confronting Catastrophes: How To Manage Risk**

- Distortions of human psychology affect perceptions of risk and the resulting preparations and responses. We need to give more attention to the psychology of risk.
- Individuals appear to learn little from past experiences and near misses.
- We face a mismatch between the problems we are trying to solve and strategies, such as cost-benefit analysis, used to solve them.

### **Rebuilding the Gulf**

- Given inevitable shifts in the waterways that will make New Orleans a “back-country bayou,” the city should be abandoned and investments made in a port 150 miles upstream.
- Relocation vouchers could be used to provide incentives for citizens to move out of risky areas without limiting where they move.
- In addition to rehousing displaced citizens, we need to pay attention to rebuilding communities.

## **Governance: Sorting Out the Public and Private Roles**

- Public and private roles are muddy. It is hard to find a “bright line” role for government in addressing such crises, and there may not be a market for clear solutions.
- Regulations need to create an environment that motivates individuals and businesses to invest in prevention and take other actions to mitigate risks and prepare for disasters.
- The current “public insurance” program only does one thing: compensation. It has no premiums, risk monitoring or clear benefits. We need a more robust system for risk management.
- There could be a need for a government backstop, with a high threshold, for insuring catastrophic risks. We might require the insurance industry to pass along a percentage of premiums to government commensurate with the risk that is transferred to the public sector.
- Since those hit hardest by disaster are often least able to bear the burden, we need to look at ways to achieve equity, but the insurance industry may not be the best mechanism.

## **Moving Ahead**

- Structural problems in the government budgeting process create disincentives for prevention, making it harder to invest in mitigation measures before a disaster and easier to appropriate funds for relief after the fact. Can these two budgeting systems be better integrated?
- We need to address gaps in disaster relief such as transitioning Katrina refugees from temporary housing to permanent communities.
- Nature won’t wait. There is an urgent need to put new processes in place before the next disaster strikes.

## **Risk: How We See and Deal with Risk**

*Moderator: Howard Kunreuther, Co-Director, Risk Management and Decision Processes Center, The Wharton School, University of Pennsylvania*

*Robert P. Hartwig, Senior Vice President & Chief Economist, Insurance Information Institute*

*Matthew Adler, Professor of Law, University of Pennsylvania Law School*

*Andrew Hickman, Vice President of Research & Analysis, RMS Consulting*

*Detlof von Winterfeldt, Director, Institute for Civic Enterprise, School of Public Planning, and Development, University of Southern California*

In setting the stage for the conference, Howard Kunreuther discussed the nature of risk, highlighting three aspects in particular:

- **Risk assessment:** Estimating the likelihood of an event occurring and potential consequences.
- **Risk perception:** Beyond statistical probabilities, many psychological and emotional factors affect the way people perceive and respond to risk. (This raises issues of risk communication and how people learn from the past.)
- **Risk management:** What is the role of state and local governments in managing risks? How do we bring together the public and private sectors to create systems for preparing for surprises?

### ***Challenges of Cost-Benefit Analysis***

Matthew Adler said risk management strategies need to undergo more rigorous cost-benefit analysis as well as be analyzed for equity. He noted that, following new federal requirements, parts of the government such as the Environmental Protection Agency (EPA) have implemented rigorous analysis to measure the impact of their investments.

He said we need to take a similar approach to natural disasters. Efficiency is not the only concern of this analysis. Measures also need to maximize well being, quantifying impacts such as loss of life, injuries, homelessness and psychological trauma to assess how policies contribute to reductions in these dimensions. Many of these softer impacts can be placed on a dollar scale. Adler noted that there is even an accepted price for loss of life, which is generally placed at \$5 to \$6 million (based on looking at what people are willing to pay to reduce life-threatening risks).

Government should also assess the equity of its strategies. Andrew Hickman said government should leverage the resources of the insurance industry, where there is already a lot of science for quantifying risks.

Robert Hartwig said the insurance industry has done a good job of risk assessment (aside from preparing for terrorism). They have modeled many kinds of worst case scenarios, including a scenario like the one experienced with Katrina. The problem is that “there are such a large number of these scenarios, we don’t know which ones to act on first,” he said. “No society can prevent all of these. There is a point of diminishing returns.”

### ***The Political Calculus***

But actual decisions about preventive measures and response plans are not made based on this cold hard calculus of risk and reward. “There is a political cost-benefit analysis that can’t be ignored,” Hartwig said. The political cost-benefit analysis is whether an expenditure will increase or reduce the likelihood of the politician being reelected, he said. This leads to ad hoc allocations and planning. “A declaration that New Orleans should not be rebuilt and sink beneath the waves is unthinkable politically even though it might be economically rational,” he said. “Politicians in the midst of crisis have no ability to apply economic cost-benefit analysis.”

Detlof von Winterfeldt said that weighing costs and benefits in preparing for or responding to a hurricane is relatively straightforward compared with assessing investments to combat terrorism. He noted that in the mid 1980s, there were cost-benefit analyses “that said protecting against a Category 3 hurricane was a reasonable thing to do,” he said. “The failure of these analyses was that many of the recommendations were not implemented. This was not a result of the analysis itself but of the political process.”

He said we also need to recognize that the analysis is more complex than just weighing risk reduction versus costs. “It is a multi-objective problem,” he said. “We are concerned not only about protecting the city from flooding, but also issues such as transportation and land use.”

### ***Distorting the Market***

Government creates distortions in the market. Hartwig said an insurer may choose not to insure a \$25 million house on stilts on the coast of Florida, but the “state-run insurance company in Florida” will protect it in order to attract individuals to the state and grow assets. The cost of providing this protection is essentially spread across the state and nation through disaster relief. “We do cost-benefit analysis but the market-based signal is completely washed away in most of these areas where we have these disasters,” he said. This subsidy is under the radar, so most people in the state don’t realize it is happening until after a disaster strikes.

This means that the costs are sometimes disconnected from the benefits. The nation as a whole might bear the costs for disaster preparedness and response, but the local region benefits the most. The connections could be strengthened by linking costs and benefits more closely. “Why couldn’t New Orleans impose a tax on conventions to pay for stronger levees?” Hartwig asked. “Local officials need to incur the costs for the benefits.” Why should the whole nation pay to keep restaurant open in French Quarter? It is not obvious that it is truly in the interests of everyone in the United States to pay for replenishing beaches in Florida.

### ***Impact of Uncertainty***

Howard Kunreuther said that uncertainty creates further challenges in assessing risks and rewards. “With uncertainty, everyone can find their favorite expert to defend their position,” he said. “The real challenge is how to get people to appreciate uncertainty as

opposed to using uncertainty for their own ends.” Adler noted that there are three types of uncertainty: 1) the likelihood of a particular event, 2) the uncertainty of complex chain reactions set off by the event, and 3) uncertainties that are not even modeled, such as an asteroid falling to Earth.

While the first type of uncertainty may be modeled fairly well, the others are much more difficult. Hartwig said this is why the 9/11 terrorist attacks were far more devastating to the insurance industry than Hurricane Katrina. The attacks were an unmodeled risk and there were correlations between the property damage, workers’ compensation, a weakened economy and collapsing financial markets.

Another uncertainty is whether we have now entered a period where natural disasters will occur more frequently than historical patterns would suggest. “Are we now in a cycle where 100-year floods are more frequent?” asked Adler, who argued for using a Delphi method to pool expert opinions. “I don’t view uncertainty as an insurmountable obstacle. We need some kind of national commission to do a full-blown analysis.”

Even experts disagree, however. Von Winterfeldt said that in the nuclear power industry, five or ten experts might have “order of magnitude” differences in their views of even a relatively simple issue such as the failure frequency of a check valve. With hurricanes, the uncertainty is not only with the weather, but how events play out afterward. For example levees could not only be overtopped but also undermined. The pumps could fail to work. And a breached levee sets off a chain of other downstream effects.

The legal environment adds another layer of uncertainty. Hartwig said that if lawsuits in New Orleans are successful, they could end up costing the insurance industry more than rebuilding the levees. Yet the industry does not model lawsuits that result from a disaster. The lawsuits in New Orleans generally involve issues of whether damage to homes and other structures was due to water versus wind. Wind damage is generally covered but water damage has long been excluded from insurance policies. Trial lawyers and homeowners, backed by the attorney general of Mississippi, are arguing that wind, not water, destroyed the homes. “We are talking about a non-priceable risk,” Hartwig said. “They are retroactively rewriting the terms of the contract to cover this even though we don’t have one cent in reserves for it.”

## ***Q&A***

### ***Q: Where does the \$5 million to 6 million cost of human life come from? What is the justification?***

Adler said people are shocked by this idea, but it is used by the EPA, FDA, and other agencies all the time. The problem with death is singular, so willingness to pay might be for an individual might be considered to be infinite. In fact, however, people accept risks all the time. There are incremental increases in wages for risky occupations and people have a limit on what they will pay to reduce risks. They will pay roughly \$60 to avoid one in 100,000 risk, and that leads to the figure of \$6 million per life. On the other hand, von Winterfeldt noted that the implicit value of a human life in government actions could

range from \$50,000 to \$10 billion, and actual coverage by individuals is lower in the US and even lower in other parts of the world.

***Q: Once you look at costs and benefits, do you fall into the trap of Ford with Pinto (where the company did not recall defective gas tanks because a cost-benefit analysis indicated that it would cost more to recall than dealing with estimated casualties)? If you look at cost benefits, aren't you looking at more problems with lawsuits?***

Hartwig said that because water damage is clearly and openly excluded from insurance contracts, this is not a Pinto issue. "Every word of every contract over last 50 years, approved by regulators in every state, clearly excluded, water, so there is no ambiguity in this whatsoever."

***Q: With all the good modeling years in advance, and a series of stories in the New Orleans paper highlighting the risks, what kind of cost-benefit and risk analysis could have made the government more responsive?***

Von Winterfeldt said many of these studies were done in relatively academic environments and didn't translate into policy decisions. Funding was also an issue. "I don't think you fix this by doing better studies," he said. "It is a necessary but not a sufficient solution. We need to design a process so the studies are embedded in a way that decisions will be made informed by the studies. Then these studies will be very useful."

***How long will it take to come up with new actuarial tables and write new insurance policies to reflect the experience with Katrina?***

Hickman said Katrina has been a learning experience, just as Hurricane Andrew was a decade ago. The insurance industry is upgrading models based on the actual experience. But "the real question is a political one." How fast can that learning be reflected in market pricing?

***Q: We all benefited from real estate values rising, and enjoy going to beach. We continue to build in coastal areas. What can we do so we do not continue to encourage behaviors that lead to high losses?***

Hartwig said that local governments that benefit from jobs and tourism should bear a greater responsibility for costs. Individuals and local governments can only be expected to maximize their own self interests. He said there needs to be a system for national cost benefit accounting to assess risks and establish structures better designed to share risks.

## **Confronting Catastrophes: How To Manage Risk**

*Moderator: Donald F. Kettl, Director, Fels Institute of Government, University of Pennsylvania*

*Baruch Fischhoff, Professor, Department of Social & Decision Sciences, Department of Engineering & Public Policy, Carnegie Mellon University*

*Peter Gosselin, Reporter, Los Angeles Times*

*Robert Meyer, Co-Director, Risk Management and Decision Processes Center, The Wharton School, University of Pennsylvania*

What is the job of government in mitigating disasters? What is the responsibility of individuals? Donald Kettl said that preventative measures, when taken, can be very effective in reducing losses from hurricanes. After the devastation of Hurricane Andrew, politicians were motivated to engage in careful analysis and investments in prevention. They found, for example, that roofs could be kept from blowing off by the addition of a relatively inexpensive steel band. “They realized that it was a lot cheaper to keep roofs from blowing off before the hurricane than rebuild them after they are gone,” Kettl said. “It often is a lot easier to manage risks and prepare for catastrophes before they occur.” But there is rarely a political motivation until immediately after a disaster.

Paying for prevention and response raises issues of distribution of wealth across geography and socio-economic segments. As many of 60 percent of the homes in New Orleans had no insurance, and the devastation was concentrated among people who were least able to respond and bear the costs.

### ***Human Psychology and Learning***

Baruch Fischhoff said that we need to pay attention to the psychology of risk and communications. “What information does the public need? Do we have the right information? And have we delivered it in a comprehensive form?” he asked. He recalled a comment by an official after Hurricane Rita that they had 15,000 people in their office and not a single psychologist. “This means that no one is qualified to evaluate evacuation recommendations to know if they apply to them or address concerns that if people evacuate their cars they will be there when they get back.” Kettl said that one of the things that might have made the evacuation of New Orleans work better, from a psychological perspective, would have been a place for evacuees to drop off their pets.

Robert Meyer said one of the puzzling things about Katrina is that the disaster happened in a region that has had extensive experience in dealing with this kind of storm. The 400-mile stretch along the southern coast of the United States experienced 21 tropical storms between 1995 and mid-August 2005. “If they had this much experience, how could they not anticipate this type of thing?” he asked. During the near-miss of Hurricane Ivan 11 months before Katrina struck, New Orleans officials actually recognized the weaknesses of their systems, including using the Superdome as an evacuation center, but they apparently did not use this experience to improve their systems. People are surprisingly short sighted and myopic.

The lack of learning is a serious concern. “How can we learn from the past?” Kettl asked. “If a doctor administered a stress test to a patient who failed first one (9/11) and failed a second (Katrina), most doctors would prescribe a very rigorous intervention. Is government itself up to the job?” Fischhoff said that “our system knows less than it did 50 years ago. The magnitude of the institutional learning barrier we are up against is staggering.”

He said, for example, that one of the robust research results is that individuals generally don’t panic during crises. Instead, they rescue neighbors and family members. But this knowledge was more widely known during World War II than today. There is a persistent view, even among those planning for disasters, that the public will panic. “People have really deep seated prejudices about other people’s irrationality,” Fischhoff said. “We haven’t been able to crack that.”

Kettl said that Kathleen Tierney, Director, Natural Hazards Center, University of Colorado, Boulder (who was not able to attend the conference), has pointed out that the way we think about disasters is much too narrow. The physical event is just the starting point. The impact depends on a vulnerable environment and vulnerable population. “We thought we had natural disasters under control and issues of race and class under control,” Kettl said. “It turned out we didn’t.”

### ***All Thumbs and No Fingers***

Peter Gosselin referred to Charles Lindblom’s quote that governments “have all thumbs and no fingers.” Markets, in contrast have all fingers and no thumbs. “Markets are not good grabbing onto big problems,” Gosselin said. “Governments can grab but they are very clumsy.”

One of the questions Gosselin had when he came to New Orleans was whether markets alone could restore the city. He concluded that they could not. In discussions with individuals whose homes had been destroyed by the disaster, he said they had similar questions. They needed to know what was going to happen to the levees, when utilities were come back and what their neighbors are going to do. “Most of the things were government’s role but they were not complicated questions,” he said. “They were not the big issues of redistribution or fixing inequities of class and race but simple declarations that make clear what they can rely on. But they were not getting any of these answers.” The roles of local, state and national government muddy the waters, and these “simple” questions such as rebuilding the levees may involve some very complex tradeoffs.

Citing the disconnect between careful academic and industry analysis and political action, Gosselin said academic experts need to consider if “there is a political market for your intellectual product.”

### ***Rising Expectations of Government***

Meyer pointed out that now that individuals expect government to step in, they may reduce preparation in advance of a disaster. For example, if people expect the government to provide water, they will not stock their own supplies.

He also said planning for rebuilding should occur before the disaster strikes. In a certain sense, he said, responding after the fact is too late because plans need to be in place to rebuild up to stronger standards. Otherwise, the infrastructure tends to be rebuilt to the old standards, setting the stage for the next catastrophe.

“One thing we know is that it is not as if inaction is an option,” Kettl said. “We are going to do something. The question is: Can we make what we are going to do a little bit smarter than would otherwise be the case?”

## **Q&A**

***Q: The Baltimore waterfront is example of how the fingers and thumb can work together. Government rewrote the rules and allowed the fingers to do their work. How can this be done in New Orleans?***

Gosselin said one positive development has been the growth of websites for sharing information about local neighborhoods and the careful analysis of the building inspector in New Orleans, who has set up a computerized assessment of all the houses and created a site for building permits. “Can this bottom-up approach produce some kind of comprehensive approach?” he asked.

Fischhoff said the solution might be to create a set of national rules that everyone could rally behind in advance, rather than the ad hoc disaster allocations after the fact. These relief funds don’t help to force people to behave better ahead of a disaster.

***Q: While government intervention may be needed in addressing disasters, many people don’t believe large-scale government action can be effective. How do we get people to think outside the box?***

Fischhoff said, “The government has inserted itself into the process but has not been able to deliver. Government needs to get a whole lot better or fade away entirely.” Government, for example, needs to ramp up public health to take a leadership role in addressing issues such as avian flu. Kettl said that while insurance and individuals have a role to play, “no matter how hard they try, it is not enough. So government gets dragged in kicking and screaming.”

***Q: From the public sector at all levels, there does not seem to be a demand for the supply of analysis and methods being discussed. Why?***

Fischhoff said one place where there might be a political market for research is on strategies for communications to help citizens respond and make effective decisions. Meyer said there also may be a market for specific answers rather than methods. Research can offer better strategies for encouraging compliance and methods for doing cost-benefit analysis. Research also can help calibrate how precise these approaches are in their outputs. Some of them are “falsely precise.”

***Q: Can we try to identify the responsibility of the government as a threshold issue rather than a bright line distinction?***

Gosselin said the line was drawn very brightly back in the time of Calvin Coolidge in 1927, when he clearly stated that it was not the government's role to respond to disasters. Then the government began working on levees and created FEMA. The lines are now no longer clear.

Fischhoff said government can help facilitate public discussions of tradeoffs related to different risks. For example, if a dirty bomb is exploded, would people rather stay in a hotel for an entire year or face an additional one in 10,000 cancer risk by returning home immediately? "This would move the conversation toward focusing on the common good," he said. "But we don't have any mechanism for getting this conversation going."

***Q: One nursing home in New Orleans had an evacuation plan that wasn't followed and more than 50 people were killed. Who is responsible for enforcing the plans we have on the books?***

Meyer said it boils down to personal and individual responsibility. Fischhoff said we need to audit whether the human side of our systems is also likely to fail. "We have no real way of estimating the reliability of the human part of our systems. Until we do that, we are just praying."

## **Building for the Future: Strategies for the Gulf**

*Moderator: Donald F. Kettl, Director, Fels Institute of Government, University of Pennsylvania*

*Kenneth R. Foster, Professor, Department of Bioengineering, University of Pennsylvania*

*Robert Giegengack, Professor, Department of Earth and Environmental Science, University of Pennsylvania*

*Todd La Porte, Professor, Department of Political Science, University of California, Berkeley*

*Joanne M. Nigg, Professor, Department of Sociology and former Director, Disaster Research Center, University of Delaware*

*Brian Strom, Director, Center for Clinical Epidemiology and Biostatistics, University of Pennsylvania*

*Michael Trebilcock, Visiting Professor of Law, Yale University; Professor of Law, University of Toronto*

The third panel turned to the case of rebuilding the Gulf as an illustration of the complexities involved in decisions about responding effectively to disasters. Many options were considered. Robert Giegengack and Kenneth Foster, based on scientific understand of inevitable shifts in Mississippi delta geography, argued for abandoning New Orleans and relocating the port city 150 miles away. Michael Trebilcock called for using relocation vouchers to give incentives for displaced residents from the hurricane-devastated regions to make their own decisions about where to relocate.

### ***The Argument for Relocating New Orleans***

Giegengack said Hurricane Katrina was not unprecedented in magnitude. “Every detail of the Katrina disaster was anticipated” but it met a city that was unprepared, despite 200 years of well intentioned but ineffective efforts to prepare for it.” He said even the wealthiest and most technological sophisticated country in the world lacks the knowledge and resources to protect New Orleans from a repetition of a Katrina-like disaster. “We lack the capacity to protect New Orleans,” he said.

A more significant geological consideration, however, is that despite many years of efforts by the US Army Corps of Engineers to keep the Mississippi River on its current course, it will ultimately be swallowed by the Atchafalaya Distributary. “Such a diversion of the Mississippi will leave New Orleans and Baton Rouge as back-country bayou towns.” He said we should relocate the city, or at least the port, at the head of the Atchafalaya 150 miles upstream to keep open a route to the Gulf.

Kenneth Foster, who teaches a course in ethics for engineers, said there must be an equitable approach to relocation, but we also need to recognize that we “cannot make New Orleans safe by strengthening the levees.” Given that another breach of the levees is inevitable, the city should prepare better evacuation plans and build infrastructure such as flood walls within the city to limit the impact. “Simply saying that technology is going to save us will not work this time.”

### ***Public Health***

Brian Strom turned attention to issues of public health in disasters. First, there is the concern about disasters in which the primary agent is biological, such as anthrax and smallpox attacks, or pandemics such as avian flu. “Avian flu, if or when it happens, will dwarf Katrina. That has been known for five years but is just receiving attention.”

The second public health concern is that disasters often spark major public health crises as the infrastructure breaks down. Katrina demonstrated this, with concerns over water, follow-up infections for citizens and rescue works, and difficulty in providing care to patients. He said that ten days after Katrina, half of the people on dialysis were missing. A serious biological attack could lead to a breakdown of society. “Society is much more likely to disappear in its normal structures because people are afraid to come out of their houses.”

One of the challenges in developing coordinated responses is that public health is local. Physicians have licenses for a particular state and privileges for a particular facility. This limits flexibility in sending resources to respond to localized crises. In addition to the decentralized nature of health services, much of the public health infrastructure “has been gutted.”

To develop effective solutions, we need to focus on prevention of direct impacts, as well as secondary and tertiary effects of disasters. There is also “a critical need for public health and clinical medicine to work together,” he said. “Public health needs to do planning, and clinical medicine the implementing. They are now operating in parallel and not working together.”

### ***Relocation Vouchers***

Michael Trebilcock examined the rationales for government involvement, policy instruments that could be used and institutions that could implement these instruments. He questioned whether the same government agencies should be in charge of preparation and response to disasters. “We wouldn’t ask the local fire brigade to engage in long-term planning prior to a disaster, so maybe we shouldn’t ask FEMA.”

Government protections may encourage people to move into risky areas. “People may make initial decisions to locate in disaster-prone areas if they think the consequences will be borne by others.” Relocation vouchers to displaced citizens would send a credible message that there would be no government support or bailout for those who remain in these risky regions. It also would allow citizens to make their own choices about where to relocate.

### ***Rebuilding Community***

Joanne Nigg, who noted that Katrina’s impact extends beyond New Orleans to the southern part of four states, said such disasters have “severely shredded” the social fabric

of local communities. “Recovery is a process that takes place over a long period of time,” she said.

To give these communities a sense of vitality, we need to address three questions:

1. What is appropriate scale for recovery efforts? Some communities have doubled in size in four days as they absorbed refugees. One plan is not going to fit all, so they have to be modified for local conditions.
2. How can the process of decision making be further democratized? With refugees from Katrina in 48 different states, “we have a diaspora situation.” How could technology and other mechanisms to be used to bring these diffused former citizens back into the planning process?
3. How do we renew a sense of community? She said that a friend in natural resources noted that “we know how to grow a tree, not a forest.” Similarly, we know how to rehouse a family after a disaster, but not how to rebuild a sense of community vitality that was there before the disaster hit.

### ***Preparing for the Next Disaster***

Todd La Porte said first and second responders were surprised by what happened in New Orleans, even though it was one of the most studied disasters in history. The event was “beyond imagining” so it overwhelmed the capacity and infrastructure for response. “People were surprised.”

One of the lessons for the future is to prepare responders for the unthinkable. He noted that the nuclear industry engages in full dress rehearsals of nuclear disasters that allow a realistic simulation of an actual emergency. Terrorism presents new risks, including increased destructive capacity and adversaries who do not see survival as a key element of self interest. “The levels of analytical demands that confront us are well beyond our capacity,” he said. “We need to increase our capacity to respond to very serious catastrophic surprises that may overwhelm our traditional response capabilities. He also said we may need something like “an annual index of expected suffering” in communities at risk to engage and motivate the population to discuss what needs to be done.

### ***Q&A***

***Q: When you say that relocating New Orleans is the only rational decision, how rational is it?***

Giegengack said that in terms of cost-benefit analysis, any cost is too large if the benefit is negative. “Every dollar we spend protecting New Orleans has the consequence of advancing the date of the capture of the Mississippi.” He said to look at other examples such as Pompeii where it was clear that it made sense to relocate rather than rebuild. Foster noted, however, that the government may have the moral obligation to make the city as safe as possible in the short term, even if it cannot guarantee long-term safety.

***Q: How effective has the new national response plan been and how does it dovetail with state and local plans? How can they be improved?***

Niggs said the national response plan is still being evaluated and implemented. Passed just last year, it applies to federal agencies in 2006, states in 2010 and there is no date for local agencies. “It is difficult to evaluate because it is so new and just wasn’t functional at this point.” Kettl added that it is not clear how many people in operating authorities have actually read it.

***Q: How are agencies dealing with long-term relocation?***

Niggs said that there have been systematic attempts to address social issues. For example, the governor of Mississippi set up a design charrette and held town meetings to develop draft plans for 11 communities. The response in Louisiana has been less systematic. “Getting people from temporary housing to real communities is going to be a challenge,” she said.

***Q: If we assume New Orleans is a patient that is terminal and dying, should there be interventions to keep it alive?***

Giegengack suggested that we should “sell crucial cultural components of New Orleans to Walt Disney.” While the French Quarter may continue to draw tourists, the city’s role as the nation’s largest deepwater port must be reexamined. Foster said that given the price tag of rebuilding, “the default decision has been made” not to rebuild New Orleans. “We will rebuild the levees to some standard, but there should be some transparency. The public should be aware that this could happen again.”

***Q: Is our federalist government designed to deal with this, or do we need a fundamental change?***

Trebilcock said biases at the political level may keep the city alive despite the rational arguments for abandoning New Orleans. “There are all kinds of political incentives to be responsive in the short-term, but making investments in long-term strategies is not something that has any payoff for politicians.” La Porte agreed that projects for prevention and rebuilding have lifecycles that are far longer than the terms of politicians. This mismatch has an impact on decisions from the space program to nuclear waste management. “We don’t have a way to make long-term commitments that can’t be reversed.” There is a Constitutional issue about whether Congress can bind its own future.

Niggs suggested that an independent body might be established to address the risks involved in rebuilding in the Gulf region. This could free the deliberations somewhat from short-term political pressures and permit an honest dialogue about risks and possible solutions.

Kettl compared the challenge to the story of an evacuee from Katrina in a wheelchair. She was to be relocated to a trailer by FEMA, but there was no ramp. “We need to create institutions that can bridge these gaps in so many ways,” he said.

## **Governance: Sorting Out the Public and Private Roles**

Moderator **Howard Kunreuther**, Co-Director, Risk Management and Decision Processes Center, The Wharton School, University of Pennsylvania

**Scott Harrington**, Professor, Health Care Systems, The Wharton School, University of Pennsylvania

**Robert P. Hartwig**, Senior Vice President & Chief Economist, Insurance Information Institute

**Charles Meade**, Senior Physical Scientist, RAND Corporation

**David Moss**, Professor of Business Administration, Harvard Business School

**Richard Murray**, Chief Claims Strategist, Swiss Re

**Harvey Ryland**, President & Chief Executive Officer, The Institute for Business and Home Safety

The final panel examined public and private roles in managing risk, both long-term and short-term, and pre- and post-disaster. What are the roles at the local, state and federal levels?

Charles Meade said our approach to preparing for natural disasters is like the Department of Defense investing in better hospitals to treat the wounded rather than better armor and aircraft. “That has been the approach to disaster, responding after the fact, and not doing much to prevent impacts from occurring,” he said. “Many impacts are quite preventable. There have been lots of discussions about rebuilding the Gulf region but not one discussion of rebuilding a more resilient infrastructure.”

Incentives are vital to changing behavior. Harvey Ryland agreed that while we know how to increase protection of people, property and businesses to decrease the impact of disasters, “we are not applying what we know.” One problem is that we have not offered appropriate incentives to homeowners and business owners to take action. “People do things because of incentives and we have not offered an adequate set of incentives.” For example, private businesses might offer discounts on financing and materials or government might charge lower building permit fees for homeowners who use disaster-resistant construction. Given that some 25 percent of companies go out of business after a disaster, the private sector should be motivated to encourage prevention.

### ***Government Role in Shaping the Private Sector Environment***

Scott Harrington said that there should also be incentives for people to purchase enough insurance coverage at rates commensurate with their potential losses. Markets “do tolerably well” in addressing risks and providing incentives, but they need public initiatives to support them. He recommended the following approaches:

1. ***Rationalize disaster assistance:*** Public policy makers need to recognize that generous ex post disaster assistance can have negative impacts on ex ante disaster preparedness. “We need to make sure the public at large recognizes that generosity also has costs. We probably err on the side of too much ex post disaster assistance.”

2. **Reform tax structures:** The US corporate income tax system provides a disincentive for catastrophe insurance, in effect taxing the industry twice. As a result, catastrophe insurance needs a premium large enough to cover this extra layer of tax. “We need to remove the impediments to a robust market.”
3. **Reduce price regulation in insurance markets:** “We need as little price regulation in insurance markets as possible if we want to get maximum incentive effects.”
4. **Limited government insurance:** There may be a need for a government backstop to cover extreme losses, as long as the threshold is very high. A federal catastrophe reinsurance program could be created to supplement the national flood insurance program.

### ***The Need To Restructure Federal Disaster Assistance***

David Moss said that the de facto federal disaster insurance system needs to be radically restructured. As it stands, public coverage “has no premium, no risk monitoring and benefits are not defined. Government insurance does one thing, compensation, not any of the other aspects of risk management.”

There are rising expectations for government in natural disasters. In reacting to a severe drought in Texas in 1880, Grover Cleveland noted that although people should support the government, the government should not support the people. In a 1927 flood on the Mississippi, the government paid only 3.3 percent of damages (Red Cross covered 5 percent). Since the 1970s, however, the government has borne closer to 50 percent of the costs of disasters. “Public expectations are such that this statement Grover Cleveland made could not be made by any politician any time in the near future,” Moss said. Yet this increased support from government has come with little risk monitoring and other controls.

In place of this ad hoc system, there needs to be a more rational federal reinsurance system, he said. Moss said a catastrophe rider could be added to every insurance policy. Private insurers might pass along between 20 to 80 percent of the risk to federal program, with the caveat that they also pass along the same percentage of their premiums. This way the market sets the price, but the government is compensated for its role. As insurers reduce their own risks, they also reduce their rewards. “The federal government would still be spending money but in a much more rational way,” Moss said. “Our disaster policy is the worst structured policy we have in the United States. We can do better.”

Richard Murray said insurance wants to be “part of the solution set” but needs to be in a context where it can still generate returns. The regulatory environment for the industry, constrained by 51 regulation centers in the United States, will determine whether companies can play a strong role in addressing “all the ticking time bombs we deal with” (including natural catastrophes, terrorism and global pandemics). The wrong policies “will kill the animal,” he said, noting that the industry is relatively easy to enter and exit. “Many people think of us as a river of gold flowing in from some other planet that will be there for the costs of catastrophes. Others see the insurance industry as Scrooge, Inc., unable to meet its obligations in order to fatten the shareholders.”

Instead, the industry can be part of an intelligent collaboration to address these challenges along with government policymakers and insurance policyholders. In addition to risk distribution, insurers can help encourage strong building codes, sound medical practice and other behaviors. The insurance industry also has a commitment to prevention, “in the near complete absence in the public sector of preventive approaches to crises.” One of the senior officers in any insurance company is the Chief Risk Officer. “We have the capacity to deliver as long as we are not overly constrained,” Murray said. “We do want to be part of the solution set.”

## **Q&A**

***Q: Usually the prerequisite for government intervention is some sort of market failure. Is there a market failure here?***

Harrington said that it is not so much “market failure” as a case where conditions that make insurance attractive are no longer in place. Losses are so large and positively correlated. Insurers cannot diversify risks so they need to hold more capital per exposure. “I would not think of it as a ‘market failure’ in a pejorative sense, but the context for the industry needs to be addressed,” he said.

Moss said policies in the industry related to flood damage mean that most of the losses from Katrina are not covered. The policies of almost every US insurer exclude flood damage. Why? In the flood of 1927, losses were so great that the coverage was removed. Catastrophes have many uncertainties and ambiguities that make it difficult to provide insurance. This has led to underinsurance of affected regions, enormous amounts of uninsured losses, which might be characterized as a “market failure” although the cause is complex.

***Q: How would a federal catastrophe reinsurance program be priced? How could we protect the reserves from government misapplication?***

Moss said that while we don’t know how to set the price for government coverage, “it doesn’t mean the right price is zero. In fact, the only price we know to be incorrect – zero – is the one that we choose.” He said the private insurance industry would set the price. Government support, such as the terrorism reinsurance program, should have some pricing. Harrington said that such a system has to be designed in a way that would prevent underpricing by insurers, knowing there is a government backstop. The government program would kick in when losses reached truly catastrophic levels.

Kunreuther said that for earthquakes and hurricanes, it is optimum to set premiums that come close to reflecting risk. With better data today, it might be possible to cover flood damage. This would increase coverage and avoid the expensive legal battles seen in the aftermath of Katrina over whether damage resulted from wind or water.

***Q: How can we address issues of inequity?***

Ryland said that the segments of communities hit by disasters that are least able to survive when disasters hit are in lower income areas, but that insurance is not the right mechanism for reducing inequities. “We do need to address this issue, but insurance by its nature should not address equity issues,” he said. “We should be a leavening agent.” Moss added that while insurance redistributes risk, it should not be “redistributing income.” Insurance has its own justice because we don’t know who the potential risks will actually affect. There probably needs to be another mechanism for addressing equity.

But a government role presents complications as well. Harrington pointed out that if there are official subsidies for low-income residents who live in high-risk areas, this will take resources from others. “Even though motivated by a concern to help, we have to think about how it might harm other low-income areas.”

Meade said policymakers have a motivation to closely examine this issue after paying so much for relocation and rebuilding after Katrina, which might have been prevented with better mitigation in advance.

## **Moving Ahead**

*Moderator, David Rapp, Editor and Senior Vice President, Congressional Quarterly*

*Doug Holtz-Eakin, Director, Congressional Budget Office*

*Daniel Matthews, Staff Director, Subcommittee on Economic Development, Public Buildings and Emergency Management, House Transportation Infrastructure Committee (FEMA/Katrina rebuilding oversight)*

*Marc H. Morial, President, The National Urban League, former Mayor of New Orleans*

*Mark Oesterle, Chief Counsel, Senate Banking Committee*

David Rapp said that as a journalist covering agriculture and the budget appropriation process, he saw firsthand the structural weaknesses of the government approach to budgeting for risks. Policymakers in agriculture wrestled with the idea of crop insurance for inevitable droughts and freezing, but given that Congress automatically appropriates crop relief every year, there was no incentive for farmers to purchase insurance.

### ***Outside the Budget Process***

The budget process also affects how governments deal with catastrophes. While zero-sum budgets mean that expenditures for prevention must be taken from other areas, emergency appropriations operate outside of this system. This “structural problem” makes it much easier to respond to disasters after the fact than pay even a much smaller price to prevent them.

Doug Holtz-Eakin said one way to address this challenge would be to bring these two systems together (emergency appropriations and ongoing budgeting) to “level the playing field against other priorities.” This way, all the options could be considered together and priorities established. This would encourage prevention rather than relief after the fact. We also need to decide what parts of the solution should be handled by the public and private sector. “The question is: Do you really believe the government has advantages in addressing risks and does it really have the capability to be an insurance company?” he asked.

Marc Morial said that Katrina was not an ordinary disaster. After most hurricanes, the community returns to some semblance of normalcy within a week or at most a month. But Katrina was a catastrophe that the response system was not designed to handle. The sheer magnitude of over 1,000 dead, hundreds of thousands displaced and billions in property damage is “unimaginable by many human beings.” He said we need to develop an immediate response to Katrina but do it in a way that will use the lessons learned to improve responses to other disasters.

The intensity and frequency of hurricanes have increased significantly over the past few years, said Mark Oesterle. Category 3 and 4 storms were relatively rare before 2000, but now we see one or two each hurricane season. Policy needs to evolve as conditions and realities change, in the same fashion that 9/11 woke up the nation to terrorist threats.

### ***Rethinking Federalism?***

Now that the federal government is expected to be responsible for everything, how does it protect itself? “Weather doesn’t fit in with the jurisdictional purview of Congress,” Oesterle said. “We are going to have to consider what federalism is going to mean and the role of the private sector and public sector. In some ways we are still driving using the rear-view mirror.”

Daniel Matthews said that it is inevitable that Congress will have to engage in some cost-benefit analysis at some level and increase the use of mitigation, both pre-disaster and post-disaster. He noted, however, that it is often difficult to motivate residents to take actions for mitigation before a disaster.

### ***Gaps in Disaster Relief***

In meeting the challenges of Katrina, there still are missing pieces to the puzzle. One major issue that must be addressed in the Gulf is the construction of permanent housing. While FEMA can provide temporary housing for up to 18 months, developing permanent housing solutions for hundreds of thousands of people is a daunting challenge. The 150,000 residents sheltered in hotels face other challenges in obtaining permanent housing, Morial said. Many landlords require a commitment for a yearly lease and are reluctant to rent to tenants with a three-month FEMA voucher but no job. “We need to develop resources and plans to facilitate this transition,” he said.

Oesterle said flood insurance will be a major focus of discussion going forward. There will also be a careful examination of the federal insurance program to see what works and what needs to be changed.

Given the atomized nature of Congress, what will be the best way to spark such broader debates and new initiatives? Holtz-Eakin said lawmakers respond to constituents, so a groundswell of public support may be needed for serious changes to be instituted.

### ***Nature Won’t Wait***

While local leaders play an important role in disaster preparation and response, Morial said they look to the federal government to lead the examination of the broader issues. He said there should be a national commission on disaster response, like the 9/11 commission, to examine Katrina and its aftermath.

“One thing that is certain is that the hurricane season happens every year,” Morial said. “It is coming back. If our process moves too slow for lessons to be learned, next year it could be another part of the United States that is at risk for a super-storm. Nature isn’t waiting on the political cycle of the United States of America. We have to learn the lessons and put new processes in place.”