

2006 National Environmental Public Health Conference
Advancing Environmental Public Health Science Practice in New Frontiers
Monday, December 4, 2006
8:30am Opening Plenary Session 1

Henry Falk: I'm the Director of the Coordinating Center for Environmental Health and Injury Prevention at CDC and it's my distinct pleasure to welcome all of you this morning to the opening of our 2006 National Environmental Public Health Conference with the theme of "Advancing Environmental Public Health Science Practice in new Frontiers." So it's great to see all of you. This is far and away the largest of our environmental public health conferences and we have great registration. And we look forward to all of you being here.

I'm going to introduce first Bill Gimson, who is the Chief Operating Officer of CDC. He has had a hand in a lot of important advances that CDC has made over the years, working very closely with our business and management practices. It's my great pleasure to invite Bill to come up here to do the welcome for you. Thank you.

Bill Gimson: Good morning. Thank you, Henry. And I can't quite figure out who brought the cold in. Because I believe this is the coldest morning in Atlanta. So from CDC, welcome to Atlanta. Welcome to CDC, and certainly welcome to the 7th Annual Environmental Health Conference. It really is hard to believe for me that the first conference was actually in 1985. We've really come a long way at CDC. But we really actually have a long way to go also. So I think this week we are here to chart the future. Let's think about the big challenges. And some of those big challenges are climate change, creating healthy built environments, preparing for environmental disasters. And certainly and perhaps most importantly, expanding our science. Last Monday, I actually had the privilege of visiting the Green County Health Department in Springfield, Missouri. And I was able to see environmental health on the front line. And it was truly fantastic. It was really exciting. People are truly motivated, and I wish to thank you and the whole network of environmental health experts around the country who keep us safe and healthy. And thank you very much. I also want you to know that at CDC we're walking our walk and talking our talk. But we're actually walking our talk. And what I mean by that is we now are a tobacco-free campus. All of our campuses are tobacco-free. We have green buildings, and we're really committed to the built environment. Please visit our campuses and see them for yourself. We have the Roybal Campus near the Emory University, and we have the Chamblee Campus, where the National Center for Environmental Health is located. But you really have to visit. You really have to see it for yourself. It's an unbelievable

transformation from what CDC looked like just five years ago. But again, we are certainly walking the talk. And again, walk into Atlanta; walk into CDC sort as though you are in absentia. Visit our campus, and congratulations on what I'm certain will be an excellent meeting. Thank you very much.

Dr. Falk: Thank you very much, Bill. And next I'd like to invite Chris Downing, who is the regional director for the US Department of Health and Human Services here in Region 4 in Atlanta. Chris has a background in political science. He is representing Secretary Leavitt. Chris has worked with the department in Washington in multiple roles on Capitol Hill. We very much welcome him this morning. Thank you very much.

Chris Downing: Well thank you, Henry. Good morning. On behalf of Secretary Leavitt, I welcome you all to Atlanta. Glad you could make it, and I'm sorry about the weather. I wish it could be better. I'd like to take a moment to step back in history. Beginning at the end of the 19th Century, sanitarians, the original environmental public health practitioners, focused on activities to improve the safety of the drinking water supply. They also examined sources of food, sewer systems and rodent control. These efforts, together with the provision of efforts of public health nursing, can be credited with a 30-year increase in life expectancy since 1900 and with the elimination of more than 80% of human infectious disease. This was accomplished well before the advent of immunizations and antibiotics. The work of the public health work force and the environmental public health workforce primarily has been behind the scenes and not generally seen by the public they serve. The environmental health workforce fought to incorporate laws and regulations concerning water, food, sewage, sanitation and vector control into legislation, and the success of their efforts is well documented, and you all have a lot to be proud of. The mantra of environmental public health is that environmental public health touches everyone's life every day. Yet, since the late 1970s, there has been a significant erosion of the environmental health force and a diminished capacity as responsibilities have expanded. The environmental public health workforce has shrunk from a high of 235,000 practitioners in 1980 to under 20,000 today, due in part to retirements, low wages and competition with industry. There are fewer than 30 college programs in the United States, and environmental public health programs are replacing only 10% of the work force. Responsibilities within the profession have expanded to include ambient and indoor air quality, water pollution, safe drinking water, noise pollution, food safety, Superfund and Brownfield sites, industrial hygiene, childhood lead poisoning prevention, asthma intervention, healthy places, vector control, pesticide control, radon gas exposure, toxic chemical exposure and adverse health effects, injury control, biological, chemical and radiation exposure, disaster planning and response and a growing number of global environmental health issues. You all have your hands full.

The 21st Century offers great challenges. To be at the forefront of public health requires a multi-prong effort to revitalize the field of environmental public health. This requires a significant increase of resources

and an expanded recruitment effort, retraining opportunities, and an expanded research agenda in recognition of the importance of the field of environmental public health beyond those of us who work within the field.

The problems we face today are profoundly more complex and difficult than those we faced in years past. To help us better address these problems, this conference is designed to develop and strengthen partnerships and build enduring relationships among federal, state, tribal and local government agencies, including national and international organizations, policy makers and planners, academic institutions, businesses and industry. This is the first conference of its type since 2003. It represents an important step in demonstrating CDC's continuing commitment to improve the field of environmental public health.

This is reflected in the conference theme, "Advancing Environmental Public Health, Science, Practice, New Frontiers." The agenda was developed with the input of many of you in the audience today. It addresses a wide range of topics, from emerging threats, such as natural disasters and homeland terrorism, to the myriad of everyday environmental public health issues and concerns. There are six plenary sessions and more than 75 workshops, 66 poster displays and more than 30 exhibits. I hope that you will actively participate by talking to your colleagues, meeting new people and sharing your ideas with the speakers and other participants. We hope that you will leave Atlanta better informed, invigorated, excited and committed to working together to confront the challenges and opportunities that lie ahead. Again, thank you for joining us this week. I applaud your commitment to the field of environmental public health. Have a wonderful conference, and thank you.

Dr. Falk: Well, Chris, thank you for that wonderful welcome. We really appreciate it. And now it's my distinct pleasure to introduce our speaker for this session, Dr. Howard Frumkin. And this is a real pleasure for me. One of my chief roles as head of the Coordinating Center for Environmental Health and Injury Prevention was to work on recruiting a new director for NCEH/ATSDR, and we were really just overwhelmingly delighted when we were able to bring Howie Frumkin to CDC.

Howie came from the Rollins School of Public Health at Emory University, where he headed the Environmental and Occupational Health Programs. His background is in occupational health, environmental health, and internal medicine, and he's done a lot of things in this field over the years. He's a prolific author and editor; three of his most recent books, for example, are on school health, environmental health, and public health.. And he adds great talent, expertise, knowledge, and wisdom to our environmental health programs at NCEH and ATSDR.

Dick Jackson served previously in that role. We are both delighted to be able to welcome Howie as head of NCEH/ATSDR, and we're really very appreciative to be able to introduce you this morning, Howie. So

welcome.

Dr. Frumkin: Thank you very much, Henry, for that warm introduction. And good morning and welcome to everybody here. It seems that the norm this morning is to apologize for the bad weather. But if you ask me, it's a beautiful day out there—a little cold, but beautiful. So let's celebrate this beautiful day together.

This morning I'm going to speak for just a few minutes and then invite four wonderful discussants to the podium, where we'll make this more of a dialogue involving both the discussants and you..

During the time that I have with you, I want to make just three points. First, we have a history. The work we do to assure safe, healthy environments for ourselves, our communities, the nation and the world continues a tradition that dates back to our earliest ancestors. Whether you inspect restaurants or perform chemical risk assessments or prepare for environmental emergencies or craft environmental policies, that tradition gives perspective and meaning to the work that we do.

Second, we now face a new and unprecedented challenge, climate change. Global changes in atmospheric chemistry, meteorology, ecology and other dimensions of our world together comprise perhaps the greatest environmental health challenge for the remainder of our careers and for those who will follow us. I'll talk briefly about climate change and its implications for public health.

Third, I'll make the case that climate change is in a sense our teacher—that the principles and practices that we deploy in protecting the public from climate change can inform our work, not only on this modern problem, but across the spectrum of environmental health. So as depicted in this wonderful Paul Gauguin painting—Gauguin, as you know, took an environmental approach to his painting and left France for the South Pacific seeking better environmental input into his art—I'm going to talk about where we're coming from, where we are and where we're going.

This very rare 15,000-year-old photograph is a reminder that even our ancestors had to deal with the problem of indoor environment. You can see that lighting and humidity were problems, and if you look to the right of the picture, it looks as though vector control is a problem as well.

Water and sanitation have been problems for as long as we've lived in cities and towns. In these ruins from several thousand years ago in the Indus Valley, you can see examples of plumbing systems, the delivery of fresh water, and even the delivery of sewage services in the form of toilets that had running water to carry away waste.

These Anasazi Ruins in the Southwest remind us of the importance of built environment features to protect

safety and health. They also are a reminder that ecological collapse, the depletion of resources, can be a major determinant of health, ultimately accounting for the collapse of this civilization.

Food safety has been an issue for thousands of years. The ancient Jewish and Islamic dietary laws that are pictured here—believe it or not, that is a kosher McDonald's—reflect necessities for food safety that were recognized by our ancestors.

Even mold has been a problem for thousands of years. The caption here says, “When the waters subside, the problem’s going to be mold.” This slide shows one of my favorite Biblical passages. It’s a bit long, but bear with me. This is from the book of Leviticus, and it’s usually translated as a passage about leprosy. But see what you think. “He who owns the house shall come and tell the priest, ‘There seems to me to be some case of disease in my house.’ Then the priest shall command that they empty the house and afterward the priest shall go in to see the house. And he shall examine the disease. If the disease is in the walls of the house with greenish or reddish spots and if it appears to be deeper than the surface, then the priest shall shut up the house seven days and come again on the seventh day.” This is probably an early example of an environmental consultant letting the clock run for seven days. “And the priest shall look again. If the disease has spread in the walls of the house, the priest shall command that they take out the stones in which the disease resides and throw them into an unclean place outside the city”—an early hazardous waste site. “He shall have the inside of the house scraped all around, and the plaster that they scrap off they shall pour out in the same unclean place outside the city. Re-plaster the house”—and so on. This is a remediation job. If this isn’t early moldy housing, I don’t know what is.

Now with the onset of the Industrial Age a couple of centuries ago, new kinds of environmental health problems appeared. Air pollution became a major problem. This is Pittsburgh in 1910. Contemporary travelers would describe noticing the presence of Pittsburgh from 50 miles away, because they could see the telltale plume of smoke in the sky. The famous smoke episode in Donora, Pennsylvania in 1948 is pictured on the right. That picture was taken at noon time. And, of course, just a few years later came the London smog of 1952 that took hundreds and probably thousands of lives. This is a mid-day picture as well. And so is this one. This picture not only shows the thickness of the pollution, but it reassures us that even in 1952 you could find a decent ethnic alternative to fish ‘n’ chips in the middle of London.

Water pollution became a problem as industry discharged pollutants into waterways. This has fortunately been largely controlled in this country. But we still have to tackle the problem of non-point-of-service water pollution.

Toxic chemicals became a major issue for the country. Such chemicals as DDT and the ways that DDT was applied with very little precaution called public attention to the magnitude of this problem. It’s a good

time to acknowledge almost half a century later the pioneering work of Rachel Carson, who called the nation's attention to the problems of toxic chemicals and eventually helped give rise to the movement that created parts of our agency.

Solid and hazardous waste from industries, from household uses, and from other sources remain problems for us. And the built environment is a new issue that we have addressed in recent years—the idea that transportation, land use, and community design, from the huge metropolitan scale you see here right down to the small neighborhood scale of disconnected single-use neighborhoods, can all affect our health and well being. We are working hard now to identify how best to design and build neighborhoods so that they are healthy for people. We even are thinking back to something that our ancestors probably knew very well, and that's the benefits of being outside in natural settings, of being physically active and creating those kinds of amenities in the places where we live.

But I want to turn for the next few minutes to a new kind of problem—a problem that's unprecedented for us: the problem of climate change. I think everybody in the room is familiar with the science, so I won't spend much time on it. In brief, we've got radiant energy arriving from the sun. It comes through the blanket of gases that envelops the earth, much as sunlight comes through the glass walls of a greenhouse. It warms the earth. And then as some of that energy is about to be reflected back into space, it is retained by the layer of greenhouse gases. That layer, of course, has intensified over the last 100 or 150 years. Carbon dioxide is one of the main greenhouse gases. As you can see here, we've lived with very stable levels of atmospheric carbon dioxide for many centuries, until about 150 years ago, when levels began to climb from their baseline of about 280 parts per million up about 380 now.

Taking a long view of things, we have ice core data going back several hundred thousand years. You can see that there is natural fluctuation. But we have never, in the history of this record, seen CO₂ levels as high as they are now. We're now up to 380 and rising. So this is absolutely unprecedented in the history of the earth.

In association with those rising levels of CO₂ and other greenhouse gases, we're seeing temperatures rise. This slide shows that we've gained about a degree centigrade—almost two degrees Fahrenheit—over the last century. Seven of the ten hottest years in history have occurred in the last decade. We continue to see average warming across the face of the globe. That has led to changes in the world. We're living in a different world than our great-grandparents did.

Severe weather events, of course, have always occurred. But as the air gets warmer, it holds more moisture, and tends to dump this moisture more intensely, making these events more likely. Here are some very interesting data from investigators at Georgia Tech, published just last year. Experts traced the

frequency and severity of storms in each of the basins of the world. It turns out that the frequency of storms hasn't changed in recent years, but the severity of storms has changed. If you look at the picture on the right, the steeply rising red line shows the proportion of hurricanes classified as "intense." You can see that the intensity of storms is rising.

We're also experiencing what I call the balding of the world. This is a picture of the extent of the Arctic ice cap, from 1979 to 2005. You can see that the Arctic ice cap is shrinking. This was a nice graphic from the New York Times, when the data were released in 2005. The red line that traces from Russia to Alaska to Canada to Greenland is the traditional extent of the Arctic ice cap from 1979 to 2000. The white picture in the middle is how it actually looked in 2005—a shrinking ice cap, the balding of the world.

Those of you who like folk music remember the story of Lord Franklin, who famously tried to find the Northwest Passage, across the North Pole, and disappeared into the cold. It's been historically impossible to make that crossing by sea. When Roald Amundsen made the trip by dog sled in 1903, it took more than two years. By 2005 there were just 40 miles of scattered ice in Victoria Strait. And no surprise, this slide shows a Website advertising a North Pole expedition. You can now sign on, get on a boat, pay your money and take a ride across the North Pole, the trip of a lifetime—something that would never have been possible in years past.

Polar bears and other flora and fauna are suffering as a result. Polar bears are one of those charismatic mega-fauna that everybody knows about and loves. The Hudson Bay polar bear population has diminished 22 percent in the last 20 years. The one-year survival of polar bear cubs has dropped from 65% to 43% in the last 20 years. There are now confirmed reports of polar bears drowning while swimming from ice floe to ice floe, because the ice is simply too dispersed—a longer swim than anything for which they evolved. And there are reports of polar bear cannibalism, something never seen before, because of the shortage of food for the polar bears.

We are losing glaciers. This is a picture of Glacier Bay National Park in 1941. Here is the very same scene in 2004. No more glaciers. This is Glacier National Park in 1932, and this is the Boulder Glacier. And here is a picture of the very same scene in 1988. You can make those comparisons at the Matterhorn. The snow cap on the Matterhorn has gone away or has diminished in the last 40 years. We can see the same pattern in Austria. This is the Pasterze Glacier, which is now largely gone. The Portage Glacier in Alaska is now a lake rather than a glacier. This is a changing world.

Not only are glaciers diminishing in size, but the ice is melting in Greenland, the site of one of the largest sets of glaciers in the northern hemisphere. As the ice melts, water from the melting glacier percolates down through the glacier and lubricates the interface between glacier and earth, causing the glaciers to

advance toward the water much more rapidly than had been predicted. So we're seeing much faster glacier loss than models predicted even 10 or 20 years ago.

Now this is my favorite scientific journal, and it points out that the oceans are rising. The good news is that the oceans are actually not rising 150 feet. But we have seen an average mean sea level rise of several centimeters over the past 100 years. And particularly in the last 10 or 20 years, we're seeing that rise accelerating. Ocean levels rise because water expands as it gets warmer. Ocean levels also rise because large repositories of frozen water in the Arctic and Antarctic regions melt and contribute to the increase in the ocean level.

The number of floods is also increasing—both thanks to rising ocean levels and because of unstable weather patterns. Here are IPCC data showing that in each region of the world, floods are becoming more common decade by decade. Weather and flood catastrophes are a major concern for the insurance industry. These rising patterns that you see here in the cost of disasters reflect in part worsening weather and of course in part more structures with more value built in more susceptible areas. But it is clear that the worsening weather, the more intense flooding, the more intense storms are a major economic threat as well.

So the world is changing. Rising temperatures, more severe weather events, loss of polar ice cover, ecological damage, glacier loss, sea level rise, floods—and that's not a complete list.

Well, that's the situation up to today. Where will this be going in coming decades? What does the future hold in store? We know that carbon dioxide levels are continuing to rise. Even if we were to stabilize our emissions of CO₂ levels and other greenhouse gases today, levels would continue to rise because there is a lot of momentum in the system. There are various projections for how high carbon dioxides are going to go and various calculations of the ceiling beyond which we shouldn't go if we are to avoid irreversible and deadly changes to the earth's ecosystem. We also expect temperatures to continue to rise. Again, there is uncertainty around how much the temperature will rise. But several degrees is a midpoint estimate. And that appears to be something that is inescapable at this point—the so-called “climate change commitment.”

Carbon dioxide concentrations, temperature, and sea level continue to rise even after emissions are reduced. In this picture, you can see the brown curve that peaks and declines. That scenario depicts a peak in greenhouse gas emissions followed by a decline, something toward which we aspire in coming decades. But you can also see that the impacts of the greenhouse gases will continue to rise—in some cases, for centuries—before stabilizing. The picture on the left shows that if we were to keep the atmospheric composition exactly as it is today, we would continue to see the temperature rise. And if we continue to emit as we're doing today, we'll see a much faster and longer-duration temperature rise. If we increase our emissions, given the rapid development in many parts of the world, we will expect even more warming in

coming years.

Now all of that is based on relatively linear models. But abrupt changes in the system could complicate things even more. For example, the thermohaline shutdown is the concept that the flow of ocean currents seen in this slide could be altered. These ocean currents are important for maintaining climate at the levels to which we're accustomed. If, for example, the ocean currents were to shut down, Europe would become substantially colder than it is. Recent data suggest this is less likely than we feared, but it is still a concern. Methane releases from tundra could occur suddenly in an accelerated form as the tundras begin to thaw. Methane is a very potent greenhouse gas that could in turn be a positive feedback loop that would accelerate climate change. If the continental ice sheets collapse, that could lead to relatively sudden increases in sea level.

This wouldn't happen in a day or a week, but rather over the course of decades to centuries. It could lead to major inundations of coastal areas. Ocean acidification could occur with more CO₂ in the atmosphere. CO₂ is absorbed in part by the oceans. That's a good thing. The oceans act as a sink. But acidified oceans are a different ecosystem than normal oceans. And that means that the food chain would be threatened. So we have a number of predictable changes, and a number of unpredictable potential changes, and all of that cautions us.

The ones that we think about most as public health people are those that pertain to human health. As you can see here, there is a range of potential health effects from climate change—the direct effects of heat, causing morbidity and mortality, and the effects of storms in coastal flooding. All of us watched Katrina last year, and we're very familiar with what severe storms do to public health. Coastal flooding could displace large populations, causing tremendous trauma and public health threats. Changes in ecosystems lead to changes in vector biology, creating infectious disease risks. Some air pollutants, especially ozone, are created at higher levels, at higher temperatures. That's why December is the ozone season here in Atlanta and elsewhere. So that warmer temperatures may cause worse problems with air pollution. Changes in the ecosystem will lead to changes in how we produce our food. And those changes could compromise the food supply for some of the most vulnerable among us. And all of this could lead to civil conflict. The public health challenges posed by civil conflict are profound and .

The European heat wave was a good example of the potential effects of climate change. The graph on the left shows the kind of epidemiologic data that CDC has collected for years to trace the effects of heat waves. There were approximately 30,000 deaths across Europe—and those are only from the countries that reported data that could be confirmed. So the death toll was probably higher than shown here. One of the public health responses is to anticipate heat waves and put heat wave plans into place. I'll come back to that in just a few minutes.

The urban heat island refers to the fact that cities are warmer than the surrounding countryside. Two factors create this effect: the loss of trees, leading to the loss of evapotranspiration, and the construction of dark surfaces that absorb heat and re-radiate that heat during the evenings, when the cities would otherwise cool down. As we build bigger and bigger cities, as we become more and more an urban species, then the combined effects of urbanization and climate change may well lead to more heat waves in cities.

Rising ocean levels will cause inundation of coastal areas. This slide shows a prediction of what will happen to Florida with a one-meter rise in sea level. The red areas are areas that would be inundated and would become uninhabitable, forcing the displacement of the people who live there. A three-and-a-half-meter sea level rise would look like this. The same picture can be done for Manhattan. Here it is on the left as it is today; large portions of Manhattan and the other boroughs and parts of New Jersey would disappear with a three-and-a-half-meter sea level rise.

Infectious diseases are a huge topic in the context of climate change. Jonathan Patz, one of the world's experts on this topic, is here with us, and he will be running a session during this meeting. So if you'd like to learn more about the impacts of climate change on infectious disease risk, I urge you to attend that session. This is an IPCC slide that shows the likelihood of an expanded distribution of the various infectious diseases. You can see indicators in the right-hand column of varying levels of risk. The "highly likely" category is reserved for malaria. The "very likely" category includes schistosomiasis, river blindness, and dengue, among others. In short, if tropical climates expand their range, then tropical diseases will expand their range. There is very solid evidence now that this is happening already, both in terms of geographic spread and in terms of spread to higher altitudes in places already at risk of infectious diseases.

This is a picture of ozone formation versus temperature and a reminder that with higher temperatures we expect more ozone formation.

Climate change and food—a very complex set of relationships. As places get warmer, as rainfall patterns vary, some places become wetter, some places become dryer, and some pests become more prevalent. Many of the standard forms of agricultural production that we know may be expected to change. It may be that the grain basket of North America migrates north toward the Yukon Territory and Manitoba.

We do have good data on the impact of warmer weather and higher CO₂ levels on the growth rates of various food plants. While there is some uncertainty, in most cases we expect grain yields to decline. Most of the plants that we now know and on which we rely have evolved (or have been evolved by us) in the context of a particular climate. If that climate changes, plant growth may be impaired. It's especially

notable that the poorest and most nutritionally precarious regions of the world depend on the grains that are most at risk of declining production under climate change scenarios. We have to worry greatly about those who are most at risk.

Mental health is another key issue, as suggested in this *New Yorker* cartoon. It says, “This past summer I got deeply depressed about our planet, as if I didn’t have enough problems of my own.” We really do need to ask about the impact of this much gloomy news on all of us and on our children, who need and deserve the prospect of a sustainable and safe world in which to grow up.

Civil strife is another concern associated with climate change. Our species has an unfortunate but very familiar history, when resources grow scarce, of fighting with each other over what’s left. We have to expect that individual acts of violence or widespread acts of violence may be on the rise in certain circumstances.

This is very gloomy stuff. It’s hard to talk about. . . How do we think about it? To begin with, we’re called on to think about the unthinkable. We’ve had to do that before. It was unthinkable until September 2001 that an act of carnage like the attack on the World Trade Center would occur on our soil. But we had to grapple with it, and we did. We took it on. We’ve taken a number of steps to prevent such terrorist acts from happening again. It changed life for many of us. But it showed us that we have the ability to take on the unthinkable and to tackle very big problems.

It’s hard to think about climate change for a number of reasons.

- It's very complicated. In the short time that I’ve talked, I’ve jumped from infectious disease ecology to meteorology to atmospheric chemistry, and there is a lot more that one needs to know to understand the problems fully.
- We’ve never experienced climate change. It is unprecedented, and that makes it hard to think about.
- It’s scary, and the natural reaction in thinking about something scary, of course, is to recoil.
- It implies behavioral changes because we are profligate users of energy. We emit large amounts of carbon dioxide into the atmosphere. And if we’re to make contributions to prevention, we’ll probably need to change some aspects of our lifestyle. But since we’re mighty comfortable, who wants to think about making those changes?
- And finally, misinformation has been actively disseminated for some time. I think we’re seeing a growing national consensus across all sectors of the nation that this is a real problem that we need to tackle. And the misinformation is declining. But it has been a real confusion to many, many people.

We can think about climate change in a number of ways that will help us move forward. One is in a moral framework, the concept of intergenerational responsibility—the concept that we have a moral obligation to leave for our descendants a world that they can inhabit safely and healthfully and to take more responsibility for sustainability over time.

For some there is a religious obligation to be good stewards of the earth that was given to us in trust. I call your attention to the Evangelical Climate Initiative, one of a number of major religious initiatives that have tackled the problem of climate change and have used this framework of divinely ordained stewardship as an obligation.

We can use the precautionary principle, something with which we're very familiar in environmental health and in public health more generally. Do we know all of the details of climate change? No, we certainly don't. Do we know how fast it will occur or how serious the problems will be? No, we don't. But given credible indications that there is a danger, we need to act in order to protect people from that danger. This is standard public health practice. We do it in emergency rooms every day, and we can use this thinking to help us move forward on climate change.

A final way to think about this problem is a medical analogy. If you feel hopeless about climate change, if you think that there is nothing at all we can do, if you think that things are too far gone to repair—we still have a calling. Our calling is to relieve suffering and do the right thing. If my patient develops a terrible terminal disease, I don't abandon the patient. I stay with the patient and see things through. If nothing else does, that concept ought to motivate those of us in public health to roll up our sleeves and work hard on the climate change issue.

Well, what do we do? In this cartoon, Bob sees on the television that the chief contributors are carbon dioxide and methane. He looks at his Coke and he looks at his bean dip and suddenly he realizes that he's part of the problem. And he resolves to take action.

What should we do in the public health context? Those in the climate change world talk about two main arenas of response—mitigation and adaptation. Mitigation corresponds to primary prevention. It represents efforts to control climate change by lowering greenhouse gas emissions, by reducing levels of greenhouse gases in the atmosphere, by stabilizing and ultimately reversing the entire phenomenon. That's mitigation.

Adaptation is also an approach that we use in public health. It involves anticipating things that will be occurring or are occurring now and taking steps to minimize the harm done to people. This is what we call preparedness.

So we can deploy both primary prevention and preparedness, mitigation and adaptation. Mitigation, technically, can be accomplished in a number of ways: reducing carbon dioxide and other greenhouse gas emissions by such means as alternative energy sources, energy conservation and efficiency and more, and pulling carbon dioxide out of the atmosphere, sometimes even before it gets there, and sequestering it in places where it won't contribute to atmospheric changes. There are policy approaches that would support these and other approaches to mitigation—voluntary behavioral changes, market mechanisms such as cap and trade regulations, and incentives for the development of new technology. Now none of these things is primarily the responsibility of public health. But we need to be aware of them, and to the extent that they are acts of prevention, we need to support them.

The public health side has a lot more to do with adaptation. Adaptive mechanisms for climate change vary widely—more dikes, dams and levees, and relocating people who are in high-risk areas for hurricanes and floods; changing agricultural practices to assure a supply of food; developing heat-wave plans for cities that are at risk of heat waves, so that those who are most vulnerable can be found and rescued if a heat wave should occur. Vector-borne disease control programs are another form of adaptation. We can assure that physicians and nurses in areas at risk of infectious disease spread are ready and prepared and can diagnose diseases such as malaria and dengue and can act rapidly to control them. Changes in food handling are forms of adaptation. There is a wide range of public health actions that we can take and that we need to be taking.

We can frame a lot of our responses to climate change in terms of the ten essential public health services. I think everybody in the room knows this list by heart, from monitoring health status down to doing research. What are some examples of how, within the public health paradigm, we can tackle climate change?

We can monitor health status by tracking health conditions that are related to climate change. In terms of informing, educating and empowering people, we can educate the public and policy makers about the health consequences of climate change to help move adaptation efforts forward and to help move prevention efforts forward. In terms of developing policies and plans, many of the necessary policies and plans belong to the energy sector or the transportation sector or others. These aren't primarily public health actions, but we can support adaptation and mitigation efforts as we have supported efforts historically in arenas other than our own—efforts such as seatbelt installation in cars. Research is a clear mandate. There is a lot we still don't know. We need to promote research on the links between climate change and health so that we better understand those links and so that we can better prepare to protect the public.

The last point I want to make is that climate change is our teacher. The things we have to do in response to climate change are things that we have to do as environmental public health professionals generally, and

they will enrich our work and improve the results that we get across the board.

The first principle I'll suggest for your consideration is to envision healthy, wholesome environments. Sir Francis Bacon said, "They are ill discoverers that think there is no land when they can see nothing but sea." We need to be visionary. We need to envision a better world than the one that bad news stories would sometimes put in front of us. When it comes to climate change, that means envisioning healthy, sustainable, stable ecosystems in which our children, grandchildren and great grandchildren live. We do that all the time. Many of us working on built environment issues are accustomed to looking at a scene like the one in this picture, a very common street scene across the country, and imagining that if we put in some trees, some transit, some better pedestrian infrastructure, some mixed land use, with residential and commercial, so that people could walk on their errands instead of having to drive, that would be a healthier place. And if we add transit and bicycle lanes, encouraging walking and biking, we have envisioned a healthy neighborhood, the kind of thing that we want to provide for the populations we protect.

We need to move from the automotive arms race, the arms race that brought us the Ford Excursion, which was topped in size by the Lincoln Navigator, which was outdone by the Hummer, which will probably be conquered very soon by the Peterbilt Crusader, All Sport, Denali Outback, Eddie Bauer 5.9 Limited.

We can move from that to envisioning efficient vehicles that look like these, that are fun to drive, energy-efficient and sustainable, and to envisioning walkable communities where people can use their feet or use bicycles powered only by the food they eat, while they are getting healthy as they travel from place to place. That's envisioning.

Second, we need to think big, to think synthetically, to think across many issues. We need to appreciate the synergies that occur when our efforts achieve goals on many levels. This picture is a simplified version of our response to any problem. Climate change is an important problem to tackle. But we're also going to face the problem of peak petroleum, probably in our lifetimes. Petroleum will become a lot scarcer. That means the transportation patterns will have to change, and that in turn calls on us to think about solutions that will serve both of those challenges.

In addition, population will continue to grow. The census bureau predicts that the US population will nearly double by the year 2100. That means we need room for a lot more people. And the places that we design and build for those people have to be places that do not emit large amounts of greenhouse gases and that do not require a lot of petroleum for traveling around.

So we have a three-part problem. We have an obesity epidemic. That means it's in our interest to get people walking and biking more, while riding in vehicles less. And that means that we can solve a number

of problems if we think holistically.

Here is an example. This is a rare photograph of a parent walking children to school. The year is 1956. It's the last known time this happened in the United States. What's good about this in public health terms? Lots of things are good about this. This family is getting physical activity, something that we know—now more than ever—people need. They're decreasing their contribution to air pollution by walking rather than driving their 1956 car. They're not contributing to climate change because they're not burning fossil fuels. They're building social capital and sense of community, because they can meet and greet neighbors on the sidewalk rather than shake their fist at adversaries through the windshield of their car. In addition, physical activity is a very effective anti-depressant, should mom have any tendency in that direction. Injury risk is down, for the automobile is a very injury-prone micro environment and they are out of that automobile. Being physically active is a good preventative against osteoporosis.

I could go on but the slide runs out of room pretty soon. But I will mention that all of those benefits and more are supplemented by the fact that if we don't have to keep on building roadways, then the money that we save socially can be put into healthcare, education, law enforcement, and other priorities that all of us share.

A third imperative for us is to be good ancestors. Remember that we are taking care not only of ourselves, but of those who come after us. When I was a practicing physician, I thought in terms of the clinical approach. I cared for each patient one-by-one in the exam room. When I shifted to public health, I took a public health approach, and I thought of myself as caring for an entire community at a time.

I want to suggest a third transition that we can all consider. We need to care for future generations as well as the communities that we now serve. This is the legacy approach. This invites us to think forward to long after we're gone, to what sort of a world we will have left for the people that come after us.

Don't be afraid to lead. A lot of the messages that we need to deliver may be difficult messages for people to hear, and our leadership is absolutely necessary. Leadership involves accountability—and community accountability is very much a part of environmental health practice. I think most of the people in this room have found themselves sitting in community meetings, and listening to the community and forming answers together rather than declaring what the answer is going to be. That sort of accountability is essential. It is a part of leadership.

Leadership requires courage, courage to deliver difficult messages, courage to get outside your comfort zone. If you know environmental public health and you don't know climatology or you don't know infectious diseases, you need to tackle those topics, and that takes courage. You even need to get up in

front of groups, as I'm doing right now, knowing that you're not an expert. That takes courage. It takes the courage to form partnerships with people in different fields, because we need those partnerships to tackle big jobs. It takes the courage to deal with uncertainty, something that we're very accustomed to in the world of environmental public health. We make risky decisions in the face of uncertainty all the time. And it takes courage, and it is an act of leadership when we do that.

Next, we need to pursue justice. We know across the public health world, including in environmental public health, that not all of us are equally affected by public health problems. Some people are disproportionately exposed and disproportionately at risk. This has given rise to the transformative field of environmental justice. Poor communities and communities of color have taught us all that people at risk deserve special consideration. We need to devote our attention to those communities. We saw in Hurricane Katrina that not all of us are equally at risk from some of the kinds of severe weather events that we expect with climate change, and we need to keep that absolutely at the center of our attention.

We also need to think about justice on a global level, because the parts of the world that are at most risk from climate change-induced disasters, changes in food supply, disease patterns and so on are those that are already the most marginal. This is true not only in the climate change arena but across all of environmental health and across all of public health. Who is most at risk? Who is most vulnerable? Those are the populations that deserve to be at the center of our attention.

Finally, be joyful. Have fun. We do have some hard messages to deliver, but we have some great messages to deliver. The vision of a wonderful, healthy, sustainable, and beautiful world is something to which we can all aspire. The fact that we have each other to work with is a blessing. I have loved being in the environmental health field, and it's because of the kinds of people who are in this room with whom I get to work every day. Be lighthearted. Be fun. Have fun. Take joy from the good work we do, because there could not be a finer and more uplifting and more ennobling calling for any of us.

These are the messages that climate change teaches us. But these are lessons that can guide us in all of our environmental public health work and in all of the public health work that we do.

You can begin following the last precept now. Be joyful and have fun over the next few days of this meeting. I look forward to meeting many of you. I hope that you can come to the reception tonight, for it is all about being joyful and having fun. Thank you for all of the work that you do to protect the health of the public from environmental challenges and to ensure that every member of the public, locally, nationally and globally, can enjoy safe, healthy environments now and for generations to come. Thank you.

Panel of Discussants

Henry Falk, MD, MPH, Director,

Coordinating Center for Environmental Health and Injury Prevention

Howie, thank you for that great talk. We really appreciate it. I want to thank Bill Gimson and Chris Downing for having welcomed everybody. And now let me invite the Panel of Discussants to come forward.

Well, to start with, let me welcome the Panel of Discussants. And our opening presentation is by Dr. Hal Zenick, who's the Director of the National Health and Environmental Effects Research Laboratory in North Carolina in the Office of Research and Development. And he oversees EPA's Toxicology, Epidemiology and Clinical Medicine Research. I've had the great pleasure of working with Hal for well over a decade.

We first met on the US-Mexico border investigating various birth defects and abnormalities in the population there. And Hal's just been a terrific person at EPA. He's always been very straight in talking about the convergence of environment and health and working in environmental health. And I think he's been a great force in building bridges between EPA and CDC and public health service. And he has a very distinguished career and has worked with many federal agencies and advisory committees. So let me welcome Hal Zenick to open the session. Thank you.

Hal Zenick, PhD, Director,

National Health and Environmental Effects Research Laboratory

Good morning. I got a call from Bill Farland about 5:30 Friday afternoon. As many of you know, Bill has accepted a new job, and he said "I'm not going to be able to make the conference." I am filling in. I view this session as a terrific opportunity for you to have a chance to express some thoughts about EPA and the CDC. And Bill said the good news is you can say whatever you want to say. Of course, Bill's no longer with the agency. But I do welcome the opportunity, and Howie had been kind enough to share some thoughts on his presentation. And I'm going to be far less eloquent but try to hit on some of the opportunities that evolved that I think are consistent with Howie's message and provide great opportunities for engagements between our agencies.

So I tried to give some consideration to a few of the areas in which I think EPA and CDC have very complementary and attractive roles. And the reality, although many people will not perhaps recognize it, is EPA is a public health agency. There are very few agencies in this country, if any, that on a daily basis make decisions that affect as much of our populace as EPA. And I think that this is oftentimes a role that the agency plays that many are not aware of. And I'm not going to speak to each of these today, but there

are two or three that I would like to comment on in the brief few moments we have. I'll start with the first one, which is accountability, including an initiative that EPA began about four years ago to try to evolve processes that would allow us to actually measure the public health impact of our environmental decision-making, moving away from some of the more traditional process measures to something that reflected outcomes more.

And this links very nicely with an initiative that was begun by CDC approximately the same time on the environmental public health tracking effort that followed a report that recognized that we were not very well equipped as a nation to actually track the environmental public health of this country. This is a very stimulating initiative that's brought in state and local communities concurrently to help in EPA's effort to provide a complementary approach to understanding something about the status of our environment, both in terms of the ecology and human health. And we've had a very active memorandum of understanding with CDC that's allowed these two programs to prosper.

The second initiative, which certainly resonates with Dr. Frumkin's remarks, is the agency's move into sustainability, under which a lot of our global climate efforts also fall. And these are areas that I think provide a very unique opportunity to appreciate something about the intimate interface between human health and ecology. In fact, when you look at the agency's sustainability initiative, it fits very nicely with the previous discussion. All areas of the initiative recognize how critical these elements of energy, of water quality, and water quantity can be to our environments. The initiative also recognizes an important dynamic of how types of land-use decisions tend to affect the ecosystems in which we live; in turn, that dynamic affects human health in a manner.

The one I want to spend a couple of additional minutes on is an evolving perspective within the agency that extends beyond that of our traditional approaches of risk assessment. I want to point out that the evolving paradigm of risk assessment has strong implications of issues-related health disparities and environmental justice. It also incorporates critical issues for addressing those populations and subpopulations of this country that may be especially vulnerable to environmental conditions.

Now this is what I consider to be the evolving risk assessment paradigm within EPA and within many of our sister agencies. We have moved from dealing with some of the obvious problems when we came into existence 30 years ago. The previous, rather simple approach was extremely effective in showing great reductions in toxic chemical releases and ambient air pollution and cleaner and safer water, along with wiser and more advisable use of pesticides. However, the agency made a commitment within the last five years to begin looking at the more complex issues. And what we face on a day-to-day basis is not an issue of a single exposure, but rather a complex of exposures. And we have lived with this exposure complexity since the beginning of mankind.

And so the issue has become one of how we can begin to get a grip on the issue of cumulative pollutant exposures and understand something about the fact that these occur through multiple pathways. They may impact our health through multiple mechanisms of action. And we're talking about more than single populations.

In the agency's cumulative risk assessment report, however, the agency recognized that even this complex paradigm understates the true complexities of our daily lives, where we in fact encounter multiple stressors. And in order for us to really understand the contribution to the environment, it becomes a challenge to understand the summation of the other stressors that impact us.

You can also take the flipside of a cumulative risk assessment, which attempts to understand how these stressors combine to affect our health. How do you begin to sort out the individual contributions of these stressors and their effect on our well-being? And you know the classic design of this is this slide showing that there are multiple stressors that contribute differentially to different disease states—in this case pulmonary disease. There's an environmental component but also many other factors that contribute to that particular illness.

And then you go, I think, to a step up to the more compelling paradigms that Dr. Frumkin commented on. I will quickly put this slide up on the board so that you can see a variety of stressors. This slide comes from a paradigm that served as a basis of a workshop last summer. What it attempts to do is reflect that when you begin to understand something about the environmental health paradigm—which is our box to the right that shows us traditional transitions from hazards to exposure—to internal dose, or effective dose, you really have to appreciate the factors that affect where we live, what our lifestyles bring to the table. Those factors become as critical in determining whether we will experience exposures as those other factors that govern our individual vulnerabilities. And as you begin to look at the complex designs that Dr. Frumkin referred to, this becomes the reality of what I think we have to face in approaching environmental health in the future in a more integrated manner.

So just to finish up very quickly here, I think one of the points that Howie made is that we need to begin looking at traditional disciplines that we haven't brought to the table, especially within our industry, to allow us to take a more holistic approach. I think that the other factor that is important is we become better able to apportion the contribution of these risk factors. Our final bullet here allows us to be much more effective in targeting better risk management strategies, better disease intervention and health prevention actions. This is a major challenge—one that I think can be achieved not by EPA's working alone but rather by EPA's working in close partnership with CDC and the other health agencies in this country .

And finally, the last admonishment that Dr. Frumkin made, be joyful and have fun, is certainly what we're attempting to do as we try to improve public health. Thank you very much.

Henry Falk, MD, MPH, Director,

Coordinating Center for Environmental Health and Injury Prevention

Thank you very much, Hal.

And next it's my pleasure to introduce Carol Henry, who is Vice President for Industry Performance Programs at the American Chemistry Council. She's responsible there for the American Chemistry Council's writing of public service programs, including long-range research and initiatives as well as the Emerging Response Center. She previously spent a number of years in the Department of Energy and in the California EPA, where she was Director of Environmental Health and Hazard Assessment. She has a PhD in microbiology from the University of Pittsburgh, with a number of postings at Princeton and Sloan Kettering. She had a very distinguished career that has intersected very much with all of CDC and people in public health. And we very much appreciate your being here this morning, Carol.

Carol Henry, PhD, Vice President,

Science and Research, American Chemistry Council

Well thank you very much, Henry. It's a great honor to be here, and I appreciate the organizers for inviting me.

I'm going to give you a slightly different view. It's from industry, and that may be something that you haven't had and may not have as much of a perspective on.

I wanted to conduct a sort of review of the context in which all of us are working, industry included. This is the list more or less of what we don't know, and it also perhaps outlines what we'd like to know.

We have insufficient understanding or agreement on what good environmental health is. There's insufficient knowledge of the relative importance of environmental factors. And when we say *environmental factors*, I think we've all started to recognize that these are fairly broad—meaning physical, chemical, biological, social, and even economic factors. We have insufficient scientific methods to investigate possible disease causes, insufficient ability to gather information, and insufficient public health infrastructure to track and work on the problem—something that I think all of you in the audience are quite familiar with. Howie actually conveyed this as somewhat of a gloomy insufficiency. I can't disagree with that. I do think that we have to recognize this context and take action and get going on some things.

So why should industry care about this? And why should industry be concerned about environmental public health? I'm going to speak from a very narrow sector of industry, the American Chemistry Council, which is the trade association that represents 130 chemistry companies and 70 partner companies. Nearly 1 million people are employed by this industry, and we represent over \$500 billion as an enterprise. The chemical industry is a science-based one that has in store many future product innovations. I will add one thing to Howie's very eloquent presentation on climate change. The technology and technology solutions have got to be part of our ability to solve this problem. Our industry will be right there trying to help solve those problems. What I'd mainly like to convey is that we are a part of this issue, and we want to have a vital role in contributing to the solutions.

The role of the American Chemistry Council is that we're working hard to reduce exposures. I'll show you some of the track record that we've produced to date. We want to understand the impacts of our products and processes. However, the incidences of any chronic diseases are increasing. We're living longer. We have better diagnostic tools for some diseases, and we have much more awareness of diseases and some causation. We have many allegations that environmental levels of chemicals are causing disease. And we want to help address that.

We support research in many venues. One is the long-range research initiative funded by the chemical industry. We support research in government and in academia. We have, since the inception, supported the National Children's Study, which we believe will make a major contribution to all of our understanding of what our kids are exposed to and what their prognosis is for the future.

We support an initiative focusing on health, safety, product stewardship and security and the environment. That support has taken the form of a voluntary program called Responsible Care.

Responsible Care was launched in 1985. I'm going to talk to you about this a little bit, because this is the ethic by which our companies are operating, and we invite your comments on it. It has expanded to the point that it's practiced in more than 52 associations around the world. It's been praised by Kofi Annan at the 2006 UN International Conference on Chemicals. It was recognized at the UN Summit in 2002, and it is the signature ethic of the global chemical industry and a key component of our corporate social responsibility programs.

What does it do? It defines the industry's commitment to improve continuously safety, health, product stewardship and environmental performance of products and processes. It encourages and requires us to listen to and engage with our stakeholders. It contributes to our sustainable development and corporate social responsibility programs. It provides the companies with a platform to manage all of these

interactions.

This is just a global map to show the extent and breadth of where this is being practiced. What was recognized a few years ago is that what we needed to issue a global charter for responsible care. The initiative was launched in Dubai in February 2006. It sets a global vision of improved performance, seeks global consistency, strengthens our product steward management through consistent guidelines, and provides a critical performance foundation in a management system that will strengthen programs.

I wanted to mention briefly the research program that I've mentioned before. It's an expanded commitment to responsible care. It was started in 1999, and it also is a global program. The list of ten major public health issues includes research, and we recognize that we need to contribute with a very vital and continual research program to address environmental health issues.

So now that's the context within which I want to provide three slides that show some of the performance measures that our companies have engaged in. This is the Recordable Occupational Injury and Illness Disease Incident Rates for the American Chemistry Council Members. The chemical industry is listed. And you can see that the other industrial enterprises are also listed. In general merchandise, food stores, and agricultural retail trade our member companies and their employees and contractors are much safer in than other industries. And we've worked very hard to achieve this.

The second level is directly related to the greenhouse gas intensity. Our companies voluntarily have been monitoring and reducing greenhouse gases. We've agreed also to track and publicly report this data. No other industry group requires its members to track and publicly report their progress on greenhouse gas intensity. Between 2003 and 2004, the greenhouse gas intensity from ACC members fell by 8.6%. This is not a government-mandated initiative. We're doing this because the companies have come to believe that reducing greenhouse gas intensity is an important contribution. Clearly, we have to do more, but I wanted to make sure you understand that this is a policy and a requirement of membership for our companies. Over the past five years, ACC members have reduced their green gas intensity by more than 26%, quite an accomplishment for such an energy-intensive industry.

Lastly, on the Toxic Release Inventory data, the red line shows industrial production has increased since 1998, and the Toxic Release exposure data, has decreased. The bottom-most slide represents the ACC members.

So I wanted to give you this to indicate how seriously our members are involved in environmental health efforts. They would like to be a part of the solution. They'd like to have an outreach to the public health and environmental community in coming up with how we're going to solve the problems that we've all

identified. And I would welcome your comments, and I look forward to engaging with you on these discussions. Thank you again.

Henry Falk, MD, MPH, Director,

Coordinating Center for Environmental Health and Injury Prevention

Thank you very much, Carol.

And next I would like to invite Ken Cook to come up. Ken is the president and founder of the Environmental Working Group. He holds BA, BS and MS degrees from the University of Missouri, Columbia. And the Environmental Working Group is known for its computer investigations of public policy issues and has been a pioneer in bio-monitoring efforts in the national environmental community. We're really delighted to have Ken with us this morning. Thank you.

Kenneth A. Cook, President and Co-Founder, Environmental Working Group

Thank you. Well there are so many points of departure here, and I do not have a PowerPoint presentation—or for those of you who are in the world of Apple Computers, Keynote. Al Gore will correct you on that, by the way, if you ever complement him on his PowerPoint presentation. He'll say it's Keynote. Of course he's on the Apple board.

I have to say that I'm worried about public health professionals who feel this is bad weather. Maybe you're a little sensitive. Let me tell you about bad weather in Atlanta. I was here about twelve years ago, something like that. And I had set up for myself and for some colleagues a day-long series of media interviews, starting with drive time radio and straight on through the *Atlanta Journal Constitution*, the whole thing. And I woke up in my hotel room, and I flipped on the television. There I saw local newscasters standing out on the beltway. It was snowing in Atlanta. So I opened the draperies to my hotel room, and there was an incredible snow storm. It had to be three quarters to upwards of an inch of snow on the ground.

So my cellphone started ringing. Cellphones at that time were about the size of this podium. And one after, another people were canceling our media opportunity to talk about endangered species and biodiversity and tropical rainforests. It was really amazing. Every single interview was canceled. But as I watched the television, I saw that the stations had dispatched every journalist in town to cover the snow crisis. And there was a guy out on the beltway doing standup commentary live from the beltway. And he was talking about how the snow had started to come down and the crews were out in the middle of the night. They were working on this, but most of Atlanta, nonetheless, was completely shut down. Schools

were canceled. Federal offices were closed, and so forth. And behind him—behind him is the guy driving the snowplow around the beltway or whatever big artery it was. And he was driving at such a speed that he was shooting the snow up over the divider and into the oncoming traffic. It was another way of saying that it is really not worth being unprepared for a major, major calamity that affects a major settled area, as we saw with Katrina and as we see with some industries.

Since Howie spoke so much about global warming so well, I just wanted to talk about the whole issue of vision, inventiveness and the cost of not acting, mostly from an economic standpoint. And this has really caught our attention at the Environmental Working Group in the past year. We've done a fair amount of work over the years on automobiles, fuel economy standards and so forth. And every time we got up and made the case that we ought to have higher fuel economy standards, what we heard from Detroit was this: (1) if we had smaller cars, more people would be killed because they're more dangerous, given the other, larger vehicles on the road today. And (2), if you want to take that risk, there are plenty of cars out there that get great fuel economy. Americans have that choice.

Well we saw in the past two years, within a period really of only about eight months of modestly high gas prices, a devastating impact on the US auto industry. Sure, enough people have concluded that they want to buy cars. They want to use their ability in the marketplace to purchase vehicles that get better fuel economy, and guess what. They're not buying them from the Big Three. And so as a consequence, we read in the newspaper everyday not just about pollution issues, not just about concerns about congestion, but we read about what's happening to our auto industry in America. It's been decimated by a brief period of moderately high gas prices and bigger globalization issues.

Thirty-five thousand workers' lives disrupted at Ford Motor Company. They've taken the early buyout. Those jobs are gone. They're going to close fourteen plants at Ford Motor alone. They've closed nine already. And all over the country, in Louisville and other cities where they have plants that have not been named, those workers are living in terror, and so are their families, that their livelihood will end. GM is the same story— 35,000 early buyouts and more to come as this industry in the US downsizes.

Now it's one thing, it seems to me, to make the case on environmental grounds that we needed to have been investing long ago in the kinds of technologies that Toyota and Honda invested in and are now selling to our companies. But it's another thing to make the case as an industry leader that you do see the future. It's about the kinds of huge vehicles that Howie had up on the screen. We're still selling some of them today—okay, fair enough—but then we see the industry calamity that can happen almost as quickly as a one-inch snowstorm in Atlanta. And lives are changed, communities are changed forever.

Now to me, as I speak to these issues from an environmental perspective, I try to think about the workers in

the communities who are going to be affected, too. And my concern is that the next industry that's going to be hit in this way is the American chemical industry. Carol very eloquently described not just the scale of the industry, but the efforts that are underway to deal with the challenges that face it. But the US chemical industry is shrinking, and it's threatened by overseas competition, globalization that will take more and more of our facilities offshore. The only way I feel that we can compete in many of these sectors is to have the cleanest, most energy-efficient economy in the world, the best, cleanest products, the safest, most fuel-efficient processes and systems. My concern at this stage is that the American auto industry has lost so much in this process that we'll have to rely on other technology in other companies to a disturbing degree to deal with climate change to the extent it's caused by vehicle pollution.

In the area of public health, specifically, for the chemical industry—and Carol, I appreciate and accept your invitation to work with ACC on this matter—I'm concerned that there is a similar kind of crisis coming there—that we're going to see a tremendous out-migration of jobs and facilities in the United States in the chemical industry. And the way that we can protect the domestic industry is not on a cost basis alone, because there will always be cheaper ways to make these chemicals elsewhere, particularly in China. The industry is exploding there, and I think Dupont's leadership in bringing together a whole group of companies to deal with the consequences of decades of releases into the environment is the kind of model that we need to be looking for and institutionalizing in federal law now to make sure that we have global standard that are set very high.

My ambition for the chemical industry, and we'll be talking about this in the bio-monitoring session, I suppose, tomorrow is for the US chemical industry is to be the world leader. And I think what they most need to do is focus on creating processes and products that result in minimal if any contamination of human beings with toxic chemicals. That's an ambition. That's a goal, but I think that kind of vision is going to move the industry in the direction that can preserve jobs, preserve its vital place in the US economy, stop the shrinkage—not just in the industry but even in the trade association— and make sure that we have a solid basis of research and development to lead the world over the next 20 years and 30 years in the direction that it needs to go in using safer, cleaner, more energy-efficient technologies. Thank you.

Henry Falk, M.D., MPH, Director,

Coordinating Center for Environmental Health and Injury Prevention

Well thank you very much for that, Ken.

And last, let me introduce Robert Blake. Robert has been appointed Director of Environmental Health Programs for Georgia, Division of Public Health. He previously was the Director of Environmental Health for DeKalb County, which is right here in the Greater Atlanta community. And he's also currently the

President-elect of NEHA, the National Environmental Health Association. It's a pleasure to have you here this morning. Thank you.

Robert G. Blake, MPH, REHS, Director,

Division of Environmental Health DeKalb County Board of Health;

President-elect, National Environmental Health Association

Good morning and welcome to Atlanta. And you can hear straight away I speak with an accent. I started my public health career in London, migrated to Michigan, and then down to Georgia. And in all these places I've worked in local environmental health. So these comments are from that perspective.

What I'm going to look at very briefly has already been covered partly by Dr. Frumkin—revitalizing environmental health, community involvement in environmental health issues at the local level, the built environment, and climate change.

If we look backwards, we should celebrate. We've done a great job in preventing a lot of diseases that were the leading cause of death in the last two centuries. The primary diseases we see in the 1900s were respiratory diseases, TB, gastrointestinal, and parasitic diseases. And environmental health practitioners really have contributed greatly to reducing those—the impact of those diseases and the extension of life expectancy. Today, however, we've got chronic diseases—cancer, heart disease, diabetes taking huge tolls. And the greatest killers do have environmental health components. For instance, tobacco obviously is an indoor-air quality issue. Diet is another, and there's a number of initiatives in New York and Chicago looking at transfat and calorie counts and healthy foods as part of food protection programs, which are traditionally at a local health department level. And then we have sedentary lifestyles, and that obviously is in the built environment arena. And in each of these, I think environmental health at the local level can play a big part in reducing the impact of these chronic diseases.

I've borrowed three slides from Dr. Sharunda Buchanan from the National Center for Environmental Health. And these slide represent an effort that took place a few years ago to look at environmental health practices. Basically, we are an outmoded profession in a lot of ways. We still have a lot of folks doing check-sheet type inspections at the local level. And we need to begin to think in terms of the systems-type approaches. In addition, many programs lack leadership. A lot of our leaders are retiring and leaving. And we have an invisible role. A lot of things that we do have a good impact, but we largely focus on preventing bad things from happening. When bad things don't happen, you're not visible. And so we do good things, but we're invisible to a lot of the public.

We have a decrease in the number of environmental health professionals. As we heard earlier, we have I

think about 300 graduates from accredited environmental health programs per year around this country. That's not enough to replace the regular turnover or the exit of the folks that are leaving the profession as they retire.

We have a lack of performance standards. In other words, we can't compare one community to another in terms of what is actually being practiced. And I know there are some meetings taking place at this conference. And there is a disconnect between environmental health and the root cause of why public health and environmental health started. Particularly out West, environmental health and public health have separated.

This is the cover of the report. And I still see this as the roadmap for the future. If you haven't read it it's worth reading. A lot of organizations participate, and national organizations have adopted this report's recommendations. NEHA has taken an official position to support this report. And the goals of that report were to build capacity, support research plus the leadership, communicate in markets, develop the workforce, and create partnerships. And a lot of discussions that we see today are built around these six main goals.

In the partnership area, I was very pleased and privileged to part of an exciting new partnership between CDC and the National Center for Environmental Health, ATSDR, and EPA. This took place in October, and we were invited in DeKalb County because we'd received an EPA CARE grant. This is the Community Action for Renewed Environment grant. DeKalb County, just east of here, is home to about three quarters of a million people. It has many, many environmental health issues. And we are looking at two communities in particular within our county to address environmental health issues. And I really see this as a future trend. But we need to be listening more and more to the communities that we're suppose to be serving and not doing so much traditional top-down, command-and-control inspection programs. We need to be listening and let feedback bubble up so that we can begin to serve.

But the underlying part that I really found exciting about this meeting is this joining together again of the environmental health part of the spectrum and the environmental protection part of the spectrum. At the federal level, can we get these two to work together and not be so divorced, and then mirror that down to the state and local authorities?

And at that meeting I asked, what does environmental health mean to a member of the community? When I walk up to someone and say I work at the environmental health department what are they thinking? I don't think that they're necessarily thinking about the traditional programs that we spend so much effort on. And so I think we need to be listening more to the community, and I know there are some of my colleagues around the metro area who are a little frightened of involving the community, because they say their plates

are already full. If, they say, I invite the community in, that's just going to add to that plate and spill over. But I think it also provides the opportunity to spotlight what we do and also to begin to listen and to begin to address the needs of the folks whom we're supposed to be serving. We've wrapped a lot of our work into the community planning process, incorporating a lot of the things that we're beginning to hear from the community into our work. And in Session, B12 this afternoon we'll have some discussion of this.

A few years ago, I was involved in a two-year course funded by CDC in the form of a capacity building grant through Emory University. And Dr. Frumkin challenged us in that meeting to get involved in the built environment, and I must admit my initial reaction was wow. It's like the horses have already bolted from this barn. Everybody is dependent on automobiles. We've got sprawl that's unstoppable, it seems, sidewalks in much of the city, combined sewers flowing to the river, etc. But we have been involved in DeKalb County in our regulatory roles with planning. And several years later, we're now involved in all rezoning and special land-use decisions.

And we attend community forums staff. The staff and I have attended community forums again to listen, but also to inject environmental health issues into the discussion. And these are just a few of the items that we have now have raised in the community comprehensive plan. It's a ten-year comprehensive plan for DeKalb County, focusing on septic systems and a healthy built environment. We're now actively writing support for mixed-development usage, for park developments, for schools, many things that we were previously uninvolved in, including tourist accommodations. I'll show a couple of slides in a minute about our emergency planning, including the issues of landfills and environmental justice issues. In South DeKalb, predominately African-American, we have five active landfills, many concerns about health impact, and odor impacts. It really came to a head when there was a talk of the conversion of methane to electrical energy. We got heavily involved in those discussions.

Take the septic system issue. This is DeKalb County, home to three quarters of a million people, a major urban area. We have thousands and thousands of septic tank systems in the ground. This is a ticking time bomb across metro Atlanta and probably across many of the cities in the United States. Septic systems do not last forever. And so we're now working with the Water and Sewer Department to extend sewers into the problem areas that we already know about, then to schedule extension of sewers as this time bomb and time marches on.

We also recognize that septic systems are contributing to the tri-state water wars around this area. Florida and Alabama are asking where the water is from Atlanta, because the Chattahoochee River flows through. We take our drinking water from the Chattahoochee and then we use it in the septic tank system. It goes into the ground and then back into another river system. So it is a local issue, but it's also regional in that it affects other states.

We need tourist accommodations, and what we're also finding is that folks are pressured to find affordable housing in Atlanta. We have now about 25% of our hotels and motels, some of them name brands, that are allowing folks to come in and stay long-term. We've got folks staying for over a decade. We've got school buses pulling up to the hotels to pick up children of hotel and motel residents. We've got regular mail being delivered to these residents. And when you've got conditions like this, you have issues that are potentially life-threatening to many people. We also recognize that a lot of the population is in these hotels, like single moms with lots of kids. And when you think about large families living in just one room, you realize that there are some major issues to deal with in modern America to address inequities in our system. We are looking to address these through zoning code changes and through working with human services agencies to re-house some people living in dangerous situations.

And then there's the climate change issue. And I must admit I was flying into Denver for a NEHA board meeting and it was late on Tuesday night and the snow was flying there. It was really cold. And I got into the hotel about 2 in the morning. And I slept about two hours. And then the first message up on my Blackberry was from Dr. Frumkin saying what he was going to talk about. And I was like, oh wow. I don't know how I'm going to respond to that, because at the local level when you look up, you say how at a local level can I really influence anything that's so huge? And you gave me, Dr. Frumkin, some ideas regarding the Mayor's taking action and signing a lot of agreements. And it was a really good site to go to. And as I talked around in the NEHA office, I got a lot of further ideas. But today I think in the audience there are many folks from different federal agencies and different universities and from business. We need for you to help us understand these issues. I think that my colleagues around the nation are already on board. Some are kind of—well, maybe— and some are like—no, that's nothing we can be involved in. We need help from you to help us describe what the issues are to educators and then help us understand what can be done on the local level. This is indeed a huge issue, and I know national organizations are addressing it. At NEHA, we've initiated a committee over the last few months to begin addressing this and to educate our members, to act as a clearinghouse of information and to begin action planning.

And as I've talked to other folks in NEHA and around the country in the last couple of days, I've come up with this list of things. This is just the beginning, and as Dr. Frumkin said, we've seen some extremes in weather, with hurricanes and tornados and extreme heat and flooding. These are all areas in which environmental health typically has been a responder. We've seen the effects on vectors already from Dr. Frumkin's slides. We've got huge areas of this country that are dealing with drought effects on ground water recharge and salt water intrusion.

I've slipped in a note about smoke control areas in London. I remember when I was a boy coming home from school and dealing with some of the end-states of those smog events and not being able to see my

hand in front of my face. Much of the smoke control work in London is done by local environmental health folks. So we can do it. Historically we've done some really good things. And I think we just need to step up to the challenge. I've already mentioned the methane and landfills and wastewater treatment plants. And that's the end of my presentation. Thank you.

Henry Falk, MD, MPH, Director,

Coordinating Center for Environmental Health and Injury Prevention

So let me thank all of the panelist and Dr. Frumkin. That was really an inspiring opening session. We will need to break now. I just want to remind everybody that the next session with Senator Reed will start promptly at 10:30 due to the Senator's schedule. So we will hopefully have a bit more time after that to catch up and have more time for dialogue and discussion. Thank you all very much.

End of Plenary One