

Symposium Summary: The Transportation, Land Use, Environment Connection

UCLA EXTENSION PUBLIC POLICY PROGRAM
Annual Symposium Series on
THE TRANSPORTATION, LAND USE, ENVIRONMENT CONNECTION

Healthy Regions, Healthy People

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UCLA Conference Center
Lake Arrowhead, California

SUMMARY OF PROCEEDINGS

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- October 1992 The Role of Pricing and Market-Based Strategies
- November 1991 Overview of Strategies for Making Connections Between Transportation, Land Use, Air Quality

FOREWORD

This report is a summary of proceedings from a policy and research symposium on **Healthy Regions, Healthy People** held October 2005 at UCLA's Conference Center at Lake Arrowhead.

UCLA Extension's Public Policy Program convened the symposium, which was the fifteenth in an annual series created to address the importance of ***The Transportation, Land Use, and Environment Connection***. Each year a special theme is selected for detailed examination of the interrelationships among these three areas. This year's topic examined public health issues related to transportation, land use, and air quality, as well as ways to measure the public health costs and benefits of public policies. The goal was to balance diagnoses of problems with prescriptions for solutions.

Specific issues addressed were:

- Demographics of public health including trends and future issues
- Public health costs and benefits of current land use/transportation systems
- Safety considerations of urban design/land use/transportation planning
- Exposure to environmental hazards/distribution of risk among communities
- Effects of goods movement emissions on public health
- Global trends in mobile source emissions and regulations
- Future roles of conformity regulations
- Transportation-urban form link between access and physical activity

To ensure that the symposium identified with the needs of policymakers, practitioners, and researchers, the program was developed with the considerable help and underwriting from numerous sponsoring and cooperating agencies and organizations. These include governmental, business, environmental, and public interest groups, which are all listed in Appendix D.

I gratefully acknowledge the collaborative partnership shared between UCLA Extension and the UCLA Institute of Transportation in convening this annual symposium series. The contributions of co-chair Brian Taylor, Associate Professor, Vice Chair, and Director of UCLA's Institute of Transportation Studies in the School of Public Affairs/Urban Planning are invaluable.

Very special thanks, also, to the two individuals who prepared this comprehensive proceedings report: Jane Berner and Matthew Dresden, both affiliated as graduate students with UCLA's Institute of Transportation Studies.

The hope of the symposium organizers is that the information and ideas that emerged from this event will contribute to ongoing policy dialogues, and will inspire applications to daily practices, political decisions, and research agendas.

Catherine Showalter
Director, UCLA Extension Public Policy Program

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I. INTRODUCTION

Healthy Regions, Healthy People, the 2005 UCLA Lake Arrowhead Symposium on *The Transportation-Land Use-Environment Connection*, brought together researchers, practitioners, and policymakers to discuss the complex relationships among transportation systems, the built environment, and public health. **Healthy Regions, Healthy People** represented a milestone in this symposium series in that it marked the first year in which public health was pointedly and comprehensively discussed within the broader transportation-land use-environment framework.

During this symposium, public health professionals and academics presented the latest findings on current trends and issues in their field. They focused on the public health effects of the transportation system (primarily, about mobile source emissions and traffic safety) and discussed ways to mitigate these effects. Public health officials also discussed the largest public health concern today, obesity, and the ways in which their field is trying to reduce this problem by supporting policies that promote physical activity.

Transportation experts offered their perspectives on the benefits and costs of the transportation system – and how health concerns fit into this analysis – and transportation planners and urban designers debated the merits of using land use strategies such as smart growth and mixed use development to promote physical activity.

Not surprisingly, this year's symposium raised as many questions as it answered. It was a landmark event in terms of its expanded focus and in the promise it held for increased dialogue and partnership development between transportation and public health stakeholders.

The proceedings that follow summarize the discussions that took place during the **Healthy Regions, Healthy People** symposium. Each of the nine sessions is presented under a separate heading, beginning with synopses of the panelists' presentations and concluding with an account of the discussion period that ended the session. Although this report does not include every detail of every presentation, we have tried to be as comprehensive as possible. This report, then, is intended to serve as a reference for those who organized and attended the symposium, but is also available as a resource for anyone interested in these issues.

II. SYMPOSIUM PROCEEDINGS

SESSION 1: PUBLIC HEALTH – THE TRANSPORTATION, LAND USE, ENVIRONMENT CONNECTION

Catherine Showalter (Moderator), Director, UCLA Extension, Public Policy Program

Brian D. Taylor, Associate Professor of Urban Planning, and Director, Institute of Transportation Studies, UCLA

Jonathan Fielding, Public Health Officer, County of Los Angeles, and Professor, Health Services and Pediatrics, UCLA

Genevieve Giuliano, Professor, School of Policy, Planning and Development, USC

The symposium's opening session gave the broad strokes of how public health figured into the trinity of transportation, land use, and the environment. Following **Catherine Showalter's** introduction, the next three presentations set the stage for the rest of the symposium with a survey of the subject area. How have public health issues traditionally been incorporated into transportation, land use, and environmental planning, and how is that changing? What are the big trends in public health, and how do they relate to transportation, land use, and the environment? What are the hot-button issues in combining these disciplines--what is known, and what is merely surmised?

Catherine Showalter introduced herself as the new director of the UCLA Extension Public Policy Program and welcomed symposium participants. She encouraged open, frank, and respectful dialogue at the symposium, and observed that the unusual mix of people from transportation and public health meant that everyone there was an expert, and that audience participation could be either asking questions or sharing relevant personal knowledge. Additionally, she happily noted that the symposium was well balanced: between men and women, between academics and practitioners, and even between northern and southern Californians.

Symposium Overview - The Waxing Focus on Public Health in Transportation, Land Use, and Environmental Policy and Planning

Brian Taylor gave a thematic overview of the symposium, starting with a comment about the symposium's structure. Because the participants were from such disparate disciplines, the steering committee had consciously decided to begin by establishing common ground -- because the people from transportation might not know much about public health issues, and vice versa. After whetting the audience's appetite with thumbnail summaries of the subsequent sessions, Taylor offered his own take on the intersection between public health and transportation, land use, and environmental policy and planning.

Even a casual observer could probably tell that a great deal of recent research had linked urban form to physical activity, with concomitant collaborations between public health and planners. But the key question, Taylor posited, was whether the excitement of these new collaborations meant that policy and practice had gotten ahead of the research. With this in mind, he offered a few basic premises:

- The built environment affects bicycling, pedestrian, and transit activity.
- The proportion of bicycle and pedestrian trips tends to be higher in central cities than in suburbs.
- In the United States, body weights are increasing and activity levels are decreasing.
- Suburban developments are expanding and, because people tend to walk and bike less in those developments, may therefore be contributing to public health problems.
- A return to compact, mixed-use development patterns may be justified on public-health grounds.

Taylor then unpacked the ambiguities of the current research. Although compact, mixed-use development was indeed correlated with increased levels of utilitarian bicycling and walking, significant questions remained about causality and significance. Although increasing access to exercise venues and attractive walking environments increased physical activity, it was unclear how to translate this into design goals beyond merely increasing the numbers of recreation facilities or making walking more attractive. In large part, this was because individual and interpersonal factors (such as socioeconomic and household status) had a greater influence on travel behavior and physical activity than physical environment factors.

Nevertheless, Taylor argued, it was essential for symposium participants to explore and clarify the linkages between urban form and physical activity. Influencing behavior through policy was complex and risky. And planners already regulated land uses and managed transportation systems--why not understand those things you have control over? Additionally, the issue of physical activity was highly congruent with several other transportation planning issues, most notably those relating to auto-dependence, like energy consumption, pollution, and low-density development patterns.

Perhaps the biggest flaw in prior transportation literature linking urban form and physical activity, Taylor argued, was its almost exclusive focus on utilitarian travel (e.g., walking to the store) at the expense of recreational travel (e.g., jogging for exercise). This approach partially reflected a difference in goals: transportation people were more concerned with access to mostly non-physical activities and coping with the issues deriving from auto dominance. Public health people were concerned with healthy communities, physical activity and other healthy behaviors. But utilitarian and recreational travel have a great deal of overlap, and not always in obvious ways. For instance, so-called "recreational" travel for children, such as riding bikes around the neighborhood, may in fact be utilitarian and an important part of socialization, play, and independence. At the same time, it has also been argued that the physical environments most conducive to this sort of activity (i.e., low-density suburbs) are least conducive to walking.

Another set of unanswered questions involved walking: the vast majority of walking by Americans was unrecorded: from the kitchen to the bathroom, around an office, and so forth. One might ask how much of this walking was enough to make a difference with respect to physical activity and public health. Except for short trips, utilitarian walking was often time consuming. Did the exercise benefits outweigh the opportunity costs of not engaging in other, perhaps more physical activities? Did people even engage in other forms of physical activity?

The nexus of public health and transportation planning remained an exciting area of public policy and planning scholarship, not least because it brought together people working on similar issues but in highly disparate disciplines. In that this collaboration

was already producing research with models covering recreational travel, utilitarian travel, and other physical activities, Taylor was hopeful that the literature would soon give a larger and more accurate picture of the links between urban form and physical activity. It was just these sorts of complex links between causes, effects, and public policy, Taylor observed, that Arrowhead symposium participants relished.

The Demographics of Public Health: Current Trends, Future Issues

The purpose of public health, **Jonathan Fielding** observed, was to "fulfill society's interest in assuring the conditions in which people can be healthy." To that end, it was vital to understand how physical and social environments affect behavioral factors that then directly affect public health. Fielding showed a series of sobering statistics on mortality rates and Disability-Adjusted Life Years (DALYs). Women were generally healthier than men. In terms of health by ethnicity, African-Americans were the least healthy and Latinos and Asian Pacific Islanders (APIs) were the most healthy, with white people in between. Fielding stressed that behavior was not totally volitional, but largely conditioned by each individual's social, physical, and genetic environments. He added that the determinants of health and function were not necessarily the same as the determinants of disease and injury.

Fielding focused on two major areas of health: obesity and exposure to air pollution. He termed obesity the "worst epidemic that we have in public health." Nearly every age group, ethnicity, and location in America showed dramatic and troubling increases in obesity rates. The rate of adolescent diabetes had increased tenfold, and children born in 2000 had an approximately 1 in 3 chance of contracting diabetes, with a 12-14 year decrease in expected lifespan if they became diabetic by age 40.

The obesity epidemic was so dire, Fielding continued, that it will soon produce the first decrease in human life expectancy since the Industrial Revolution. In California alone, the costs of obesity (measured by summing health care, lost productivity, and workers compensation) were estimated at \$21.6 billion in 2000 and \$28 billion in 2005. Fielding added that whether you were lean or obese, there was still a health benefit to being active.

Fielding then segued into air pollution, noting there were two major types of air pollution: local (from vehicular traffic and industry) and regional (from photochemical reactions). Currently, Southern California was among the worst in both categories, largely because so many communities and schools were adjacent to freeways. Studies have linked proximity to freeways and busy roads to preterm babies and birth defects, asthma, respiratory diseases, and abnormal lungs in children, heart disease in adults, and lung cancer. And disproportionate numbers of minority and poor children attended freeway-adjacent schools. Children from the most polluted communities also had more school absences, meaning increased costs for both caregivers and school districts. In a final, bitter irony, those children in these communities who did get more exercise were more likely to develop lung problems.

While conceding Taylor's thoughtful point about not wanting policy to get ahead of research, Fielding countered that some things were "too important to wait for all the research." It wasn't necessary to wait for all the research to know if it good idea to take snack food out of LAUSD schools, or that K-12 kids ought to have a physically active part of every day as part of school.

Fielding closed by calling for health issues to be considered in transportation and land use planning and policy development, citing an ongoing project which attempted to measure

the public health effects of policy changes in non-public sectors. For instance, how did increased walkability to school affect body mass index (BMI) measurements? The key, Fielding said, was to get policy makers some of the data to help them make good choices. Sometimes, the most important lesson was to show them the effect of doing nothing.

Mobile Regions, Healthy People: Exploring the Transportation-Land Use-Environment-Public Health Connection

Genevieve Giuliano gave an overview of the costs and benefits of auto mobility, which she paraphrased as being about the costs and benefits of the really cheap transportation that exists in the US. She noted that she was focusing exclusively on the human element, and not the economic costs or benefits. She added that although most of the symposium might focus on the costs of auto mobility, there were also tremendous benefits, and a major policy challenge was to reduce the costs of auto mobility while preserving its benefits.

Giuliano started with the long and growing list of costs. Traffic congestion, even for those who quibble with the Texas Transportation Institute's methodology, was clearly increasing at a nonlinear rate. In Southern California, this trend seemed inevitable, given the growth in jobs and population over the last 20 years, with almost no increase in highway or transportation system capacity.

Giuliano acknowledged the growing recognition of the major health hazards from small particulate matter and proximity to freeways. She noted that as we have become better at regulation, the marginal costs of decreasing regulated emissions have increased, and non-regulated emissions have become an ever larger percentage of the total pollution. This generalization was writ large with the massive growth of the ports of Los Angeles and Long Beach: as emissions from the port were increasingly linked to a variety of health problems, people were realizing that most of the pollution came from unregulated oceangoing vessels. Giuliano added that after years of improvement in ozone levels, since 2000 the air quality in Los Angeles and the South Coast region as a whole had started to worsen.

Roughly 42,000 Americans are killed in traffic accidents each year, about the same as the number of women who die from breast cancer. It's a huge number, Giuliano pointed out, and clearly one which ought to be reduced. For Americans aged 4-34, motor vehicles were the leading cause of death, and in fact motor vehicles were among the top ten causes of death for every age group except those over 65. When you also considered the nearly 2.8 million injured each year in traffic accidents, vehicles clearly accounted for a tremendous amount of health care and loss-of-work costs. Giuliano added that while only 4600 pedestrians were killed each year, statistically they faced a much higher risk.

Giuliano then argued that physical activity had been largely engineered out of daily life. American life was characterized by more motorized travel, fewer jobs requiring high levels of physical activity, more labor-saving devices, and proportionally more leisure time spent on inactive leisure activities such as television and video games. Increasingly, Americans needed to go out of their way to get physical activity. Giuliano then presented a chart implying that the most likely opportunities for increasing Americans' physical activities were at the workplace, such as going up and down stairs.

Giuliano reminded us that although they were increasingly ignored, the benefits of auto mobility were enormous, and had everything to do with accessibility. Even in cities with good transit systems, cars arrived at destinations quicker than any other form of

transportation. For low-income people, the transit schedules were often not aligned with their work hours or destinations--and from spatial mismatch research we knew that many low-income jobs were not close to where low-income workers lived. For all workers, the relative cheapness of car travel has allowed job mobility. Put another way, this has meant people are able to choose long commutes to maintain the job and the residence and the social network they prefer. For the elderly, social networks were extremely important, and continued mobility (meaning the ability to drive or be driven) had a well-documented psychological benefit. Finally, cheap travel allowed distributed families to stay close, and allowed far-flung colleagues to gather in locations like Arrowhead.

In terms of health care, cars were the only way many uninsured people had realistic access to health care, especially given the declining number of health care providers for them. Underlying this point, Giuliano observed that the single biggest reason children missed chemotherapy sessions was lack of access to a car. For the insured, auto mobility enabled them to drive as far as it took to receive the best care. Clearly, public transit was not a viable option for anyone in medical emergencies. Auto mobility has freed people from being captive to local retail. Mobility has driven competition and scale economies. Were Target and Wal-Mart really that bad for consumers?

Giuliano closed by identifying three historical solutions to the geographic separation of the poor from the not-poor: 1) move the poor into wealthier areas, 2) promote or create jobs in poor areas, and 3) provide transportation between the two areas. Because the first two have been so problematic, the third has become the default option. Access to transportation allowed poor people more opportunities.

DISCUSSION

Kathryn Phillips noted that since high-density areas were generally close to freeways and busy streets and therefore had higher levels of pollution, shouldn't we then encourage people to spread out into suburbs? Fielding acknowledged the apparent contradiction, but noted that only 14% of Californians made enough money to buy a new home, and that people live where they can afford to. Conceding this wasn't really his field, he opined that it was both a question of density and design, because high-density developments did not need to be within 100 meters of a freeway.

Taylor asked Fielding how much of the striking differences in health outcomes by ethnicity and sex could be explained by differences in household income and education, and how much was residual from genetics or cultural factors. Fielding first identified the "Latino paradox" - although Latinos' education and income levels were much lower than non-Latino whites, their life expectancy is much higher. At the same time, there was a clear "noxious effect of acculturation": the longer Latino families stayed in the US, the more their health outcomes mirrored those of non-Latino whites. The Asian American population is much less heterogeneous, however, and consequently more difficult to assess. Fielding cited the folly of trying to compare Samoans and Chinese on anything from body mass index (BMI) to patterns of nutrition. In sum, education and income do not explain the divergent health outcomes, but an argument can nonetheless be made for reducing the wide economic disparities between ethnic groups. Take tobacco use: while men and women smoke in equal numbers among white and black populations, among Latino and Asian American populations, men are twice as likely to smoke.

Joan Denton asked if any studies were tracking the refugees from Hurricane Katrina, in the context of studying the dispersal of poor families among the non-poor. Giuliano cited a famous study on the Gautreaux Program, a Chicago program in which low-income black housing project residents were given the option of staying put or moving to a

middle-class neighborhood. The households that moved had much better outcomes, especially regarding the children's educational attainment. But as seen recently in Mission Viejo, it was still difficult to get affluent neighborhoods to accept poor people. Taylor added that with respect to Katrina, preliminary evidence showed that poor people from New Orleans were primarily moving to poor areas in Houston, Los Angeles, Nashville, and other cities. With respect to Gautreaux, the adults who moved demonstrated some slight improvement, but the children virtually mirrored the performance of their school peers (in terms of education). Fielding added that changing social norms was critical--in most poor areas, the expectations are low, but when you change those expectations children perform at a higher level.

Barbara Lupro asked how close was too close to build residential near highways. Fielding said there was a gradient (the study he cited used 150 meters as the cutoff), but it was also important to recognize the existence of tradeoffs. Air pollution was only one issue among many: was it better not to build a school at all, or to build it near a highway? Taylor noted an irony of development: being adjacent to freeways reduces the value of residential property, but increases the value of commercial property. Yet in many new areas, like the Central Valley, development started along the freeways and went inward. In that we know about the health risks, and that the property will be worth more if it's commercial, why would we ever let highway-adjacent property be zoned residential?

Fielding added that the physical and psychological environments during prenatal and early childhood stages were increasingly being shown to affect later adult health and that these needed to be studied.

Mark Brucker noted a recent legal settlement in Las Vegas in which a widened highway led to some school buildings being moved, diesel buses shifting to cleaner-burning fuel, and so on. In short, there are other options between building a school or not. Fielding stated that it was a huge mistake to think about schools as schools alone, because they could and did serve a wide variety of functions: increasing social capital, serving as meeting places, preschools, and health care facilities, as well as playgrounds and parks. This view was particularly important given the large new bond measure funding Los Angeles-area schools.

Alex Kelter noted that, as Giuliano made clear, if you spent 50 years developing a society around the car, you got a society organized around the car. He wondered, then how one could reduce the demand for transportation and still preserve the quality of life. Giuliano said that accessibility today may not be accessibility tomorrow, and putting people and destinations closer together might be a very good thing in the long run. But we needed to be careful of the consequences of reducing demand in the short run. Regardless of whether we were paying the right price for transportation, we had to recognize that people, especially low-income people, were dependent on goods and services in the current spatial configuration.

Ellen Greenberg characterized Giuliano's hospital story as more about kids not having affordable health care close to home. The reality was that cheap car travel has been compensating for suboptimal performance in other systems, such as housing, health care, and retail. Giuliano agreed, observing that this was transportation as a social equalizer in a nutshell. Fielding concurred, but cautioned that for treatments like chemotherapy, you wanted cancer treatment to be in a hospital, not at a local clinic--and the best hospital might not be that close to home. Although the health care system had problems, Giuliano's story was not necessarily about that system failing, but rather about the transportation system failing.

Bob Leiter spoke about working as a city planner on a master-planned community in which half of the people lived within a quarter-mile of the school and community center, but that large numbers of parents still drove their children to school, because of bad habits and safety concerns. Without community buy-in, good design and good intentions were not enough. Fielding agreed, citing recent walk-to-school studies.

Gill Hicks asked about the health impacts of curbing or decreasing economic growth, especially at the port. Giuliano noted that she intentionally omitted economic productivity, but would now address it. On the one hand, there was increased opposition to enlarging the Los Angeles/Long Beach port complex, largely due to the clear adverse health effects of port emissions. At the same time, 400,000-500,000 Los Angeles area jobs were connected to port-related international trade. These were largely good jobs, with health benefits, and many were filled by the less-educated. If we stopped growth at the port, regional economic vitality (and concomitant public health) might suffer. Taylor noted that if the economic effects of stemming port growth were indeed so dramatic, that was a powerful argument for spending a lot of money to mitigate the adverse health effects. Fielding added the importance of considering the distributional effects: if port growth continued, 20,000-30,000 more people would get health insurance, but everyone near the port would continue to suffer from air pollution exposure. Additionally, as health care costs continued to outstrip the gross domestic product (GDP), more and more workers would become uninsured or underinsured.

Dennis Washburn noted that all the issues discussed so far required local solutions, because there wasn't enough money or will from the state or federal government. In Calabasas, they were partially funding their own school, using 10% of the city budget. Giuliano agreed there had been a tremendous devolution of responsibility to the local level, and affluent cities have more options. Cities like Irvine had been able to preserve their schools despite losses from the state, but whether this strategy helped cities like Compton was another matter.

SESSION 2: MEASURING AND EVALUATING THE EFFECTS OF TRANSPORTATION SYSTEMS ON PUBLIC HEALTH

Randall Crane (Moderator), Professor of Urban Planning, UCLA School of Public Affairs

Marlon Boarnet, Professor, Department of Planning, Policy and Design, UC Irvine

Steve Pickrell, Senior Vice President, Cambridge Systematics

Daniel Sperling, Professor, Civil and Environmental Engineering and Director, Institute of Transportation Studies, UC Davis

This second session, moderated by **Randall Crane**, examined how to measure and evaluate the effects of land use developments and transportation systems on public health. Crane began by identifying several factors necessary for such measurement: public health, physical activity, exposure, mechanisms such as the built environment and the transportation system, and the behavior of individuals, regulators, and the marketplace. But the story of evaluation was not just about data availability and the things we can observe and measure, but also about the linkages among the above factors. Causality, in particular, was critical. Take, for instance, the question of whether walkable neighborhoods cause more walking or merely attract people who like to walk. The answer was probably a bit of both, but teasing out these distinctions has been quite difficult. Both the actual data available for measurement and the choice of measures were equally important, and affected the feasibility of acting on these linkages.

Analyzing and Measuring the Public Health Costs/Benefits of Transport and the Built Environment

How would one do a cost/benefit analysis of built environment interventions aimed at increasing physical activity? The short answer, **Marlon Boarnet** conceded, was that we did not have the data, and would not for at least a generation. The best we could do presently was a "back of the envelope analysis." Using cross-sectional studies on the incidence of walking and biking in different environments, for example, we could distinguish behavioral change from mere associations, but because the ongoing studies were longitudinal, we did not know crucial questions about whether behavioral change would persist over lifetimes.

The obesity rate is the defining statistic of this field, and Boarnet noted its gripping parallels to tobacco use. If current trends continue, diseases linked to physical inactivity and diet will soon take over from tobacco-related diseases as the biggest cause of preventable deaths. As an aside, he noted that the CDC had downwardly revised its prediction of obesity-related death rates, but arguably because medical technology was allowing people to live longer in spite of obesity. Boarnet then showed a series of maps detailing the stunning rise in obesity rates, in every American state, from 1988-2003. What had been the high end of the distribution (an obesity rate of 10-14%) was now the low end--and all this happened in a single generation.

Boarnet then addressed the question of whether the suburbs make you fat. It's a tempting argument, he said, but the timelines did not match up. While the obesity epidemic started in the mid-70s and is still going on, peak suburban growth occurred from WWII through the 1970s. You could run the numbers different ways--looking at the percentage of Americans living in suburbs, the changes in suburban population numbers--but the answer would still be the same. And Boarnet considered any story about how the built environment's influence on obesity lagged by a generation to be a stretch. Rather,

Boarnet contended that suburban development patterns are at best a minor factor contributing to the obesity epidemic. The only way an epidemic of this magnitude occurs is via broad societal trends, and so we ought to be looking at things like changes in food processing (especially the rise of cheap sweeteners), food availability, diet, and lifestyles (especially the rise of two-income households and different time-use patterns).

Nonetheless, the suburban built environment and land use planning can be a meaningful part of the solution. Boarnet cited travel diary data from Portland, showing that of those people who had a walking trip during a two-day period (roughly one-fourth of the respondents), the median walking distance was 0.54 miles--which was long enough to be a meaningful part of the physical activity solution.

Boarnet noted that transportation professionals were conditioned to focus on small (mobility) benefits for large numbers of people: say, shaving a couple minutes off a highway commute. But they needed to change their mindset in this context, because public health analysis was often about large benefits for a small number of people: say getting 100 people to increase their daily physical activity from 16 to 48 minutes. The measurable health care benefits for such an intervention might only be \$10 million, but this could be a big win if the project did not cost very much.

Inexpensive interventions in the built environment could measurably increase the amount of physical activity. As an example, Boarnet cited the California Safe Routes to School program, which had seeded several projects, each costing about \$300,000 and with two main goals: increasing the safety of the walk to school and increasing the amount of walking to school. Boarnet had been the principal investigator on a before-and-after study done with ten elementary schools, mostly in Southern California. The project consisted of one specific improvement to the built environment, such as adding a sidewalk or putting in a traffic light or signalized crosswalk. Because the improvement was along one specific walking route to school, it created a natural control group. The study asked parents if their children walked more to school after the projects were built, and the results robustly showed a statistically significant increase in the number of children walking to school. A couple caveats: these interventions were small and in many cases obvious (i.e., low-hanging fruit), and in some cases the overall number of children walking was still low. Moreover, it was unclear whether this behavior would last.

We are beginning to learn about low-cost built environment interventions that improve walking rates and increase safety: installing sidewalks, traffic control, street trees, etc. It's a bit early to derive cost-benefit ratios, but at any rate it's encouraging. It should also be said that some of these interventions might be expensive to implement in already-developed areas, but less so in greenfields and redevelopment areas. Finally, Anthony Downs' critique--that the bulk of the built environment is already built, and therefore any changes will be at the margins and won't solve any regional problems--was inapplicable. The potential with these interventions was not in reducing regional congestion, or air pollution, or energy use, but about meaningfully improving neighborhood "livability" --- creating a place where more children walk to school, and where that walk is safer.

Incorporating Environmental and Health Costs/Benefits into Measures of Transportation System Performance

Steve Pickrell spoke about the measurement and incorporation of health care costs into transportation policy and decision making using performance data--how it's done, how it might be done differently, and what's missing from the discussion. In his work as a

consultant, he noted, he works primarily with major state transportation agencies, which spend a huge amount on transportation and therefore have a disproportionate effect on transportation options for everything but local trip making.

He started by briefly reviewing the direct effects of transportation systems on health and safety. Most major agencies track safety data, starting with injuries and fatalities. Pickrell noted that this was good because "being alive is an important precursor to being healthy." He added that the National Highway Traffic Safety Administration (NHTSA) had estimated that injury crashes cost about \$11 billion annually. Safety data on pedestrians and cyclists had historically been a problem but were improving due to better data collection, storage, and retrieval methods. These data were used to varying degrees in decision making and policy formation, however. As an example, he described the Crash Outcome Data Evaluation System (CODES), which linked crash data to injury outcomes--following crashes and costs through health care systems, and attributing those costs to different types of accidents. About 17 states participate in CODES, and it could be an effective diagnostic and legislative tool, but in his experience it has had limited effect because it competed with many other stories for limited investment dollars.

Pickrell then discussed factors involved in measuring indirect connections between transportation and public health: personal health (noise, hours spent in congestion, etc.), changes to the physical environment (water quality, air quality, loss of open space and habitat), lifestyle-changing things (spatial layouts of transportation systems and communities, accessibility of different transportation modes). It was difficult to track these connections, and there was not one single way to do it. Oregon connected premature deaths to transportation by measuring traffic fatalities, use of safety belts, safe drivers, and the rate of impaired driving; but for linking air quality to transportation, the state only measures the hours of traffic delay. Maryland, by comparison, estimated the transportation system's contribution to specific pollutants in urban areas, which was a slightly more direct measurement.

Pickrell then moved on to how spatial relationships and sprawl were viewed as a leading indicator of health impacts. He identified a measure used by Northwest Environment Watch, which tracked population growth and growth rates, population density, percentage of residents in compact communities, and percentage of new residential units in compact neighborhoods in Pacific Northwest states. Pickrell conceded it would be difficult to change the level of accessibility for most of the country without major reworking of communities and transportation systems, but some cities and communities were growing extremely rapidly. From 1990-2000, 65% of Las Vegas' new metropolitan growth was in compact neighborhoods and as of 2000 half of all its residents lived in "compact neighborhoods" (versus 28% in Portland and 24% in Seattle). Certainly, residential density alone was not enough--accessibility is of course key, but these data are increasingly available and could fortify previously weak connections.

Pickrell reiterated how the obesity rate exceeded the smoking rate in the United States, and the rate of obesity in children might soon exceed that in adults. But there were some interesting countertrends: per capita food energy and food fat consumption was declining, and levels of structured physical activity (gym time, playing soccer, etc.) were relatively stable. Arguably, the remaining explanatory factor was the "quality of life" improvements, as noted by Giuliano, which eliminated the need for unstructured, informal transportation.

Pickrell showed a chart demonstrating a fairly strong correlation between the obesity rates and per capita transportation energy use in various nations. A second set of charts compared weekday travel by age and mode in inner-city Toronto and in suburban

Ontario. The obvious result was that urban dwellers used transit more and drive less, but the less obvious result was that children in higher-density areas used transit at earlier ages, continued to cycle and walk at older ages, and did not start driving until much later and at lower rates than their suburban counterparts. In light of Boarnet's comment about small projects that could increase walking, the travel behavior of children after they turn 16 has a lot to do with whether such results could be replicated in a non-inner city environment.

Pickrell noted that transportation agencies were good at monitoring the public health effects of investments, but bad at forecasting the health effects in order to make better decisions. Because the agencies decided among transportation investments based on cost-benefit breakdowns, health outcome information did not yet play a significant role in the decision making process.

Pickrell closed by opining that transportation agencies were increasingly loath to link their actions to secondary and tertiary things they did not control--things like air quality, exposure levels, and public health outcomes. Instead, they were largely focused on the efficiency and accountability of their projects. Ironically, transportation policymakers were becoming increasingly interested in how transportation investments affected economic development and competitiveness--although the linkage between transportation and economic development was just as indirect as the link to public health. Pickrell hoped conferences like this one could push public health back into the spotlight.

The Price of Regulation: Measuring the Costs of Making Transportation Systems Cleaner and Safer

Daniel Sperling talked about the effect of regulations (emissions control, energy use, and safety-related) on motor vehicles: costs, consumer markets and industry behavior. There had been remarkably little previous analysis of this topic, but luckily he had headed a large project requested and funded by the California Air Resources Board, to help that agency understand the effect of regulations on motor vehicles as they embarked on a set of new regulations dealing with greenhouse gases.

His team studied historical data to understand how regulations have affected the motor vehicle industry over time, analyzing purchase behavior, vehicle sales, costs, and pricing, and the cost effects of safety, emissions, and energy regulations. The bottom line was that regulations were responsible for about one-eighth to one-fifth of the price of new cars, but had little discernible effect on industry performance and activities. The costs of imposed regulations had been largely accommodated within automakers' normal business and market planning processes. As an aside, Sperling noted that although this particular project was wholly funded by the ARB, the ITS at UC-Davis received considerable funding from the automotive and energy industries, who tried very hard to keep the researchers "honest."

The United States began imposing safety and emissions regulations in the 1960s, and energy regulations in the 1970s. But directly measuring the effects of regulation was extremely difficult for Sperling. First, robust cost data were not available, because vehicles were complex, and data on emissions controls were either difficult to locate or proprietary. Second, car prices were historically manipulated by automakers to solve a wide range of problems, from production targets to keeping legacy union plants active. Adding in pricing strategies such as financing incentives and cross-subsidization, it was easy to see that car prices had a tenuous connection to costs. A chart backed up this contention, showing a near-total lack of correlation between car prices and the costs of regulation-based adjustments. Instead, Sperling's team focused on periods when

regulations required expensive new technology in a short time period: specifically emissions controls in 1975 and 1980-81, and airbags in the 1990s.

Sperling highlighted a recurring theme: technical innovations by automakers in response to both regulation and demand. A 1990 regulation required dual front airbags in cars by 1998, but by 1995 nearly every car already had them, arguably because media attention on safety created a demand which outpaced the government regulation. From 1981-2003, while fuel economy standards were unchanged, cars got 24% heavier, 29% faster, and 93% more powerful -- which is to say, a steady increase in fuel efficiency (more than 1% per year), was put in the service of enabling faster, heavier cars. A more remarkable story is that over the last 20 years, while emissions controls have been dramatically tightened, the cost of emissions control per vehicle have decreased. There's been a tremendous focus of engineering talent to reduce these costs. And while the car and oil industries opposed emissions standards, saying such regulations would put them out of business, the historical data showed a minimal relationship between vehicle price changes and emission control costs.

While the costs of regulation have been significant -- about \$2500-4000 per vehicle--the benefits have been much bigger, albeit formally unquantified. And automakers' compliance costs were neither permanent nor cumulative: there were high initial costs, but human ingenuity consistently reduced them over time, and at any rate the costs were largely accommodated within automakers' normal business processes.

To make industry behave in a way that's beneficial for society, Sperling contended, we needed to make the technical challenges not too disruptive, and ensure the costs were borne evenly. Arguably, the reason greenhouse gas and fuel economy emissions had been such a tough sell for American politicians was that regulations have been seen as helping Japanese companies and hurting American companies. Finally, Sperling wondered whether we could continue to focus on technology and safety improvements, or look more to altering human behavior.

DISCUSSION

Randall Crane characterized the session as an important foundation for the rest of the program -- getting at operationalizing what we know and don't know about the relationships among public health and transportation systems. He then offered a rhetorical question: what do we do now, and how do we even decide what to do next?

Richard Napier wondered, in terms of the Clean Water Act and water pollution, if there had been any quantified analysis of what happens to cars and car parts as they get junked. Sperling said it was not really his area, but that the costs of other vehicle externalities (such as accidents, congestion, and parking) were much larger than those relating to water quality--because the former were huge. Pickrell added that water quality was a more site-specific question. In places like Austin, Texas and Lake Tahoe, local governments are extremely careful about things like impermeable surface coverage.

Donald Shoup was surprised to learn there are now fewer smokers than obese people, because his friends uniformly said that when they give up smoking they gain weight. He wondered if there was a connection (and got appreciative chuckles).

Bill Satariano wanted to know more about what Boarnet had learned about children walking to school. Was it a daily improvement? Did children walk with parents? Boarnet admitted, somewhat sheepishly, that they had not studied those particular things,

but until recently very little was known at all about travel to school. The results he discussed were based on one survey question: whether parent's children walked more to school after the intervention.

Martin Wachs noted that the "compact development" versus "sprawl" debate was not a dichotomy but rather a continuum, and asked Pickrell to clarify where benefits began. Pickrell conceded that there was no single inflection point for density after which you started to see benefits--that it varied based on a number of factors--but that this was the right question to ask. Las Vegas' increasing density was almost wholly residential, and it was not clear that this allowed non-automotive transportation to be any more practical or cost-effective, or whether it even allowed for physical activity benefits.

Suzanne Ekerling asked whether anyone was tracking the existence of sexual predators on heavily traveled routes to school, or when locating a school. Boarnet recognized that it was a concern and that as a parent of schoolchildren he was of course worried about such things, but that objectively, traffic safety posed a bigger risk. That said, neighborhood context matters a great deal in this and other arguments.

Michael Walsh commented that the EPA had recently adopted regulations requiring lower-emissions fuel for cars, trucks, and non-highway-legal vehicles, and that once the fuel is in regular use the annual costs will be \$11 billion, but the annual savings will be \$70 billion and 20,000 lives. He noted that when computer controls were added to cars, they enabled emissions reductions, but also other performance improvements such as fuel economy and durability. How had Sperling allocated the cost of those controls? Sperling noted that it was tricky, but by rough justice they allocated a third of the cost to emissions controls.

Kathryn Phillips argued that although obesity was a good marketing point for Safe Routes to School (SR2S), the main reason for such programs was to protect kids and provide transportation options for the families. Obesity was connected to food, and when she was in elementary school, the food was so inedible there was no chance of being obese. Boarnet conceded that many programs, including SR2S, improved safety and quality of life and were simply sound neighborhood planning efforts, irrespective of walking rates. One take-home message for urban planners, then, is that while a common cause can be made with public health experts, many interventions are simply common sense.

Dan Beal appreciated hearing how regulations were not a disaster at all for automakers. He wondered whether the lack of national standards for vehicle performance means we would not be able to impose measures such as remote exhaust sensing, mileage-based insurance, and direct-use pricing. Sperling commented that emissions/fuel economy regulation had largely become a Detroit vs. Japan argument, because Japan invested in good technology and Detroit did not. For the distributional effects just cited, there would not be the same resistance in Washington; rather, it would be a matter of convincing the politics of such metrics' value.

Gregg Albright commented that Pickrell was correct, DOTs became organizationally insecure about measures that they were charged with changing yet had no control over. It was simply common sense. How did he propose they reconcile this? Pickrell noted that he did not fault transportation agencies for not rising to the challenge, but it was disingenuous to jump on the economic development bandwagon when there was a similar lack of control. Sperling added that sometimes things seem intuitively right, but of course Caltrans and other agencies could not act without the help of private industry.

Barbara Lupro wondered if the generational lag in suburban development could be explained by the fact that people who grew up in the 40s and 50s, largely not in suburbs, developed walking as a habit and continued it throughout their lives, unlike their children. Boarnet said it was possible and that was indeed the sort of story he would tell, but he thinks there's a lot more going on, and at any rate it was impossible to tell.

SESSION 3: LAND USE AND TRANSPORTATION ASPECTS OF RISK AND PUBLIC SAFETY

Martin Wachs (Moderator), Roy W. Carlson Distinguished Professor in Civil and Environment Engineering and Professor of City and Regional Planning, UC Berkeley
Susan Herbel, Senior Associate, Cambridge Systematics

Anastasia Loukaitou-Sideris, Professor and Chair, Department of Urban Planning, UCLA

Raul Lejano, Assistant Professor, Department of Planning, Policy, and Design, UC Irvine

Kristine Thalman, Chief Executive Officer, Building Industry Association, Orange County Chapter

Martin Wachs observed that normally, on a Sunday evening in October, he would be watching the baseball game and drinking beer, but after listening to the presentations so far he realized this was bad for his health and he would be better off going for a jog. On the other hand, the next panel would tell us all about the dangers associated with engaging in that sort of physical activity, such as traffic hazards and the polluted air that you breathe while jogging. On a more serious note, Wachs noted that previous Arrowhead conferences had inadequately addressed safety, and this panel was a start at redressing that gap, and hopefully would contribute to greater understanding of a complex subject.

Risky Business: Understanding Relative Risks and Safety Trends in Travel and Transportation

Susan Herbel characterized her overall theme as making people think about the safety of everyday tasks. She noted that safety research, like other research presented, suffered from a lack of data, had multiple causes and solutions, and required both cultural and organizational changes. Generally, we used reactive solutions when we need proactive approaches.

Motor vehicles were the leading cause of injury-related death, for Americans aged 1 to 64. Since the 1960s, the fatality rate had decreased at a near-miraculous rate, but the raw numbers were still gruesome: about 43,000 deaths and 3 million injuries each year due to traffic injuries. In 2000, NHTSA estimated the annual cost of car crashes at \$230 billion--it's a huge public health problem! Moreover, policymakers rarely linked traffic crashes to things like mobility or to environmental pollution. She recently did a study for Orlando showing that 50% of the metropolitan congestion was due to traffic crashes, but they decided to solve the congestion problem by adding another lane.

The reduction in motor vehicle-related deaths had plateaued for the last ten years, which was troubling. Causation was extremely tricky, and usually due to multiple risk factors. That said, the leading factors were (in order): failure to wear seatbelts, impaired driving, roadway departures, speeding, distracted driving, intersections, and unlicensed drivers. As an aside, the biggest story in these fatality rates was the increase in motorcycle deaths, even while states are doing away with helmet laws. Herbel noted the phenomenon of males 35-50 buying high-powered bikes, then riding without helmets or training, and crashing in large numbers.

To get raw data for analysis, Herbel used police accident reports, but acknowledged such data was not robust because in accidents, the focus of the police is (understandably) not on data collection. Some states have implemented large-scale systems to coordinate hospital data, EMS runtimes, driver histories, etc., but it is difficult to do so. A threshold question was whether a traffic incident is an accident. Although the public tended to believe traffic incidents are random, in fact they were highly predictable, and therefore ought to be preventable.

The top two public traffic safety-related concerns were aggressive driving and driver inattention. Unfortunately, although aggressive driving was unquestionably a concern, states' attempts to regulate were reminiscent of the Supreme Court's famous take on pornography: they cannot define it, but they know it when they see it. Delaware, for instance, had a seven-factor test (including tailgating, speeding, disregarding traffic signals, and cutting in line) and if a driver is doing any three then they are driving aggressively. This was extremely hard to define. Driver inattention, and especially cell phone usage, was another hot-button issue, but Herbel contended the real problem was people trying to multitask--because the roads were so smooth and the cars so easy to drive.

The public ought to be more worried about the safety and mobility of older persons. A current trend was that America is rapidly getting older, and aging boomers were healthier, wealthier, more educated, and more mobile than previous generations, and expected to stay that way. An ongoing trend was that women outlived men and were far more likely to be living alone and in poverty--and then needing to drive again, when they had not driven for years. And although older drivers were extremely careful, and tried hard to follow the rules, when they got in accidents they were killed or injured far more often, because their bodies were more frail. Finally, we were looking at today's aging population but making decisions about the future aging population, when they were very different.

In terms of priorities about traffic safety funding and policy, SAFETEA-LU did not even provide enough money to maintain the roads, much less improve them. Although safety did pretty well in terms of funding, much of that was dedicated to projects that have little to do with data-driven, technical identification of problems. But there was so much pork that nearly every area got something, and no one was insisting that those decisions be technically informed. In policy discussions, congestion always trumped safety, which just meant we needed to do a better job explaining the relationship between congestion and safety--which was difficult, because we didn't always know what that was. This was an area screaming for further study. SAFETEA-LU, however, did reinforce the idea of safety as a priority planning factor: funds were doubled, with every state required to develop a comprehensive, data-driven strategic highway safety plan. Also note that since 9/11, safety and security were now two separately considered issues with respect to transportation.

Looking back over the last 30 years, we have been analyzing the same issues, but with more sophisticated methods. But even though the cars and roads were much safer, the drivers were not. The challenge now was applying knowledge of the old systems to the new and rapidly evolving ones.

Safety Considerations of Urban Design/Land Use/Transportation Planning

Anastasia Loukaitou-Sideris presented a synthesis of research incorporating criminology, public health, and urban planning insofar as they link walking and physical

activity and health. She began by observing that numerous studies had confirmed the concept that perceived risk and fear could constrain individual behavior, leading to inactivity and then poor health. Features that were important for walking included personal safety, aesthetics, the presence of destinations, and the convenience of nearby facilities.

Loukaitou-Sideris then examined how perceptions of neighborhood safety varied due to modifying socio-psychological, demographic, and environmental factors. Socio-psychological factors could be highly personal, such as prior experiences with a setting, familiarity with an environment, or past victimization, or they could be socially produced, such as parental admonitions, highly publicized media stories, and police warnings.

Demographic factors included a wide range of modifiers. Women were generally more afraid of crime, less likely to walk after dark, and felt more at risk in spaces like parking structures, underground passages, and bus stations. Residents of low-income neighborhoods were more afraid of crime (often with good reason), and identified safety as an obstacle to walking--yet they also do more utilitarian walking, albeit out of necessity. The rate of children walking has declined dramatically, largely because of parental fears about crime and traffic, which--at least on the subject of traffic risk--were not unfounded. Older adults--for whom walking is their primary physical activity--are particularly afraid of the dangers of walking in public, such as victimization from crime, injury from traffic collision, and dog bites. Poor sidewalk conditions increase older people's risk of post-fall injuries. Non-white people generally reported higher levels of perceived risk, were overrepresented in pedestrian deaths, and were less likely to participate in recreational physical activities.

Turning to environmental factors, Loukaitou-Sideris observed that people were afraid of both neighborhood incivilities (graffiti, broken windows, panhandling, etc.) and physical features that limit their ability to survey the environment: darkness, tunnels, or unfamiliar settings.

Loukaitou-Sideris then introduced some policy and design interventions. For crime, many of the same environmental features which made people afraid of walking were indeed correlated with higher crime rates. Interventions, then, included fixing broken windows, facilitating eyes on the street, improving lighting, and eliminating adjoining land uses associated with higher crime rates. It was vital, however, to reduce both crime and the perception of risk, which meant also creating safe territories and protecting access routes to destinations, as well as complementary strategies such as policing and surveillance, educational programs, and emergency buttons on transit.

In terms of traffic safety, Loukaitou-Sideris noted that a lack of attention to pedestrians had made streets less safe for walking, but interventions affecting driver's behavior could mitigate the effects of vehicles. The regulation of traffic through traffic lights, crosswalks, etc. should be customized to specific neighborhoods: if you have a lot of senior citizens, crosswalk signals need to give them more time to cross the street. To reduce the amount of car traffic generally meant both encouraging auto-alternatives and making auto travel more expensive. Traffic calming and enforcing safety zones were methods to reduce traffic speeds. At the same time, pedestrian behavior could be affected too. Such infrastructure as maintained and unobstructed sidewalks, bike lanes, crosswalks, and lighting was necessary but not sufficient.

The built environment should be designed to decrease, not aggravate perceptions of risk and fear. Design and policy interventions aiming to enhance neighborhood safety were

necessary first steps to encourage walking, but they should be tailored to the needs of different subgroups, and the characteristics of the neighborhood. Also, it is vital to evaluate if the proposed interventions are reaching those most fearful of walking and in danger of physical inactivity and obesity-- women, children, the elderly, inner city residents, and low-income people. It's also essential for collaboration among researchers, schools, parks, community groups, and policymakers -- in short, everyone who affected the design, planning, and programming of the built environment.

Exposure to Environmental Hazards: Understanding the Distribution of Risk Among Communities

Raul Lejano spoke about air quality as an environmental hazard in communities, focusing on work he had done with Communities for a Better Environment (CBE) in Huntington Park, a small, low-income city in southeast Los Angeles County disproportionately burdened with environmental risk. His goal, in his work and his presentation was to make the idea of environmental risk real, almost tangible.

Thirty years after the Clean Air Act, a great deal of time and money had been spent cleaning up point sources, but many communities still had areas with extremely high levels of environmental risk. The current regulatory model was an amalgam of single-strategy approaches: regulating primarily large sources, using primarily technological solutions, and determining success primarily by regional air quality. Unfortunately, the risk from air pollution was ubiquitous, embedded, and much more intractable than thought 30 years ago, and the regulatory model needed to be rethought.

Measuring success by regional air quality regulated at the median ignores the existence of "hot spots"--because the areas of greatest exposure could only be measured on the micro level, areas on the scale of four square blocks. Though the South Coast Air Quality Management District covered the better part of four counties, it only had 30-odd air quality monitoring stations.

Huntington Park was full of mixed uses--a typical four-block area might include houses, apartments, an x-ray laboratory, a truck depot, parking lots, an aluminum casting outfit, and a hardware store. Many of these land uses polluted, but they were almost all unregulated, and it was difficult to tell how much they produced or what sort of risks they created. Instead of a single point source, this neighborhood suffered from a complex cumulative impact problem. At the same time, people lived and worked there, and to solve the problem the community first needed to define the problem itself. CBE, the advocacy group, had to develop a different strategy as well: their typical approach involved shutting down large polluters via picketing and protesting. Here, CBE developed the community's ability to correlate pollution with health outcomes and also interact with policymakers.

Lejano's goal was to make the risk real and thereby more policy-actionable, and his strategy was to map risk as if it were a terrain, using modeling to estimate the risk from each type of land use. He showed a map displaying a terrain graph of cumulative cancer risk, which showed that most of northern Huntington Park had a risk of about four to six times the regional average. It was also worth noting that Huntington Park lies between the 110 and 710 freeways, with the Alameda Corridor freight line running through the middle. The exposure risk from these corridors was extremely high, but fell off once you got about 200 meters away--at least according to the model. Thus, although we often heard that the risk in the basin was primarily from vehicles, in the most vulnerable places--like Huntington Park--the primary risk was the small point sources.

Describing the problem in spatial terms did not mean the solution was also spatial; because the risk came from cumulative small sources, removing a few would hardly change the risk at all. As seen in Huntington Park, some problems were uniquely contextual and could not be solved by regional regulations. Others were created by the ways people navigate these topographies of risk: if people did not have day care, for instance, they might take their children to the bus stop, which might be a major source of heightened risk. Put another way, risk was the intersection of behavior and built form. Because risk was complex and often tied to numerous local sources, the solutions must also be multi-strategy and locally tailored. Because the most vulnerable populations were at the greatest risk, interventions should focus on them. Finally, in that the risks were often rooted in behavior and social mores, solutions often required strengthening the community and building networks.

Commentary

Kristine Thalman commented that the current generation was driving and making housing choices quite different than previous generations. For one thing, they were interested in transit oriented developments (TODs). She largely agreed with Loukaitou-Sideris' suggestions about built environment interventions to prevent crime, but cautioned that as with most policy suggestions, they required political will to be implemented. Things which might be approved in Santa Monica would not pass muster in the city of Orange, or Anaheim.

Building upon Lejano's presentation, she stated that the building industry far preferred relationship-building to blanket regulations, and in fact often views regulations as a substitute for finding solutions. That said, developers--especially the current generation were interested in the same things as many of the people at the symposium. They grew up as environmentalists, and wanted to find solutions that made sense both as business and public health solutions.

DISCUSSION

Susan Herbel cited a recent study which found that two-thirds of elderly pedestrians admitted to hospitals had suffered sidewalk-related injuries, which strongly implied the need for communities to perform sidewalk audits. Anastasia Loukaitou-Sideris agreed, stressing the need for individually tailored approaches and how cities can do a lot with small, doable projects. Kristine Thalman added that the one-size-fits-all argument was also employed by NIMBY opponents whenever, say, someone wants to build an AM/PM mini-mart. The effects of such a store are quite different in the inner city versus in the suburbs. Raul Lejano added that creative-minded city officials and community leaders should be creative in crafting policy instruments by, for instance, attaching environmental quality standards to conditional use permits.

Bill Satariano wondered about identifying community assets to leverage the more negative aspects. Anastasia Loukaitou-Sideris noted that asset mapping was valuable but required people in neighborhoods to commit a lot of time and effort, and were especially hard to sustain in areas without preexisting neighborhood groups.

Douglas Kolozsvari wondered about studies demonstrating the effects of education and training on safety. Anastasia Loukaitou-Sideris noted that some of this work had already been done in New York schools, using modeling to teach children the safest way to cross streets, ride the bus, and so forth. Susan Herbel mentioned that many older people would prefer not to drive but didn't know their transit options. Programs that matched up new transit riders with neophytes had been very successful, implying education has a big role to play in traffic safety.

Lejano was asked if he had compared his modeled risk in Huntington Park with the actual health effects. He said they had been surveying but it was difficult to tell, and at any rate the richer picture of individual risk derived from individual's daily travel patterns. That said, the air was measurably less clean there and the area had a higher asthma rate than elsewhere in the county.

Randall Crane asked about safety and teenage drivers, especially in light of how his teenage son had just totaled his car. Susan Herbel agreed that teenage boys and girls were extraordinarily high risks, and added that the current sort of drivers' training did not improve safety. She suggested requiring more training, higher fees, and postponing licensing, as in Europe. She also proposed absolute bans on cell phones for teenage drivers, and added that each additional teenager in a car increased the risk of an accident.

Toby Tiktinsky asked how about how important density was to the safety analyses and prescriptions. Raul Lejano noted that risk hotspots are in the denser areas, and Anastasia Loukaitou-Sideris added the well-known correlation between walking and high-density/urban areas, for the simple reason that there are more destinations within easy walking distance in those places. Martin Wachs noted the multiplicity of ways in which the word "density" was used in transportation planning. As a metropolitan area, Los Angeles is far denser than New York City, yet it has a completely different sense when seen and experienced in person. Density alone is an imprecise measure.

Dennis Washburn cited the difficulty in getting citizens involved because they did not know where to start, and proposed revisiting participatory democracy. Raul Lejano noted that a single city official could often shepherd a project through political hurdles. Susan Herbel paraphrased Margaret Mead, noting that a small group of dedicated citizens could indeed make a difference. Anastasia Loukaitou-Sideris qualified this statement by noting that in middle and upper class neighborhoods, neighborhood action was usually in opposition to something, and not proactive; it's difficult to inspire citizens to be more proactive and participate in neighborhood governance. Los Angeles' experiment with neighborhood councils had uncertain results to date.

Muggs Stoll noted the high levels of distrust in low-income communities regarding community visioning projects, in response to environmental hazards such as in Huntington Park, because many ostensibly incompatible land uses are owned by local businesses and families. Lejano agreed, noting that simply starting the participatory process was a huge time and energy commitment, but as seen with Taylor Yard downtown, it was a lot easier to kill a project than to create one.

SESSION 4: THE HEALTH EFFECTS OF EMISSIONS AND AIR QUALITY

Mary Nichols (Moderator), Director of the UCLA Institute of the Environment, joint appointment with the UCLA School of Law

Arthur Winer, Professor of Environmental Health Sciences in the UCLA School of Public Health and core faculty member in the UCLA Environmental Science and Engineering Program

Joan Denton, Director of the Office of Environmental Health Hazard Assessment (OEHHA) for the State of California

Michael Walsh, Consultant and mechanical engineer with extensive experience working in the field of motor vehicle pollution control

Mary Nichols introduced this session by providing context to the issue of air pollution, drawing from her own experience as Chair of the California Air Resources Board during the Jerry Brown governorship. She explained that, while it seemed as though she and her colleagues were moving fast and hard in terms of setting air pollution standards during the 1970s and '80s, looking back one could only ask, why did it take so long to set air quality standards? The Clean Air Act regulations have proven to be cost effective and American business' response to these regulations, in terms of developing new technologies to reduce pollution emissions, has been faster and more innovative than expected. Most of these technological improvements have come to light vehicles – in the form of reduced emissions in passenger cars – but much work still needs to be done for heavy trucks and diesel engines, especially as the goods movement industry – an industry that is not directly under local control – continues to grow. Nichols then introduced the panelists: **Arthur Winer**, a colleague and leading researcher who will provide general context on the issue of air pollution exposure; **Joan Denton**, who has the distinction of running a small science agency within the context of state government; and **Michael Walsh**, one of the original architects of air pollution programs related to motor vehicles.

Transportation-Related Air Pollutant Exposure: Implications for Regional Policies and Public Health

Arthur Winer began his presentation by explaining a recent paradigm shift in the way air pollutant exposure is assessed. For several decades, researchers have understood the regional impacts of automobiles and other transportation-related air pollutants (namely, smog), but they are only beginning to explore and understand the localized effects of such exposure. The increasingly popular philosophy is that air pollution needs to be measured in the microenvironments in which people live, rather than at remote air monitoring stations. This paradigm shift requires a new generation of physical measurement systems, which so far have included backpacks that pull in air for measuring an individual's personal breathing zone, and the installation of air monitoring stations in neighborhoods.

Winer discussed five examples of microenvironments affected by transportation-related pollutants, focusing primarily on the first three: near-roadway environments; passenger vehicle compartments; school buses; near-roadway structures (schools, homes); and the proximity to ports, airports, and rail.

For near-roadway environments, Winer explained that a number of studies have shown that spending time in proximity to heavy traffic, especially diesel truck traffic, is associated with a wide range of morbidity effects and increased mortality. There are

tremendous spikes in black carbon, ultra-fine particles (UFP), and carbon monoxide (CO) concentration in downwind areas within approximately 200 to 300 meters of major freeways (examples were taken from research conducted on the I-405 and I-710 freeways in the Los Angeles area). High concentrations of UFPs are particularly worrisome because these particles are so small that they can penetrate the cell wall, with the potential of causing oxidative damage to people's DNA and RNA, and because these particles' distribution cannot be captured by traditional remote air monitors.

For the passenger vehicle compartment microenvironment, Winer's take home message for drivers was to not drive behind diesel trucks. For a vehicle following a regular car, its passenger compartment should have a relatively small concentration of black carbon (on the order of 5 micrograms per cubic meter). However, a vehicle following a diesel truck with a high exhaust would have approximately 3 times that amount of black carbon in its passenger compartment, 4 times that amount if it were following a diesel truck with a low exhaust, and 20 times that amount if it were following a transit or school diesel bus with low exhaust.

The mention of the dirtiness of school buses brought Winer to a discussion of air pollutant exposure in relation to children, a vulnerable group because of children's immature lung formation and relatively high breathing rates. Recently, Winer led a research team that studied the exposure suffered by school children that rode school buses in the Southern California region, at a time when approximately 70 percent of school buses in California are diesel powered with low exhaust. His team found that some students spend up to three hours a day riding school buses from their homes in south central Los Angeles to magnet schools in places like Brentwood, traveling during rush hour periods when they are not only exposed to the emissions coming from their own school bus, but also from other school buses (driving in caravan) or other diesel trucks on the freeway. In this study, the research team put real-time air pollutant measurement instruments on the bus and rigged white propane tanks to follow behind the bus' exhaust pipe. They measured that exposure rates were up to 20 times that of regular background air inside the bus cabin, and the propane tanks were turned black from the exhaust. Winer and his team concluded from this study that students face the worst exposure when they are actually riding the school bus, from these buses polluting themselves and from encounters with other diesel vehicles, while exposure from time spent waiting on the sidewalk for the school bus was not nearly as serious a concern.

To help reduce school children's exposure to air pollutants during the ride to school, Winer proposed the implementation of several low-cost behavior modification strategies:

- Assign the cleanest buses to the longest bus routes
- Instruct school bus drivers to avoid other diesel trucks and not to drive in caravan
- Minimize the time children have to wait outside for the school bus
- Instruct drivers to turn off their buses rather than idle
- Develop strategies to shorten commute times, to be integrated into the decision-making process of where schools are sited

Winer closed with a mention of how important goods movements is becoming to the issue of transportation-related air pollutant exposure, especially to children, as approximately 75 percent of goods from the ports of Los Angeles and Long Beach are being transported on land by big rig diesel trucks and several schools are located near the terminal island freeway.

In conclusion, Winer emphasized the following points:

- We must focus on installing particle traps on diesel vehicles and on retiring the diesel truck fleet and emphasizing the use of cleaner fuels, for the health of children and for the general public
- We must reduce vehicle miles traveled (VMT) and cold starts and as well as improving emission standards
- It is only 10 percent of passenger cars that account for 50 percent of total vehicle emissions, indicating that the smog testing system is flawed and in need of reform
- Even though smart growth and high-density infill development might have benefits such as reducing VMT, the risk factors of building residential units next to freeways and above potentially dangerous retail uses need to be carefully weighed
- Environmental justice concerns are growing as attention shifts from regional conformity to the localized impacts of air pollutants, as minority and underprivileged communities may experience above-average levels of exposure because of their location near freeways or other pollution sources
- Creativity and innovation is needed to find new ways to buffer diesel trucks from communities, whether it be the creation of physical buffers or even virtual buffers, in which trucks would drive down the center lanes of the freeway rather than the outside lanes

Air Emissions and Human Health Effects

Joan Denton's presentation summarized the findings of many research projects published in the last two to five years, which has been something of a "Golden Age" of knowledge about the health effects of air pollution. Denton explained that this research has been made possible through funding opportunities from organizations such as the Environmental Protection Agency (EPA), from advancement in computer capabilities that allow for meta analyses, and from increased availability of relevant databases. She also noted that much of this seminal work is being done in California.

The message front and center in Denton's presentation was "Air Pollution Affects You." She asked the symposium to remember that everyone feels the effects of air pollution, whether directly or through friends and family members. She also stressed that people who live near heavily traveled roads or have a preexisting medical condition (respiratory disease, cardiovascular disease, and even diabetes) are especially vulnerable to air pollution.

Denton's presentation focused on four key areas:

- Birth outcomes from exposure to air pollution
- Children and the effects of air pollution
- Adults and the effects of air pollution
- The mechanisms through which pollution affects the human health system

In her discussion of birth outcomes, Denton presented research findings that suggest that low birth weight and preterm births are among the possible adverse effects of exposure to air pollution. There also is evidence linking ambient air pollution (CO) to cardiac and orofacial birth defects. She closed this discussion by sharing an example in which a mother was known to have been exposed to particulate matter and her child was born with underdeveloped lungs.

Denton's discussion of children focused on the dangers of early life exposures – especially those in the first year of life, when the lungs are still developing, because air pollution can retard lung development. Such early life exposure increases the probability that a child will develop asthma, and also can lead to increased school absenteeism,

which could have wider implications in terms of the learning capacity and educational attainment of a child. In terms of transportation-related pollutants, asthma is associated with residential proximity to freeways (i.e., the closer the residence to the freeway, the higher the rates of asthma), and pollution from automobile traffic is associated with respiratory symptoms in children. Denton also built on the environmental justice concerns raised by Winer, presenting findings that school exposure to traffic-related pollution correlates with the percentage of black and Hispanic students in a school, and that children of color in California are approximately 3 times more likely to live in high traffic areas than white children.

For adults, exposure to air pollution is associated with strokes, atherosclerosis, cardiovascular disease and cancer, morbidity, and mortality.

Finally, Denton discussed the mechanisms through which illnesses are occurring from exposure to air pollution. She explained that there are three keys in terms of cardiovascular and respiratory effects: inflammation at the cellular level, recruitment of the autonomic nervous system (which controls heart rate), and oxidative stress. The narrowing of airways, airway inflammation, decreased air flow, and the blockage of cells in the respiratory system can all be due to the irritation of air pollution. Particulate matter (PM) 2.5 is associated with the disruption of the integrity of cellular material.

In conclusion, Denton underlined the importance of expanding our knowledge about the health effects of air pollution. She acknowledged that this is a daunting task but also a great opportunity to do so, at a juncture in time when the California population, the number of cars being driven, and the goods movement industry are growing at high rates.

The Rapid Growth of Goods Movement-Related Emissions Worldwide: Trends, Health Effects, and Needed Policy Responses

Michael Walsh followed with a presentation that focused on the status of emission control policy related to heavy-duty vehicles, maritime vehicles, and rail. He opened his discussion by explaining that, in this country and in the rest of the world, we are just beginning the process of cleaning up and setting controls on heavy-duty vehicles in the same way we have already done with light-duty vehicles. In terms of the rail and marine sector, there is virtually nothing controlling these vehicles internationally, while we have minimal national standards. Changing international institutional structures is vital as the importance of global freight grows, especially considering how current international marine organizations are heavily influenced by industry and are, as a result, ineffective.

Walsh provided an overview of the mode share in the global freight industry. Trucks make up approximately 60 percent of global freight energy use, and this share is gradually increasing, while rail has a relatively small share and water transport is declining. However, rail and marine vehicles are the most in need of improved controls. Ships are among the dirtiest vehicles in the world, some using fuels that have 10,000 parts per million sulfur, as compared to 15 parts per million on trucks in the United States. As these ships approach land, people begin to feel the effects, as has been demonstrated in the English Channel, the North Sea, and now in Los Angeles. The MARPOL agreement was ratified to reduce the 10,000 parts per million sulfur to 4,500 parts per million, and to include some SO_x and NO_x controls, but it is unclear what effect this agreement will truly have on the industry. Currently, much of the growth in marine transport is in Asia, where there are few regulations. Asia, particularly China, also is growing in terms of rail freight and without regulation. In comparison, the United States is about to introduce its 3rd generation of controls, which will bring locomotive and

marine control to approximately where we were with trucks in the early 1990s and which will introduce sulfur controls on marine diesel for the first time.

Walsh focused much of the remainder of his talk on heavy-duty diesel trucking, the largest sector in terms of the global freight industry, and also the biggest source of NO_x pollution. These diesel trucks also emit much more particulate matter (PM₁₀ and PM_{2.5}) than regular gasoline vehicles, and this is dangerous because PM can penetrate into the deepest parts of the lungs. Walsh stated that particulate filters could go a long way to reduce PM emissions.

Comparing national regulations on the trucking industry, Walsh reported that, in the United States, the EPA 2007 and 2010 regulations are expected to require particulate filters for diesel trucks. In 2005, the Japanese required particulate filters, and the European Union standards restrict the balance of NO_x and particulate emissions, but do not yet require particulate filters. China and India, both experiencing large growth in commercial trucking, lag behind most developed countries in terms of pollution control. By 2010, Walsh expects the Chinese to be where Europe is today – meaning no particulate filters – and by 2015 the Chinese should have particulate filters on new trucks. India has moved more quickly to put controls on trucks in large cities, but has not done so for the countryside.

Walsh detailed the many challenges we face in controlling international trucking in the future. Today, approximately 25 percent of new trucks have no controls on them. This is especially a problem in Africa (where leaded fuel can still be purchased) and parts of South America and Asia. As trucks can last 20 to 30 years, these vehicles will be on the road for a long time, so retrofitting or taking vehicles off the road must be considered (something California does well). The good news is that truck standards are converging between the United States and Europe and Japan, and these standards should guide developing countries. However, trucks are still major polluters of NO_x and PM, and as there is an apparent linkage between fuel sulfur and PM emissions, it is important to promote the use of low-sulfur fuels around the world. Other priorities to reduce pollution should be to retrofit older, high polluting trucks, and regulate marine and locomotive vehicles more stringently.

DISCUSSION

Mary Nichols began the discussion session by posing a question to all three panelists. She noted that in the shift of focus towards individual, localized exposure, this was shifting the air pollution discussion to the community level, where political movements can occur and where people are indeed beginning to mobilize (for example, the communities surrounding the ports of Los Angeles and Long Beach). She asked if the panelists could envision localized movements and localized health impacts translating into effective policies at the state, national, or global level.

Michael Walsh responded that he thought this could happen, continuing the example of the ports to support his position. He explained that local people who are being affected by the ports around the world – not only in L.A., but also in Hong Kong and Singapore – are generating political pressure that is necessary to bring about change, and local regulations are beginning to start up, creating incentives for shipping companies to have clean ships. Some places are beginning to impose fees on ships at dock, based on how dirty they are. These local regulations are beginning to have an international effect.

Arthur Winer and **Joan Denton** agreed, with Winer adding that electrifying transfer stations outside the ports is key to improving the air quality around ports, as they reduce

hours and hours of truck idling. He noted that local communities are starting to make demand for electric transfer stations, and that these transfer stations can be regulated by government.

Mary Nichols followed up her question by pointing out that our current air pollution regulations were borne out of local pressure during the 1970s, with arguments that were grounded on public health concerns.

Ryan Snyder, Ryan Snyder & Associates, asked about the land use implications of the air pollutant research presented by Arthur Winer. If air pollution is concentrated around heavy traffic corridors, should we never have people living near freeways or large boulevards? Or, if technical improvements are made and emissions regulations become more stringent, will this concern about living close to large streets disappear?

Winer responded that, first of all, it is important to distinguish between freeways and large arterial surface streets when discussing air pollution, because it really depends on the diesel fraction of traffic, and diesel vehicles tend to travel on freeways much more than surface streets. He reiterated his point that, if super-emitters and diesels are cleaned up through retrofitting and retiring, then we should not need to worry so much about land use patterns around freeways.

Norm King of the San Bernardino Association of Governments asked the panelists, if they each had \$10 billion to spend on diesel reduction in California, how would you get the biggest bang per buck?

Winer and **Walsh** concurred that retrofitting, retiring, and changing to cleaner fuels such as LPG or CNG would be the actions to take, that these answers are fairly straightforward and not that hard to implement.

Dean Taylor of Southern California Edison asked how the solutions proposed in this focused discussion on air pollution might change if we were discussing the broader problems of global climate change or peak oil supply.

Walsh responded that these broader questions do not require different solutions. Black carbon is a significant contributor to global warming, so this is another reason for promoting clean diesel. **Winer** added that the problem of peak oil and higher gas prices are finally getting people to realize the importance of all of these issues, including air pollution, and getting them to think about alternatives, so he is all for peak oil.

Tom Christofk, an air pollution control officer with the Placer County AQMD, brought a technician's perspective to the discussion and asked Winer if there is any technology for filtration systems that could be put in indoor microenvironments (schools, passenger cars, etc.) to reduce air pollution?

Winer responded that he is currently working on an ARB-funded study to remove low exhaust on school buses, and there is a new bill being proposed that would restrict the siting of schools within 500 feet of a major roadway. He also mentioned that work is being done to create positive pressure in vehicle cabins and to improve the filtration and retard the intrusion of outdoor air into indoor microenvironments.

Miriam Lev-On directed a question to **Michael Walsh** about international maritime controls. Because the United States has not even ratified the MARPOL Treaty, what is a practical way in which to set international standards?

Walsh answered that the current institutional arrangement is a failure, in that is it dominated by an industrial sector that does not want to regulate itself. He is calling for a different mechanism of control, whether it is through treaties or through local initiatives and individual ports regulating the ships coming into dock. In any case, it must no longer be practical for ships to be polluting ships. He is involved in the International Council for Clean Transportation, an organization comprised of regulators around the world that is trying to come up with strategies that are practical and that can be used to turn around the current failed system.

Mary Nichols closed the session with an aside that the largest single chartering company of ships is Wal-Mart, and that Wal-Mart has shown interest in making peace with the environmental community and may be willing to open up a dialogue because of the difficulties the company has been having with siting stores. Wal-mart may be interested in agreeing to tighter shipping regulations if it would mean reduced opposition to store siting.

SESSION 5: MITIGATING THE HEALTH EFFECTS OF MOBILE SOURCES

Elizabeth Deakin (Moderator), Director of the University of California Transportation Research Center and Associate Professor of City and Regional Planning at the University of California, Berkeley

Miriam Lev-On, Executive Director of The LEVON Group, LLC, providing worldwide consulting and facilitation services in the areas of greenhouse gas inventories, clean fuels, and energy technologies

Abby Young, Director of Strategic Planning, International Council for Local Environmental Initiatives (ICLEI) – Local Governments for Sustainability (replaced Michelle Wyman on the program)

Hasan Ikhata, Director of Planning and Policy, Southern California Association of Governments (replaced Sarah Siwek on the program)

Todd Campbell (Commentary), Burbank Vice Mayor and the Policy and Science Director for the Coalition for Clean Air

Angela Johnson Meszaros (Commentary), Director of Policy and General Counsel for the California Environmental Rights Alliance (CERA)

Elizabeth Deakin opened this part of the program by remarking how this session would follow nicely from the previous session, in which the rather alarming health effects of pollution were discussed. This session will discuss ways to mitigate these negative effects of air pollution. She also provided an outline of the challenges before us: we need to develop a strategy that will allow for economic growth (with trucking and goods movement) as well as a healthy environment, and that does so equitably. This is a global challenge, and sustainable solutions are needed for mobile sources around the world. In this session, we should think about whether our methods of transportation management and analysis are good enough to meet this challenge.

The Long View: Trends in Policies to Address Mobile Sources Around the World

Miriam Lev-On presented facts and trends concerning global efforts to control pollution from mobile sources. First, she provided a few background notes relative to these efforts:

- Energy demand keeps increasing, with some projections indicating a doubling or tripling of energy demand by 2050, in conjunction with development;
- Global technology change is a slow process, and is related to the lifespan of energy infrastructure;
- Over time, alternative fuel light duty vehicles will begin to make a dent in the car market, especially as these cars become older and could be shipped to developing countries, as older cars often are;
- There is an air quality and public health nexus, as discussed in detail during this symposium.

Lev-On supports the development of a worldwide, science-based air quality management process in which municipalities or countries would measure and identify their air pollution problems, create emissions inventories, set emission reduction goals and timelines, set regulations to meet these goals, adopt these regulations, and periodically assess the program's performance. Around the world, transportation is still a major contributor to the air quality inventory, and as such, the transportation industry must take action to assist this air quality management process. However, as **Lev-On** pointed out, there are many barriers to this action, with an industry of fragmented and self-interested

actors, tensions between transportation and environmental policies, and with developing countries that are ill-equipped to maintain, control, and regulate their automobiles.

Several international initiatives, including the World Bank Clean Air Initiative, the UN Partnership for Clean Fuels and Vehicles, and the USDOE Clean Cities International program, are in place to help countries address transportation-related air quality problems. They support national strategies to set emissions standards, use cleaner and renewable fuels, and reduce vehicle miles traveled (VMT). Systematic air quality planning is sprouting up in many regions, perhaps because developing countries have begun copying European Union or U.S. emissions policies rather than trying to make their own regulations without the necessary institutional capabilities.

Even with these improvements, **Lev-On** explained that developing countries still face an uphill battle in fighting air pollution. She outlined that typical developing countries have performed little quantitative assessment of their air quality problems, have high PM emissions from heavy vehicles, old vehicle fleets with poor maintenance records and little inspection, poor traffic management and weak enforcement of transportation rules. To help overcome these problems, Jim Lents at UC Riverside has been developing an International Vehicle Emissions (IVE) model with the goal of providing a more accurate method of estimated on-road emissions worldwide. Results from Lents' work so far indicate that a power index (acceleration, velocity, and drag) is needed beyond raw speed data to predict emissions. Emissions data for several cities have been generated from this work, allowing these places to know what their most serious air pollutants are and providing them with information necessary to develop an emissions control strategy.

In conclusion, **Lev-On** wrapped up her presentation by listing some key factors for success in combating global air pollution. She stressed the importance of municipalities setting goals and timelines for achieving cleaner air; using the science-based air quality management process that she discussed; educating a whole generation of scientists, planners, managers to implement an integrated process and strategy; using cost benefit analysis when appropriate; and engaging stakeholders in policy development. If these key factors are followed, the international community could be in a solid position to reshape its energy future and to cap global emissions to be no higher than they are today (or at a lower rate). **Lev-On** also suggested focusing on the following issues: environmental quality and equality, new technology dissemination and retrofitting, the proper enforcement of laws and regulations, and a rethinking of the integration of transportation and quality of life issues.

Assessing Efforts in the U.S. and Abroad to Address Global Warming

Abby Young's presentation focused primarily on the United States and the efforts of ICLEI to engage local governments in efforts to combat global warming. She first provided some background information on ICLEI, an international membership association comprised of over 700 local governments that are working on sustainability-focused programs. ICLEI's mission is to improve global environmental conditions through the cumulative actions of local governments.

ICLEI's flagship program is entitled The Cities for Climate Protection Campaign, and it currently involves 650 local governments internationally, 160 of which are in the U.S., which are committed to reducing their greenhouse gases. Young outlined the five

milestones of the campaign: each local government does a baseline greenhouse gases inventory, adopts a greenhouse gases reduction target and timeline, develops a Local Climate Action Plan, implements the Plan, and continually monitors and reports on the results of the Plan.

Young then discussed global warming in the context of transportation. Approximately 35 to 50 percent of a local government's greenhouse gas emissions come from the transportation sector, and the transportation sector is the fastest growing source of greenhouse gases. Young commented how local governments are often looking for ways to reduce air pollution in general (to meet air quality standards) and face other issues (public health issues, etc.) related to the transportation sector, so even if the global warming issue is removed, cities and counties are often still interested in reducing pollution from their transportation sector. She explained how ICLEI is trying to link all of these issues and show local governments how the same steps and the same policies can help solve them all.

However, Young also acknowledged the challenges associated with reforming the transportation sector. Between 1970 and 1998, VMT increased by 132 percent in the U.S., and we are increasingly a driving culture. So, how can local governments reduce this growth in VMT in the future? Young suggested several tactics, including governments leading by example through reducing and cleaning up their own municipal fleets. Local governments also can promote green fleets programs, in which incentives are created for people to buy more energy efficient vehicles. In fact, there are a whole host of policies that local governments could enact to control and influence VMT, including the provision of more frequent, comfortable, and user-friendly transit; more bicycle facilities; car-sharing programs; downtown pedestrian zones; and ultimately supporting urban form changes that promote infill development and other smart growth principles.

Young admitted that many of these ideas are not new, but that the innovation is in the fact that governments must do all of these things, not just one or two of them. She also recommended a change in priority from mobility to access. She gave the example of Miami-Dade County, Florida, where they have instituted a paperless traffic court so that people do not need to travel to court in most cases. Here, people's access to the court system may have even improved, while their need for mobility – to drive to court – has been reduced.

Young then discussed how local governments are faring in their efforts to reduce greenhouse gas emissions. She explained how many local governments are very ambitious, aiming for a 10 to 15 to even 30 percent reduction in 1990 levels of greenhouse gas emissions, targets that go beyond what is outlined in the Kyoto protocol. Portland, Oregon has become the first city in the country to reduce their overall greenhouse gas emissions below 1990 levels. That city has taken a comprehensive approach to land use and transportation planning, including removing waterfront freeways and installing parkways, walkways, and transit facilities, and ICLEI is trying to get more cities to take such comprehensive approaches. If enough cities do so, then we have a real chance at keeping our greenhouse gases in check. If cities can work together and form networks, then there is an even higher likelihood for success because these cities will have more power to make changes in state and federal environmental and transportation policy.

The Future of Transportation Conformity

Hasan Ikhtrata's presentation first provided a historical context of U.S. conformity regulations. In 1990, the Clean Air Act strengthened the transportation and air quality planning connection, and there were high expectations about how the transportation investment decision-making process would change. Transportation conformity regulations were issued in 1993 and there have been five amendments since then, including one resulting from litigation.

According to Ikhtrata, conformity is now a numbers game, often calculated with little concern for effective emissions reduction or health issues. He showed several tables with figures of baseline data and targeted emissions reduction amounts for certain pollutants (e.g., VOC and NO_x) for the Los Angeles region, to be achieved by 2010. He explained that, if the targeted reduction numbers are not met, the number difference is put into a black box, usually with the excuse that expected technological advancements were not made, making it impossible to reach the reduced emissions target.

Ikhtrata pointed out several deficiencies in the conformity process. First of all, certain emissions may not be under the control of the MPO or other local authority, making it impossible to achieve reduced emissions from those sources. For example, at the ports of Los Angeles and Long Beach, neither SCAG nor any other agency has control over ocean going vessels, yet the emissions from these vessels are included in conformity calculations. He also called attention to the fact that the compliance process does not consider off-road vehicles (trucks, planes, ships, etc.), which are a potentially huge source of transportation-related emissions. Furthermore, while conformity may make transportation and air quality linkages clearer, the transaction costs of compliance are high, the compliance process has not materially changed transportation investment decisions over time, and transportation control measures have been ineffective in reducing emissions.

The main thrust of Ikhtrata's argument is that technology is the key to conformity compliance. While other factors, such as land use strategies, may help to reduce emissions, technological advancements have in the past, and will continue to be in the future, the main factor on which metropolitan areas will either meet or not meet their targeted emissions reductions numbers.

However, the passage of SAFETEA-LU does change the conformity landscape. SAFETEA-LU conformity modifications are meant to reduce transaction costs (a plan update will now be required every 4 years instead of every 3) and administrative burdens, and promote cost-effective strategies for CMAQ funding. Another change to conformity is that PM_{2.5} is a pollutant that must be addressed in terms of hot spot measurement, analysis, strategies for reduction, and the connection between fine particles and air toxins.

Ikhtrata discussed the ports of Los Angeles and Long Beach, and the controversial project of building a truck way on the I-710 as an example of the complexity of situations involving trade, transportation, emissions, and health concerns. The I-710 freeway is infrastructure that needs rebuilding yet community opposition is high; a truck way is needed to move all of the truck traffic, yet people are against it. It is obvious that a great sum of money will need to be spent to mitigate the negative effects of the ports' economic activity, but we do not know how best to do this yet.

Ikhtrata stressed the need to recognize the key roles of trucks and non-road vehicles in emissions production, and the need to focus on ports and airports in the conformity process. MPOs are more sophisticated in dealing with conformity now, and compliance can generally be managed, but how conformity relates to transportation decision making, air pollution, and health standards is not clear. He called upon the EPA to step up and

address these issues, but also believes that the political will does not exist to link transportation decisions to conformity, air quality, and health. But, Ikhata acknowledged that at least the awareness exists that we need to do something to reform transportation conformity. When the will exists to do so, technology exists to spur the process, the finances probably exist because of the wealth of the private trade industry at the ports, and industry stakeholders are willing to talk and work with local government agencies.

Ikhata's final message emphasized the need to invest in the most cost-effective strategies for air quality. And, maybe the most cost-effective strategies will mean smaller fixes, instead of a big one. But, regardless of what is most cost-effective, technology is where significant emissions reduction has come from in the past and where it will come from in the future.

Commentary

Todd Campbell's commentary offered an environmental, economic, and political perspective on the session. He also addressed the complexity of the San Pedro Bay port issue, citing a recent ARB study on the cancer risk from the port. The conclusion was that for someone living within 15 miles of the port, there was a 50 per million cancer risk. Living closer to the port could mean on the order of a 500 – 1000 per million risk. Campbell pointed out that the port's no net increase plan is expensive to meet, but so is the expense of people getting sick. Beyond environmental justice, these health concerns are also about economic justice. The port provides many jobs (1 in every 7 in Southern California), and local governments need to keep this in perspective.

Campbell called for action to be taken at the regional level in order to formalize policy to retain the quality of life in Southern California. Topics for regional discussion could include infrastructure improvements, transportation project efficiency, public transportation, urban form, mixed-use development, strategies for clean fuel, and, of course, what to do at the Los Angeles and Long Beach ports. He suggested that the ports act more like landlords in a market-based scenario, imposing tariffs according to the characteristics of each vessel (how much it pollutes, etc.) and cargo handling fees. Finally, Campbell discussed the importance of conducting outreach to affected communities and establishing public-private partnerships within the region. With these steps, and by advancing technology and reducing pollution, we should be able to say we are on our way to conformity.

Angela Johnson Meszaros' commentary focused on what she perceived to be the three largest challenges relating to the issue of microenvironments, through which local emissions impacts could lead to global air quality solutions.

1. As we move towards zero tailpipe emissions, we want to be sure that pollution is not concentrated in low income communities of color. If we use hydrogen fuel, we need to know where those hydrogen sources are, or if electricity is used, where is that electricity generated? And, will we really be reducing emissions?
2. How do we address the issues of the economy and of health, which seem to be at odds with each other in many of these presentations? Industry should be encouraged to internalize the negative health costs that are currently externalities, but we also should expect to pay more than we currently are to keep ourselves healthy.
3. In the quest to reduce VMT, we should make sure that if we put people closer together, especially along transportation corridors, that we are not putting people's health at risk. We should be cautious of infill projects being exempted

from CEQA analysis, because we don't want to cause more environmental problems or environmental health problems in our communities.

DISCUSSION

Hasan Ikhata commented to **Todd Campbell** that communication is indeed needed. For 10 years, **Ikhata** has been trying to highlight the numbers game of conformity, and it has been a frustrating time for him, made worse by poor communication between agencies.

Elizabeth Deakin addressed several questions to **Abby Young**, inquiring as to how many cities in the ICLEI program are looking into technology to help them reduce emissions, and how many of the 160 U.S. cities involved are within the Los Angeles region? Finally, she asked, could regional agencies also be members of ICLEI?

Abby Young replied that, in Southern California, Los Angeles, West Hollywood, Santa Monica, Chula Vista, and San Diego are involved in Cities for Climate Protection. Within the last year and a half, ICLEI has begun working with RPAs (Regional Plan Associations) in Connecticut and Massachusetts and with a water JPA (the Marin Municipal Water District). ICLEI is actively thinking more about what local government means, and how local government does extend beyond the city and county level. She stated that ICLEI is open to working with any type of local government for climate protection.

Jeff Peltzlow, Minnesota Pollution Control Agency, agreed with **Hasan Ikhata** that conformity is a numbers game, with too much time being spent on numbers and not on results. He did not believe that SAFETEA-LU changed any of this, and asked **Ikhata**, what would he do if he were in charge of the next reauthorization? Would he delete the whole system of conformity?

Hasan Ikhata responded that he would not delete it, but he would ask if there was the political will to change transportation decision-making as a result of conformity. If there was the will, then he would support continuing on and looking for cost-effective ways to reduce emissions.

Bonnie Lowenthal, a Long Beach Councilmember and MTA board member, made some corrections about what had been said about the I-710 freeway improvement project. She stated that EIR funding is currently being gathered for the I-710 plan. The project has been perceived negatively because it was borne out of a poorly conceived MTA study, but the Gateway Council of Governments modified this plan and involved the community more than had been done for any other prior highway improvement project. She asserted that thousands of people came out to help develop this plan for 14 lanes of traffic, including truck lanes in both directions. The community is not against this plan; quite the opposite, the communities lining the corridor have developed, designed and bought into it.

Ty Schuiling, San Bernardino Association of Governments, agreed with **Hasan Ikhata**'s comment that cost-effectiveness should be the criteria for allocating federal funds for transportation. He explained that SANBAG, as a CMAQ fund-allocating agency, has used a prioritization scheme in its call for projects in which it has looked at emissions reduced per dollar. It found that, while CMAQ money is highly desired by transit agencies as a source of transit capital, service expansion, unless coupled with

diesel bus conversion to CNG or other clean fuel, is not cost effective. SANBAG's Board funded such transit expansion projects anyway, even though they were not cost competitive. He asked **Ikhmeta** what he thought about that decision.

Hasan Ikhmeta responded that the decision should be judged based on what the organization wanted the final outcome to be out of their prioritization scheme. He also commented that very seldom does one see emission benefits out of projects.

Norm King, San Bernardino Association of Governments, weighed in on the I-710 discussion, commenting that the truck ways could be a good first step but that he was concerned, as someone who represented the inland area, about what would happen once trucks got off the I-710. He called for a commitment to the entire transportation system network, and lamented that regional awareness does not really seem to exist in many local decision-making agencies. He then switched subjects and asked **Hasan Ikhmeta** about the black box – who owns it?

Hasan Ikhmeta first commented on **Norm King**'s I-710 remarks, stating that many trucks from the port end up in inland empire warehouses. He supported the notion that we need to be concerned with getting trucks all the way there – 160 miles, whereas the I-710 project focuses on only 17 miles. He agreed that there could be big problems associated with I-710 trucks dumping onto other freeways with less capacity. In response to the black box issue, **Ikhmeta** stated that, originally, the ARB and SCAQMD had ordered the L.A. region black box be opened by 2006 and that a plan be introduced to reduce 70 percent of the emissions total in the box. But, the rules have now been changed, and the L.A. Region black box will not have to be opened.

Susan Herbel, Cambridge Systematics, wanted to explore the idea of partnerships. She explained how Cambridge Systematics has a contract with the FHWA to support the Transportation Research Board in promoting research projects on transportation safety. The FHWA environmental offices have been approaching her about how to work together. She stated that, now, she knows why they want to talk – they want a relationship like the ones discussed in this session. But, she pondered, how do you start that dialogue?

Todd Campbell responded that it would be great if Cambridge Systematics started a dialogue with FHWA. He continued to say that cooperation is a big key in the port issue, and that, from his perspective, the environmental community likes to reward companies and industries that try to do the right thing. He stressed the importance of communication, to avoid escalating conflicts, and of organizations sharing their visions and coming to the negotiating table with ideas and something to offer the other side.

Elizabeth Deakin announced that **Abby Young** had just given her a list of ICLEI's member cities from the Southern California area and that they represented 5.5 million people out of about 22 million people in the region. She then asked **Young** and **Miriam Lev-On** about how they have worked on networking issues.

Abby Young responded by recounting how she has recently spoken at a meeting of Cal EPAs in which they discussed how local governments could work to shape the state's policies on greenhouse gas emissions. She thought that, until recently, local governments had not been considered significant stakeholder groups in reducing greenhouse gases, but of the 30 local governments in California involved in the Cities for Climate Protection program, they represent 28% of the state's population. Through such numbers, it is

possible to see that if all the cities in California would do small things to reduce their emissions, the state could get a long way in reaching the climate protection goal for the state.

Miriam Lev-On spoke about international efforts to implement air quality standards. She said that, at the 2002 Rio Earth Summit, the international community concluded that not all governments have the tools and resources to control air quality. As such, the concept of major groups was created, and now there are nine major groups recognized by the United Nations, including Local Governments, Science and Technology, Young People, Indigenous People, and Business and Industry. The importance of facilitating multi-stakeholder dialogue and public-private partnerships also has been addressed in UN sessions regarding sustainable development. In Johannesburg in 2002, Type 2 Partnerships were defined. These are recognized global collaborations that have been organized to implement political declarations that are part of the Johannesburg Plan of Implementation. **Lev-On** stated that the United States, despite its opposition to mandatory global criteria for emissions reductions, has been part of many of these Type 2 Partnerships. The World Bank also is a pioneer in creating partnerships and involving stakeholders. The World Bank clean air initiatives that began in Latin American cities, in which joint plans were created, is now a model for similar work in Asia and Africa (where it is being used for lead gasoline phase out).

Elizabeth Deakin wrapped up this line of questioning by summarizing that it appears that many partnerships are not formal government partnerships, but rather informal partnerships based on shared interests and abilities, and that they are actually accomplishing goals.

Dean Taylor of Southern California Edison thanked **Hasan Ikhmeta** for mentioning the non-road sector and the black box. But, he thought a bigger problem was a color of money problem. The non-road sector does not tax much, and taxes raised on-road cannot be given to non-road projects, so there is a need for funding sources for non-road sector projects. **Ikhmeta** responded that a fee structure for emissions mitigation should be developed, and then there would be no color of money problems, because this money could be used for anything related to emissions reduction. He discussed a recent study conducted by Dr. Robert Leachman at Berkeley for SCAG, which found that if the infrastructure to alleviate congestion at the ports were provided, the ports could charge up to \$200 per container without losing money from trade, and this money should be colorless. **Ikhmeta** emphasized the need to talk about partnerships in this instance, too. He said that, at the ports, the biggest obstacle to partnerships is the public sector, because it is too fragmented and no one knows who has the final authority.

Carol Gomez, South Coast AQMD, commented that the AQMD recognizes the importance of handling air quality issues locally. In May, the AQMD released a guidance document for local planning agencies, offering strategy suggestions regarding air quality issues. This document can be found on the AQMD website.

Bob Leiter, San Diego Association of Governments, commented on the Carbon Dioxide reduction plan he had worked on while planning director for the city of Chula Vista. Because they were a rapidly growing city, they had focused on measures related to new development, smart growth, and energy conservation strategies that overlapped with air quality improvement. The City received an EPA grant to look at designs for new development projects and determined that there could be energy savings and air quality improvements realized from “green building”-type design ideas. He thought there was some overlap with this idea and the current discussion about local air quality

improvement planning. He asked the panelists if they were aware of any efforts at the state level to bring these concepts together and work through COGs or MPOs as a way to connect things at a local level.

Miriam Lev-On responded that in the California Energy Commission bi-annual report, there is an Integrated Energy Plan that does take into account the environmental and climate change impacts of energy developments. She thought a new plan was coming out in November, in conjunction with the Governor's climate action plan. **Angela Johnson Meszaros** added that there is a similar program with the Energy Commission, which is studying the fuel efficiency of appliances in buildings and the effects on climate change.

Dennis Washburn, Mayor Pro Tem of Calabasas, noted that there are existing mechanisms in which existing organizations can be reached. Every county or group of counties in California has a League of California Cities, and there are links between what is discussed in the League of California Cities and action, because these organizations are comprised of elected officials who have legislative influence.

Abby Young added that it is great to have local champions for certain causes, because they can bring these causes to greater prominence. She gave the example of how she had spoken about climate change to policymakers in Alameda County at the request of the mayor of Berkeley, who wanted the issue to be discussed at the county-level.

Kathryn Phillips of Environmental Defense explained how her organization has been involved in many partnerships, both formal and informal. She thought four main ingredients were needed for successful partnerships: 1) a mutually agreed upon problem, 2) a mutual goal, 3) motivation for success, and 4) having the people who really care within the partnering institutions involved. **Miriam Lev-On** agreed, adding that it is also extremely important to define objectives clearly, and to not set objectives too high. She also thought it was important to make sure organizations have the same time tables, as working at different paces can lead to problems. **Angela Johnson Meszaros** commented that it is important to have all relevant stakeholders at the table and to not leave people out.

Christopher Cabaldon, Mayor of West Sacramento, commented that, in the central valley, local governments have not yet felt the backlash against infill development, as in some places in Southern California, and that conformity has been used as a tool in incentivizing infill development and smart growth. He thought there was a need to focus on land use as a component of dealing with conformity, and asked **Hasan Ikhata** how important land use could be in the conformity discussion, or was it really all about technological change?

Ikhata responded that land use can contribute to achieving conformity, but that it is not possible to achieve conformity solely through land use changes.

Lindell Marsh, attorney, commented that he thought collaboration was a major theme of this symposium. He asked, how do you create frameworks in which a number of different issues can be addressed through the same partnerships?

Ellen Greenberg, Freedman Tung and Bottomley, added to **Marsh's** question, asking the participants to think about how we are addressing this whole set of public health issues at this meeting. She stressed the need to be able to map out all of these issues so that we can tease out answers, and form partnerships from there. **Dennis Washburn**,

Mayor Pro Tem of Calabasas, responded that he had attended a NEPA policy workshop that did tease out these multi-variant and multi-disciplinary issues.

Elizabeth Deakin then closed the discussion and asked the panelists for their closing remarks.

Miriam Lev-On suggested that reward systems within jobs be developed to reward collaborative activities. She noted that, in academia the system is often reverse, and academics are rewarded for being specialized, not for looking broadly or being collaborative.

Abby Young closed by saying that, for local governments, a framework may already exist within their comprehensive planning processes to identify all of their goals and indicators and determine how they interconnect.

Angela Johnson Meszaros emphasized that we start with communities, where people have first-hand experiences related to the local air quality conditions.

Todd Campbell stressed that we not get too caught up on timelines, and to not force air quality strategies and plans too quickly to fit into political timelines.

SESSION 6: ACCESS AND PHYSICAL ACTIVITY: THE TRANSPORTATION-URBAN FORM LINK

Asha Weinstein (Moderator), Assistant Professor in the Department of Urban and Regional Planning at San Jose State University

Susan Handy, Associate Professor in the Department of Environmental Science and Policy and the Institute of Transportation Studies at the University of California, Davis

Noreen McDonald, Assistant Professor in the Department of Urban and Environmental Planning at the University of Virginia

William Satariano, Professor of Epidemiology and Community Health in the School of Public Health at the University of California, Berkeley

Asha Weinstein introduced this session, which switched gears from the transportation emissions and health effects discussions of the morning to the subjects of physical activity and urban form. She presented this session in the context of what she believed to be two overarching themes of the symposium. The first theme was that there are two ways to look at transportation and public health, from the perspective that the transportation system causes health problems, or from the perspective that the transportation system can provide health benefits. By looking at these issues from the latter perspective, one can think about how policies aimed at changing travel behavior – say from driving to walking or biking – could both reduce air pollution and improve physical health. Weinstein's second theme concerned the importance of microenvironments and looking at the details of a situation. This idea can be extended to

include the importance of studying different segments of the population, such as children, women, and the elderly, because these subgroups often have different travel preferences and travel patterns.

Assessing the Relationships Among Transportation, Land Use, and Physical Activity

Susan Handy's presentation focused on the following question: can we increase physical activity (namely, walking and biking) by changing the built environment?

Handy first provided some background as to how this question had become one necessary to ask. She outlined some traditional transportation concerns, including the economy, equity, and safety, and explained how physical health concerns have been added to this list as obesity rates have continued to rise in the United States at the same time that vehicle miles traveled (VMT) has grown and low density, segregated-use suburbs have become a standard type of development. Because of the growing health concern of obesity, planners have begun to study if travel behavior and physical activity can be linked by promoting active, or non-motorized, travel to destinations.

Handy briefly discussed some of the different elements that comprise the built environment, including:

- Land Use – what activities are located where
- Transportation system – how activities are linked
- Design – aesthetic characteristics
- Natural landscape – physical environment
- Human Use

Research questions include which of these elements affect our levels of physical activity, and what are the links between these elements?

Handy then presented her research findings, which are from a literature review she conducted for a TRB-Institute of Medicine Committee on Physical Activity, Health, Transportation, and Land Use study. Her literature review explored two bodies of research: travel behavior research and physical activity research. The studies she reviewed presented clear evidence of an association between the built environment and walking and bicycling to destinations; for example, walking and biking increased with population and employment density, with increased access, and with shorter distances. Distance appears to be of critical importance to active travel, with people showing reluctance to walk more than $\frac{1}{2}$ mile in general. General physical activity also was explained by distance, as well as sidewalk condition and other factors. Recreational travel was less easy to explain, with an important variable being pet ownership, along with the quality of gym or park facilities and aesthetics.

Handy discussed the major outstanding issues in this research, which are special populations and causal relationships. Women, the elderly, children, and low income households are among the special populations whose relationships with the built environment need additional attention. Women's concerns with crime and safety are key issues, which have begun to be addressed through the work of Anastasia Loukaitou-Sideris. Low income households tend to walk and use transit more for travel, but also perceive less favorable conditions for walking, and pedestrian accident rates are often higher in low income communities. And, children's travel issues are being addressed in safe routes to school programs. Neighborhood design characteristics, such as the presence of cul-de-sacs, are also important variables for children and their outdoor physical activities.

The other key issue of causality concerned the relationship between the built environment and physical activity. It is currently unclear if walkable environments lead to more walking, or if self selection and personal preferences are skewing the data. It is possible that people who are more predisposed to walking live in walkable neighborhoods, making it appear that such neighborhoods cause people to walk more, while in fact the difference can be explained by personal preference. The important question to answer is, does living in a walkable environment change a person's preference for walking? This question cannot be answered by cross-sectional studies that compare two places, yet this is the more common type of research in the field. Some studies are beginning to address this question, however, by studying people before and after a move (a "movers' study"). This type of work is being performed in Perth, Australia, and Handy and Patricia Mokhtarian performed a similar, quasi-longitudinal study by asking people who had recently moved about the changes in their walking behavior, controlling for socio-demographic characters, attitudes, and preferences. They found that there were changes in walking behavior associated with changes to the built environment.

In conclusion, Handy argued that research does not yet indicate that changes in the built environment will necessarily lead to an increase in physical activity; rather, one can say that changes in the built environment will increase the opportunity for physical activity. She called for increased collaboration between researchers and practitioners to improve the evidence base, so that there is stronger proof about causality and about what built environment policies would be the most effective strategies in promoting physical activity.

Opportunities for and Barriers to Non-motorized Travel Among Adults and Children

Noreen McDonald's presentation focused on the special population group of children. She began by explaining that, when thinking about how land use can affect travel behavior, researchers tend to focus on the 3 Ds: density, diversity, and design. She believes that there should be 4 Ds, with distance included as a policy variable, rather than just a model constraint.

McDonald presented U.S. national survey data from the Department of Transportation depicting school trip mode share, comparing the years 1969, 1977, 1990, 1995, and 2001. In 2001, 55 percent of school trips were made by automobile, 30 percent by school bus, 15 percent by walking, and negligible shares to transit and biking. Over time, the walking mode share has been decreasing, the auto share increasing, and school bus trips remaining relatively constant at about 1/3 of all trips.

McDonald argued that distance is a key variable in explaining these school trip data. Of children living within $\frac{1}{2}$ mile of their school, 70 percent walk to school. However, less than 10 percent of children live within $\frac{1}{2}$ mile of their school. In fact, over 80 percent of children live farther than 1 mile away from their school, so there is little chance that any of them will ever walk to school. Because distance appears to be the major underlying factor explaining why children are not walking to school, the issue of school siting is of critical importance. She called for land use planning, development, and school planning to be more closely integrated to avoid school siting on the periphery of residential areas, especially during a time when California has school bond money available and when school sprawl and large campuses are the norm.

McDonald also stressed the importance of having a connected pedestrian network. This network can be curvilinear, as with cul-de-sacs, and high rates of activity (including children playing and adults walking for leisure) can occur in low-density suburban developments with well-connected curvilinear streets.

McDonald concluded by emphasizing the importance of thinking about distance explicitly, acknowledging behavioral differences among sub-groups, and between leisure and destination-based travelers, and using street design to encourage walking in low-density areas.

The Influence of Transportation and Access on the Well-being of Older Adults

Bill Satariano's presentation focused on another population sub-group, the elderly. He presented a review of research concerning transportation and the patterns of functioning and health in older populations, considered the policy implications of this research, and suggested new directions for research and practice on this issue.

Satariano first shared data about how the population is aging. In the year 2000, 13 percent of the population was over 65, and by 2030, this number is forecasted to be 20 percent. This trend is significant because living longer is associated with increased health conditions and disabilities, and aging is not just being an older adult. The elderly have different needs and different standards by which to live, and different people and different groups (e.g., women and men) respond to age differently. Why some people age well while others do not is an important research question in the fields of epidemiology and public health.

Satariano then discussed how the health outcome of functioning (i.e., the relative ease of performing everyday tasks such as lifting, reaching, and even driving) is a more comprehensive measure than other health outcomes, such as longevity and diagnosed condition, when thinking about policy for older people.

Satariano summarized how research has found that mobility and transportation are associated with both positive and negative health outcomes. Physical activity (defined as a type of mobility) is associated with a variety of health and functional outcomes, and mobility and transportation are associated with access to goods, services, and recreation, as well as with contact with friends and family. Driving an automobile is often considered a source of freedom for the elderly, but it can also be a necessary tool for accessing health care (nine percent mentioned transportation as a barrier to receiving health care in a recent study). Older people who had to stop driving were three times as likely to be depressed, another study showed, but on the other hand, driving increases the chance of crashes and injury to elder drivers.

Satariano then outlined a research agenda that called for the translation of research into practice and policy, and enhancement of individual capacity (e.g., encouraging physical activity) and technological capacity (e.g., improving roadway design to make signs easier to read), and modification of environmental demands. In his final thoughts, he underlined the importance of research exploring the connection between functional capacity and mobility options. For example, does driving increase functional capacity and improve health outcomes? He also recommended that policymakers be more creative in setting standards for safe driving, and not just consider a person's age. He suggested considering ideas such as provisional licenses for the elderly, as currently exist for young drivers, or conjoint licenses, in which two people would share a license and be required to drive together.

DISCUSSION

Martin Wachs, UC Berkeley, led off the discussion by tying together themes from this session with those from previous sessions. While the built environment might be used to increase walking, there is also the fact that more walking could increase exposure to injury from accidents and to air pollution. He asked the panelists to comment on this potential risk to pedestrians.

Susan Handy responded that the goal is to increase walking that is safe, and for design ideas that emerge from built environment studies to focus on creating safe walking environments. She admitted that researchers in this field have not always addressed the safety issue, but this is partially due to the fact that most people will not walk if they do not feel safe in the first place. **Noreen McDonald** added that the Safe Routes to School program is directly trying to address the safety issue, because children who walk to school have a fatality rate 15 times higher than children riding a school bus and 3 times higher than children who have their parents drive them to school.

Toby Tiktinsky, EPA Region 9 Air Division, asked **Susan Handy** if it was really true that nothing stronger or more concrete could be said about the relationship between land use and physical activity, which he saw as a relatively intuitive connection (e.g., if places are closer together, more people will walk between them).

Handy responded that one's interpretation of the relationship between land use and physical activity depended on how one felt about the research, which is predominantly cross-sectional. She stated that the public health field has deemed this kind of research as enough to propose built environment changes, but in her opinion, the research has not provided hard evidence that shows that changes in the built environment result in changes in physical activity. **Bill Satariano** added that many studies have shown variability in results, which indicates that other factors may be influencing the land use – physical activity relationship. He cited a study being conducted through the Robert Wood Johnson Foundation's Active Living Program in which the relationship between functional capacity and environmental design is being analyzed. The hypothesis of the study is that changes to the built environment will have greater effect on people with lower functional capacity, because they will not be able to overcome design barriers to physical activity.

Kevin Krizek, University of Minnesota, commented that he would be frustrated if he were a policymaker in the audience, because of the contradictory findings. He asked the panelists, what would be the most effective policies to enable incremental advances in public health for these different populations?

Bill Satariano argued that there was indeed a consistent vision in this research, but that there are simply many factors to be considered and not all of these factors have been systematically linked yet. Current research has been focused on different population groups (e.g., children, elderly, low-income), and he argued that cities could make decisions depending on the group they wanted to help. He also noted the importance of understanding that different population groups interact in different places, and that a place needs to be designed to accommodate all the groups that use it. **Noreen McDonald** added that the best strategy would be to make decisions at the community level, which would be in response to the specific situations and needs of local people.

Patricia Mokhtarian, UC Davis, brought up the point that there could be opportunity costs in terms of changing the built environment to promote walking and biking. She argued that most people probably have a limited number of hours that they can allocate for physical activity, so if someone begins walking in his neighborhood, he may stop going to the gym, in order to keep the time spent on physical activity even. In this regard, she argued, it is difficult to determine the net effects of changes to the built environment. She then asked **Bill Satariano** his thoughts on the importance of access, instead of mobility, for seniors.

Satariano replied that access to goods and services is what is ultimately important, and that he is not advocating mindless mobility, but at the same time mobility is an important health concern for seniors, and walking can be a key physical activity.

Noreen McDonald picked up on the issue raised by **Patricia Mokhtarian** regarding physical activity net effects. She promoted the idea of public health officials and planners collaborating on studies in which people's entire daily movement would be recorded.

Hollie Lund, Cal Poly Pomona, pointed out what she believed to be a deficiency in current travel behavior and built environment research. She argued that most studies have focused solely on land use and transportation best practices, and have overlooked the common practices. She recommended that researchers look more at how concepts like new urbanism are actually unfolding in our communities, and analyze situations such as mixed use developments separated by six lanes of traffic. Then, she posed the question of why cycling is often forgotten in the active travel discussion.

Susan Handy responded that the reason researchers are not paying as much attention to bicycling as they are to walking is because bicycling has a much smaller mode share than walking, and some people just are not comfortable with bicycling. That said, she noted that there are strong bicycle advocacy groups that ensure researchers do not completely neglect bicycling.

Michael Radetsky of the San Francisco Department of Public Health stated that walking should be a part of being in a community and belonging to a social network, but that sometimes it sounds as if it is too dangerous for walkers to go outside. He noted that several studies have suggested that the greater the amount of walking happening (i.e., the greater number of people on the street), the safer walking is. He asked the panelists if they believed that walking begets walking safety.

Bill Satariano responded that he agreed. He added that walking seems to reduce depression among the elderly, especially when elderly people see other elderly people out walking.

Valerie Knepper, MTC, asked the panelists if there is linear relationship between population density and walking, or if there is a threshold number.

Susan Handy responded that she did not go into that detail in her research. **Noreen McDonald** added that the relationship is non-linear, and **Asha Weinstein** commented that, in her review of the National Household Travel Survey, she recalled there being a high threshold number – that only very dense areas tend to have higher walking figures.

Julie Kirschbaum, San Francisco County Transportation Authority, questioned **Susan Handy** about the issues of causality between physical activity and the built environment. She asked, if more livable communities and safer environments are easy to sell, what is the benefit of proving causality? And, is not knowing the causal relationship an excuse to do nothing?

Handy responded that some academics require causality, and there is an economic argument for doing so. Redesigning communities is costly, and to minimize risk, academics, as well as policymakers, want proof that a project will work in the ways intended. **Julie Kirschbaum** asked a follow-up question about whether one type of built environment design seemed better than others at promoting physical activity. **Handy** replied that this question is where the research is going. Studies are beginning to explore what types of densities and other characteristics are important, and how these elements need to be packaged.

Pam O'Connor, Mayor of Santa Monica, expanded on the point that **Bill Satariano** made regarding the importance of mobility to seniors. She added that mobility can be an important part of an elderly person's social interactions, such as conversing with a bus driver or other people on the bus or on the street. **Asha Weinstein** remarked that **Pam O'Connor's** comments touched on the topic of psychological health and development, one aspect of public health that was not addressed substantially in this discussion.

Asha Weinstein then closed the discussion portion of the session by asking the panelists one final question: If they were making a presentation to a MPO board or to a city council and had to give advice and policy guidance, what would the panelists say?

Bill Satariano answered by highlighting the difficulty of this question, in that this is an emerging field yet land use and public health decisions need to be made now. He recommended focusing on the discussion about distance and health concerns, thinking broadly about pollution exposure in relation to the physical environment. **Susan Handy** stated that it is important for decision-makers to understand what research is saying on all of these issues and to use it, but at the same time not be limited by what research says. She would like to see agencies help academics frame their research questions, so that the findings can be directly used in decision-making. **Noreen McDonald** would recommend that, in the local development process (e.g., in permitting), the land use planners, school planners, and developers be required to sit down and talk to one another.

SESSION 7: ROUNDTABLE ON CITY DESIGN, TRAVEL, AND PUBLIC HEALTH: WHAT SHOULD BE THE NEXT STEPS?

LeRoy Graymer (Moderator), Founding Director Emeritus of the Public Policy Program at UCLA Extension and former Associate Dean of the Graduate School of Public Policy at the University of California, Berkeley

Eloisa Gonzalez, Program Director for the Physical Activity Program at the Los Angeles County Department of Health Services

Patricia Mokhtarian, Professor of Civil and Environmental Engineering, Associate Director for Education of the Institute of Transportation Studies, and Chair of the interdisciplinary graduate program in Transportation Technology and Policy at the University of California, Davis

Ellen Greenberg, Principle at Freedman Tung & Bottomley Urban Design, a city planner focused on resolving problems at the intersection of land use, transportation, and urban design

LeRoy Graymer opened this session with a few remarks about the relationship between research and policymaking. He stated that, while this symposium was aimed at creating a stronger connection between these two activities, research and policymaking will never be completely linked because of limited resources and the fact that it takes time to research issues that may need to be addressed immediately by policymakers (such as obesity, as discussed earlier). But, if researchers and policymakers learn to communicate on critical issues, use common language, and discuss the quality of information available on any given issue, then the discussion will be admirable. He commented that he was encouraged by how people had come to this symposium with issues and interests and needs and not with concrete positions, but rather had been open to listening.

Graymer set the format for this session as one in which the panelists would begin a dialogue on a certain topic and then open the discussion up to include the audience. He then briefly introduced the panelists and turned the session over to **Ellen Greenberg**, who shared a few slides. Her slides presented graphics related to some of the issues that the panelists would discuss, and offered examples of what local governments are doing in their efforts to satisfy the many demands and needs of many different people. Her slides included a photograph of a grass median with traffic on each side, a model of a courtyard housing development with internalized open areas protected from the street, and a set of street design models, including a multi-way boulevard.

LeRoy Graymer then commenced the roundtable discussion by asking Ellen Greenberg to speak about the design and built environment policy choices that would produce some of the desirable outcomes that have been discussed at the symposium, especially those that would promote healthy choices. Greenberg responded by returning to the question that closed the previous session: What advice would you give to a city council or MPO board? As a practitioner, she would recommend that local agencies build safer streets, slow down traffic, build continuous sidewalks, enforce traffic regulations, and take other actionable items that are relatively simple and that would benefit all groups.

Graymer remarked that this advice implies that if you build it, they will come. He asked, if the environment is made better for walking, will people really walk? Or, more broadly, if we design for certain outcomes, will these outcomes really happen?

Ellen Greenberg replied that people may not come in exactly the way you want, or choose the mode you want right away, but that planners should be making the best

possible long-term investments for their communities on many different levels, so that it is as easy as possible for people to do the things that we want them to do.

Eloisa Gonzalez postulated that if you built it they will come, maybe. She discussed how it is not an easy sell to get people to exercise more and be healthy. There are many factors that go into a person's activity level, including personal preferences, social context (such as how physical activity is valued by friends and family), and the larger environment. People can be broken into different groups regarding their attitudes toward exercise: Precontemplators are the overweight couch potatoes who are unwilling to change; contemplators are people who understand the benefits of exercising and are thinking about it; and then there are people who are already active. The contemplators are people to whom public health officials want to offer encouragement and social support, to entice them into taking up basic exercise. People who are already exercising can be encouraged to do more strenuous or intense activity.

Gonzalez then discussed the findings from a best practices guidebook for promoting healthy behavior, published by the U.S. Clinical Preventive Services Task Force (of which Jonathan Fielding is a founding member). Its six recommended strategies for promoting public health are: (1) Community-wide and specifically targeted outreach campaigns; (2) Point of decision prompts (e.g., signs that encourage taking the stairs instead of the elevator); (3) Individually adapted health behavior change (in which a health educator, doctor, or nutritionist sits down with someone to create an individualized plan); (4) School-based physical education; (5) Non-family social support networks; and (6) Enhancing or creating more places for physical activity (e.g., parks, walking trails, jogging trails, bike paths). She also detailed how the Task Force explored environmental factors, including community-scale and street-scale design interventions, to determine if they had any effect on physical activity. The guidebook says that the built environment can influence activity and encourages design ideas such as providing better lighting, shorter blocks, and more street trees. However, since these recommendations are somewhat at odds with Susan Handy's Institute of Medicine study, the release of these recommendations has been held back. Gonzalez emphasized that obesity is an epidemic, and it is the first chronic disease to follow a communicable disease pattern. Therefore, it is critical to reduce the problem and she reiterated that public health officials want to partner with planners to improve the situation and take action to prevent the epidemic from worsening.

LeRoy Graymer asked **Patricia Mokhtarian** about what researchers can do to create more complete pictures of issues and to increase our confidence in plans as they go forward. Mokhtarian responded by first putting in a general plug for research, especially for research that is relevant to real-world policy questions. She reiterated the importance of establishing an ongoing dialogue between researchers, politicians, and practitioners, to make sure, on a real-time basis, that the actions taken are the best ones possible. Next, she summarized how the relationship between land use and physical activity, and the problem of increasing physical activity, is complex. She asserted that the built environment is a facilitator but not a driver, and that it may be a constraint but not a barrier, to physical activity. People have varying attitudes towards exercise that have nothing to do with the built environment. In her opinion, the built environment can play a role at the margin in encouraging physical activity, but social marketing strategies like the ones mentioned by Eloisa Gonzalez must be the driver in terms of changing people's behaviors.

Mokhtarian then discussed a key issue in her mind – the question of whether physical activity generated through changes to the built environment is replacing or adding to the net physical activity that people do throughout the day. In this context, she believes

causality is important, so that we can understand if self-selection is leading us to overstate the importance of the built environment in generating physical activity, or if the built environment is truly influencing people's behavior in a complete way. She stressed the importance of determining the causality because of the associated opportunity cost – if money could be spent more effectively in another way to increase physical activity, then we need to know. She recommended that researchers perform longitudinal studies, tracking people when they move from one environment to the next, and determining how their behavior and attitudes change. She also recommended capturing people's total daily activity, not just their work commute or another aspect of their daily travel. In the meantime, before the results of these studies are known, she commented that some ideas, such as supporting mixed use communities, are good on many fronts, and that we should be pursuing them regardless of whether they increase physical activity.

Graymer opened up the following topic for discussion. If, as Eloisa Gonzalez outlined, there are different segments of the population – those who are active, those who are thinking about being active, and those who probably will never be, then how can planning and policy decisions encourage that vital group, those people who are thinking about being active? Can Safe Routes to School, connecting cul-de-sacs, and siting facilities closer together help, or are there other ideas?

Gill Hicks, Gill V. Hicks & Associates, commented that a useful research exercise might be to look at city land use decisions to see how many residential facilities have been allowed to locate next to industrial areas. Paying more attention to siting decisions could be useful.

LeRoy Graymer posed a question to **Ellen Greenberg**, asking about existing opportunities in terms of redeveloping older places or infill development. **Greenberg** replied that old arterial corridors have been highlighted for potential infill redevelopment and intensification. Since many community members oppose what is along these corridors now – usually aging commercial or service commercial buildings – they are generally in favor of redevelopment. These corridors could become residential areas, but parcel depth is often shallow, not permitting a large buffer between buildings and the street, and in light of the recent discussions about the air pollution exposure dangers associated with being proximate to high-volume traffic corridors, this type of redevelopment should be more carefully scrutinized. She commented that forthcoming ARB and SCAQMD reports should address these health concerns.

Dennis Washburn, Mayor Pro Tem of Calabasas, changed the subject to that of fun. He commented that, during this symposium, he had never heard the word “fun,” or the ideas of fellowship and recreation, mentioned. He highlighted the fact that physical activity needs to be worth people's while, and asked the panelists how the concepts of fun, recreation, and fellowship fit into the physical activity equation. **Eloisa Gonzalez** responded that these are critical issues, and agreed that people need to enjoy what they are doing if they are going to keep doing it. She stated that people need to have emotional as well as physical well-being. **LeRoy Graymer** asked **Dennis Washburn** what ideas he had for promoting fun, fellowship, and recreation, and **Washburn** mentioned the growing popularity of skate parks, and the issues local governments are facing with where to locate these parks, how to finance them, and how to deal with liability issues. He stressed the importance of allowing people to be able to do what they want to do in their communities, but lamented how planning for different people (walkers, bikers, equestrians, rollerbladers, etc.) simultaneously can be difficult.

Christopher Cabaldon, Mayor of West Sacramento, discussed how this symposium had been different from many others he had attended, where it had been easy to go away being an advocate for something. In this symposium, there has been a lot of conflict, between promoting outdoor physical activity and keeping people safe, and between giving people choices while at the same time trying to shape their behavior. He asked the panelists how policymakers can weigh these conflicting findings. For instance, is it better to have a community that is walkable near a freeway, or an unwalkable community far away from a freeway? He asked if there was a common language about these issues.

Ellen Greenberg agreed that addressing these issues has been difficult, but that some breakthroughs are being made in terms of realizing the need to measure what is happening in microenvironments. By looking at an individual piece instead of the whole, different options can be weighed for a particular location and policy can be crafted to improve a community's health. **Eloisa Gonzalez** added that the public health community wants to be involved with policymaking that addresses the obesity problem, and that many community-scale ideas (such as reducing the distance between homes and schools and jobs, and increasing population density while preserving open space) and street-scale ideas (such as improving the ease and safety of street crossings, evening out and connecting sidewalks, and installing traffic calming devices) can be used in this effort.

LeRoy Graymer made an observation about scale. An issue about scale that had not been addressed in this discussion is that of the market, which really shapes the built environment that we have. Builders have to be willing to build design plans, so how can governments create incentives, or disincentives, to influence the private sector to create a built environment that promotes physical activity? **Donald Shoup**, UCLA, commented that eliminating minimum parking requirements would be something that would be in-line with this discussion. Free parking encourages driving, which is sedentary. And, parking is the single biggest land use in the United States. He also mentioned that, while we may be calling for research to determine the causality between land use and physical activity, minimum parking requirements have been instituted without conducting any research into their effects.

Ryan Snyder, Ryan Snyder & Associates, asserted his opinion that we have enough information to take certain basic actions now. We know people like bike lanes and that they encourage bicycling and can help reduce emissions, make places more desirable, and improve health. He said that we also know intersection improvements can make streets more walkable and livable, and that streetscape improvements can attract shoppers and make people feel better about community. We know mixing land uses is a good idea, with few exceptions. With some of these basic design improvements, it is possible to make walking and bicycling more of a part of our culture.

Kevin Krizek, University of Minnesota, agreed and disagreed with **Ryan Snyder's** comments. He explained how Minnesota has a relatively large number of good bike paths, and while they are appreciated by many, people do not value them in the suburbs, and there is disagreement over whether biking facilities should be off road or on road in certain places. So, in his mind there is controversy surrounding this issue. **LeRoy Graymer** added that it is difficult to come up with universal truths, and that everything needs to be put in context.

Bob Leiter, SANDAG, relayed how he had seen a recent article in *Newsweek* related to the public health benefits of smart, walkable communities. He thought it was significant to see some of these issues, including smart growth, becoming more prevalent in the community at large. The notion that there is public health benefit, and not just environmental benefit, to smart growth is an opportunity for planners and the public

health community to work together to promote smart growth. He recommended that public health officials attend city council meetings and regional planning meetings and advocate for this type of development.

Alex Kelter, State of California Department of Health Services, reassured planners that they do not have to help people lose weight. Rather, the goal is to prevent people from gaining weight. He compared the solution to the obesity epidemic to that of tobacco. For years, the California anti-tobacco campaign tried to get people to stop smoking, and this strategy did not work. Then, the campaign targeted people who did not smoke, and in this way the public health community has succeeded in creating an environment that discouraged smoking. He argued that the only way the obesity epidemic will subside is to figure out how to create incentives or environments in which people can keep from gaining weight.

Jeff Peltzlow, Minnesota Pollution Control Agency, commented how he had been a smart growth junkie prior to this event, but that now he was having a crisis of faith. At a time when health care is employment-based, schools are funded through property taxes (in most places), and mortgage tax deductions and subsidized fuel determine where people live and what activities they partake in, perhaps there is not much future for smart growth.

In the panelists' final remarks, **Ellen Greenberg** addressed the notion that this discussion had been overwhelming. She agreed that a lot needs to be done, but she found it optimistic that, in the earlier session, it was demonstrated that there is a strong understanding on the subject of trucks and diesel emissions, and that appropriate policy is following. Another good sign was that the light vehicle fleet is very clean. She was encouraged that this allowed planners to actually say that congestion (and idling cars) is okay, and that wider, higher capacity roads are not needed.

Eloisa Gonzalez closed by emphasizing the need for more interdisciplinary partnerships between public health, transportation, and policy professionals, in order to understand what policies would benefit all of these fields and to focus on engaging local politicians in issues that affect them all.

Patricia Mokhtarian spoke about how to reconcile some of the conflicting points raised in this symposium. Because everything is so complex and interconnected, there will always be unintended consequences to policy. She suggested that the participants focus on minimizing these unintended consequences by having an open discussion about the big picture, and to not take an overly narrow approach. By thinking collectively, we can do our best and slowly make progress on the issues we do understand.

LeRoy Graymer closed the session with two brief comments. He agreed with **Mokhtarian** and **Peltzlow**'s comments that policies often have unintended consequences that skew the choices we make (such as with our tax structure and mortgage benefits), and that this fact necessitates that our policymaking process be agile. Our policies and incentives must reflect this agility and make adjustments possible. He also mentioned the potential of involving private, commercial enterprise in supporting and funding some of these built environment changes, such as having a skateboarding company sponsor a skate park, or a bike manufacturer contributing to the construction of bike lanes. Finally, he ended the session on a high note by commending the tone of the symposium and the fact that people are talking to one another about their needs and problems and doing their best to understand each other.

SESSION 8: NEW EFFORTS AND INITIATIVES TO DEVELOP HEALTHIER CITIES

Don Chen, Executive Director, Smart Growth America

Katherine Perez, Executive Director, Transportation and Land Use Collaborative of Southern California

Acquanetta Warren, Council Member, City of Fontana

Eric Schreffler, Principal, Eric Schreffler Transportation Consultants (ESTC)

Catherine Showalter introduced the panelists, explaining that they would be referencing a number of the theories presented during the symposium, and discussing how they had already been implemented. The presenters would respectively address a wide range of initiatives on several different scales. Don Chen would speak about national efforts, Katherine Perez would address regional programs, Acquanetta Warren would discuss local plans, and Eric Schreffler would present international efforts.

Quick Hits

Don Chen observed that smart growth advocacy was coming from perhaps unlikely sources, such as Mike Leavitt, Bush's secretary for Health and Human Services. Leavitt was the former governor of Utah and chairman of Envision Utah, a group which had tried to address sprawl and grappled with the same thing as many other metropolitan regions: lack of centers, lack of downtowns, big, segregated, single-use zones, poor street accessibility, and low density. Chen observed that the way things were built in this country conspired to make walking difficult.

A significant trend Chen had observed was the linking of schools to sprawl. South Carolina had been consolidating its schools into large new schools built on the edges of suburbia, where the only way to get there is by driving. But this caused a mini-revolution; the governor of SC, a moderate Republican, picked up on this discontent and spearheaded an effort to pass legislation to ban "big-box schools" in favor of creating and maintaining neighborhood schools. His motivation was not health, but community--that parents and children shouldn't have to deal with traffic and having to drive, but kids should be able to walk to school. Chen saw this as emblematic of how one issue--that kids ought to be able to walk to school--could change people's mindset.

Chen then highlighted some other programs being implemented. Projects concerned with kids walking to school were both popular and successful; Safe Routes to School, which started in California, was one of the few new initiatives in SAFETEA-LU. With respect to SAFETEA-LU, transit did pretty well, as did bicycle and pedestrian enhancement and auto-alternative programs (the latter two helped considerably by an influential Republican bike advocate from Wisconsin).

About one-fifth of the national GDP is spent on health care costs, Chen noted, and politicians remained extremely interested in the possibility that changes in the built environment might lead to better health outcomes. While there was not enough conclusive evidence yet, because the right questions were only starting to be asked, hundreds of cities had already begun to implement bicycle/pedestrian enhancement projects and promote auto alternatives. Congress ought to fund studies of these as natural experiments, longitudinal studies, and so forth, to see if they really work.

Speaking about compact, mixed-use communities, physical activity, and self-selection, Chen observed that the distinction was irrelevant to politicians--they would love to have a group of fitness-oriented people move into their cities. Perhaps this might lead to a competition, with cities vying to attract healthy people. Chen then called for more research on the effects of market-oriented programs like car-sharing and location-efficient mortgages (LEMs) that allowed people to opt out of driving. Did they reduce VMT, increase walking, and improve health outcomes? Speaking of LEMs, Chen termed them failures as financial instruments, and argued that they be repurposed as a tool to get rid of minimum parking requirements in high-density areas. Tossing a bone to Donald Shoup, Chen marveled at the value that could be saved by unbundling the cost of parking from the cost of development.

Chen reiterated that a number of programs were already ongoing: some market-driven owing to consumer preferences, some community-driven because of pressure on politicians, and on and on. It was incumbent upon researchers to study these natural laboratories, so that better decisions could be made in the future.

Katherine Perez recognized that sound planning principles could enable the self-improvement of communities, especially ethnic minority communities like Coachella (where she grew up). She had created a nonprofit focusing on new urbanist principles, but specifically as applied to minority ethnic communities in Southern California. The descriptive tagline for her nonprofit's movement was Latino New Urbanism (LNU), which could be seen as a variation of the oft-referenced New Urbanism, and looked at many of the same issues: transit, health, walkability, housing, quality of life, etc.

Although she primarily discussed the Latino community, Perez stressed that LNU was culturally relevant to nearly all ethnic growth, because ethnic minorities and recent immigrants were in many ways qualitatively different. They wanted to incorporate faith and culture as an integral part of their built environment, they had more multigenerational housing, and also walked and biked more (although to some degree this was also a function of their socioeconomic status).

LNU has focused on extensive use of public spaces, increased walkability, compact development, and greater access to transit, noting that issues of environmental justice and equity are disproportionately centered in the overcrowded, majority-Latino communities of southern California. These communities have significant obesity and diabetes problems due to the population's sedentary lifestyle, unwalkable communities, and limited access to open space, with increased levels of asthma and other health problems deriving from proximity to pollution.

Perez presented a brief case study of South Gate, a small city in south-central Los Angeles. South Gate was the former center of the Los Angeles' tire industry, and now two-thirds of the city is a Superfund site. It covers 7.5 square miles, with 101,000 people, 92% Latino (48% foreign-born overall), with a median income of \$27,279. The city was designed in the 1950s for about 50,000 people, and the infrastructure, not surprisingly, is breaking down. The schools today are overcrowded, and when school gets out the streets--arterials used by trucks from the port as alternatives to the 710--become danger zones. At the same time, there is no available land for new schools.

Because these communities do not offer sufficient jobs, housing, or shopping, when children from these communities come back from college they move to the Inland Empire. Antonio Villaraigosa knows this very well--he has to drive to Ontario to see his grandchildren, because his schoolteacher daughter could not afford to live in Los Angeles.

Perez proposed that cities like South Gate embrace population density, and the solutions that go with density. They did not, and should not try to be like Santa Monica or Pasadena. They needed to think about housing, transportation, and ways to create healthy choices, both in suburban and urban areas. She offered two existing models. First, the Fruitvale Village Transit Station TOD project in Oakland has a lot of what the Latino community wants: affordable housing, child care, plazas, and library, and a transit system--all walkable. Second, downtown Santa Ana, which is currently over 90% Latino, has recently built artist lofts, a college satellite, an arts academy, and also ethnic retail mixed in with contemporary shopping. The city has embraced its Latino heritage, and is not afraid to have a Starbucks next to a panaderia. One way cities like South Gate could achieve this sort of mix was to replace big-box retailers and unused areas with infill: affordable housing, walkable developments, transit choices, and making streets manageable for different populations. Local elected officials would be extremely important in making this change, and the best way for cities to promote healthy living is to incorporate it into their general plan.

Acquanetta Warren was appointed in 2002 as the first African-American councilperson in Fontana history. When she looked at her picture in the paper following her surprise appointment, she noticed that she needed to lose weight. She also quickly realized that as a councilperson, she needed her own project. When she became aware of Fontana's alarming obesity rate, especially in the downtrodden downtown area, she decided to combine her personal goal of losing weight with a citywide plan of Healthy Fontana. She had a simple, three-pronged strategy for losing weight: don't eat after 7:30 pm, drink a lot of water, and move like your life depended on it.

The main problem with Healthy Fontana was that it needed to be funded. Her first step, then, was getting the word out to stakeholders: hospitals, local officials, the county, health officers, and the state. Healthy Fontana's basic idea is to promote a healthier lifestyle, which is tied to enjoying the city where people live. The immediate goal is to promote and implement programs, which come in three varieties.

- 1) Nutrition programs include such things as cooking workshops, education on food choices, and public educational presentations.
- 2) Active living programs include creating walking clubs, employee wellness programs at the city's largest employers, a community garden, and using existing public and private resources.
- 3) Smart growth development programs include requiring that development also bring economic development, stronger neighborhoods, and healthy communities, and establishing an advisory board.

Healthy Fontana's marketing plan includes a website, a community newsletter, a kids' newsletter, and brochures, posters, videos, and live presentations. The immediate goal is to decrease Fontana's obesity rate, with larger concomitant goals including improved education on smart food choices, both at chain and ethnic grocery stores, increased levels of daily physical activities, decreased health risk, and increased usage of smart growth principles. To date, Healthy Fontana's activities have comprised incorporating multiple stakeholders as partners, and exploring multiple funding sources. In January 2006, the formal Implementation Plan will be presented to (and presumably approved by) the Fontana City Council, with actual implementation and monitoring throughout 2006 and 2007. The concept has also been adopted by other area communities, such as Chino, Rialto, and San Bernardino.

Healthy Fontana recognizes that social and physical environments matter, and healthy lifestyles are not just about individual behavioral choices. Environments need to promote

desirable activities like healthy eating and physical activity. Warren noted that she was not trying to be incredibly thin; she just wanted to be healthy, in control of herself, and improve things for future generations.

Last summer **Eric Schreffler** went to Europe with a group of American transportation professionals to learn about new ways to manage traffic congestion. But they soon realized that the Europeans were implementing strategies explicitly designed to reduce emissions--unlike in the United States, Europeans view reducing pollution as an integral part of their demand management strategy. They were also quite keen on reducing energy consumption, enhancing livability, and improving health. He then segued into some highlights from the trip.

Rome has cordoned off the city's historic core from cars, except for residents and permit holders, which has reduced traffic entering the zone by 20%, enhancing livability and lowering auto emissions. (To get a permit, commuters must drive a low-emissions car, prove they have a dedicated off-street parking space, and pay 340 per year.) An unintended consequence, however, has been a large increase in scooters, which are often older and less clean. In Sweden a national law was passed requiring congestion pricing in Stockholm, but the city itself was reluctant; as a compromise there will be a seven-month trial period.

In Europe, photo enforcement is used to maintain lower speeds on highways in urban areas--in a manner similar to red-light intersection photos in California. In Rotterdam, Holland, this has been implemented as a successful environmental solution, after a port-adjacent neighborhood was being deluged with noise and pollution from all the port traffic.

In the United Kingdom, every primary and secondary school must have a school travel plan by 2010, and the government has allocated over \$80 million to pay for advisors (to help the students, parents, and policymakers devise the travel plans) and capital programs. The program began as a way to improve localized congestion and safety near schools, but has come to be seen as health-based.

The smallish college town of Lund, Sweden devised a comprehensive, integrated sustainable transportation program and implemented a number of programs all at once, both on regional and individual levels: converted many street lanes to bicycle and pedestrian lanes, gave annual bus passes to new riders, and provided individualized marketing to induce new transit riders and encourage bikers to keep bicycling. Finally, they have also taken great care to measure whether the plan reduced traffic, and currently have reduced overall VMT by 1-2% while still growing economically, effectively "decoupling" traffic and economic growth.

The obvious lessons for the US are that projects can and should be justified not just for congestion but for air quality, because it has become clear that improving air quality produces both livability and health benefits. His group's final report will be available in early 2006.

DISCUSSION

Acquanetta Warren noted that she was working on increasing diversity in law enforcement to reflect the influx of black and Filipino families in Fontana, but that police departments were having difficulty making progress with this goal, largely because so many of the applicants were unable to pass the physical.

Kathryn Phillips wondered about Germany's implementation of comprehensive tolls on trucks and how it had been linked to air quality. Eric Schreffler noted that Austria and Switzerland were tolling trucks, too, but the primary motivation was road maintenance, due to the significant damage trucks cause to the roadways. That said, those countries are starting to link the tolls with air quality, and will probably soon make the tolls a function of engine size.

Alex Kelter wondered how to account for diversity of physical ability -- people using strollers, wheelchairs, walkers -- as well as the fact that boomers will want to stay in their homes for as long as possible. Don Chen agreed that this was a vital issue, adding that it actually engendered a great opportunity for smart growth, because aging boomers were driving housing market demand for walkable neighborhoods. Warren added that she kept telling developers to provide variety in housing stock, because many people needed single-story residences.

Barbara Lupro added that her city, Murrieta, had recently passed an ordinance addressing issues of universal accessibility to housing. She wondered how to reconcile smart growth goals with dramatic rises in both housing prices and energy costs. Katherine Perez responded that while many new homeowners were buying single-family homes, in many cases it was because urban areas did not provide enough housing variety close to jobs. Chen added that his organization was founded by environmental groups, but today most of their work was in housing and community development. There was increasing recognition that open space was being developed and commutes were longer because people were living farther away from their jobs, in places they could afford to raise families. One response has been to promote affordable housing measures, while another has been to build more in places with high demand.

Mark Brucker noted that one way to reduce housing costs was to reduce parking requirements, which made everything more expensive. He added that roundabouts reduced accidents by 90%, and encouraged walking and biking.

Ryan Snyder noted that people were often afraid to talk about density, but according to his rough calculations the Arrowhead center had a housing density of 15 units per acre, which was fairly dense but clearly a very nice environment--as was the UCLA campus. Perhaps when talking about density, the key is to present different scenarios, such as the neighborhood as campus.

Tom Plenys suggested embedding air quality indicators into the Healthy Fontana plan, indicating, for instance, how to incorporate air quality levels into exercise guidelines. Warren said she would love to, adding that that was the sort of thing people typically did not want to have to engage.

SESSION 9: CLOSING PANEL: WHERE DO WE GO FROM HERE?

Brian D. Taylor (Moderator) Visiting Scholar, Department of Civil and Environmental Engineering, University of Hawaii at Manoa

David Calkins, Principal, Sierra Nevada Air, and Senior Consultant to Environ International

Steve Heminger, Executive Director, Metropolitan Transportation Commission

Barbara Smisko, Director of National Environmental, Health and Safety Operations, Kaiser Permanente

Brian D. Taylor observed that in the past, they had one person weave together the various strands of the symposium in a summary presentation, but this symposium was so interdisciplinary that they tried to get various people from various disciplines try to summarize what they've taken from the symposium.

Taylor commented that we knew going in that the public health data were very clear, and that the links to transportation and land use were tantalizing, provocative, but in their infancy. The conference reinforced the complexity of these connections, which hopefully would inspire research on the issue. Taylor then noted a possible dichotomy pitting pure researchers against those who feared paralysis by analysis, especially when the public health data were very clear. He did not see this as irresolvable, noting that research could and should go on even in the midst of promulgated policy.

Density was indeed a crude term, Taylor said, and desperately needed to be refined, especially insofar as new urbanist principles were being woven into policies. It was not enough to understand general relationships. For example, in San Francisco people drive less, take transit more, and walk more. In part this is because it is easier to walk and use transit in San Francisco, but in part this is because it is harder and more expensive to drive there. If we tried to replicate San Francisco somewhere else, adopting a number of new urbanist principles but ensuring every development has a lot of free parking, we may have made it easier to walk, use transit, and drive--which would make this new area fundamentally different from San Francisco.

This is not to say that we should not go ahead and implement policies, but that we needed to continue to study their effects. Researchers needed to hear what information policymakers wanted, but policymakers also needed to understand causality and make informed decisions.

A final point on complexity: when we have policies that might be promulgated to achieve a wide variety of objectives, and that policy may also achieve another objective, as a public health benefit, characterizing the policy as benefiting public health is justifiable. So long as that is not the only justification for the policy! Put another way, we probably could not justify spending a lot of money on compact mixed-use development solely as a measure to combat obesity or to reduce fine particulate matter pollution. But we could say that compact, mixed-use developments address a wide variety of policy objectives, and they might also address public health. In sum, when we've identified a particular problem and which intervention will get the biggest bang for the buck, that should not necessarily discount the intervention's use to achieve other goals. In the context of this symposium, we know enough to pursue compact, mixed-use development for other reasons and at the same time study its effect on obesity and health.

Barbara Smisko stressed the need to continue building partnerships among the health, transportation, land use, and environmental disciplines. For one thing, most environmental regulations were primarily written to promote health. Also, economic growth and health care were not mutually exclusive--irrespective of what is happening to health care costs.

Smisko then noted that California mandated seismic upgrading of all health care facilities within the next 10-20 years, which means that many large new hospitals will be built in the next several years. For those hospital campuses not already in the blueprint stage, meaningful opportunities exist to build them using smart growth principles.

Obviously, Smisko continued, there was no single major action to take now, but rather a myriad of actions. First, it was essential for transportation, land use, and environmental professionals to partner with public health and health care (which are not always the same) and with local communities. There ought to be a formal process to engage health care in transportation planning, from the beginning to the end of projects. Sometimes contractors or public works departments may fail to implement designs due to well-meaning but misguided cost-cutting measures.

Second, when there was evidence to take action, take action. We needed the courage to move forward when we have enough information, which could come from local physicians, local nurses, or school nurses, from public health findings, or from large health-care providers like Kaiser. That said, we needed to ask whether an action is necessary, or if other alternatives made more sense.

Finally, it was vital to agree on common, consistent measurements. Complex areas required complex measurements, and it was disingenuous to think that such a multidisciplinary problem can be solved by only one group defining and taking measurements, without collaboration. What gets measured gets managed. At the same time, it must be said that neither transportation professionals nor health professionals have control over everything, and the only way to go forward is giving up the idea of total control and embracing the idea of common goals.

Dave Calkins applauded incorporating public health issues and experts into the symposium for the first time, and hoped future years would continue to push the envelope with non-traditional issues. He noted that the relationship between environmental concepts and public health had come full circle. The initial impetus for federal and state air and water quality programs came from health departments, and most of the standards were developed by public health professionals. In 1970 the EPA took over these programs and made them more regulatory over time, but now things were getting back to a public health focus.

Unquestionably, the integration of public health into transportation, land use, and the environment was a complex matter. Some of the findings conflict with what we might call good planning. For instance, exposure levels were much higher for those living along transportation corridors, a finding that puts public health at cross purposes with ideas of smart growth and infill. At the same time, it was nice to see that so many ideas were already being implemented.

Calkins observed that a burgeoning amount of research--and solutions--were focused on the local level. Abby Young showed how numerous California cities were adopting programs to reduce greenhouse gas emissions. Arthur Winer made clear that local emissions and microenvironments were increasingly important areas of study, noting that one hour on a freeway exposes you to more pollutants than 23 hours in another location.

Mike Walsh pointed out that regional, state, and federal mechanisms were failing to manage port pollution, and local entities needed to pick up the slack.

Another theme was partnerships and collaboration, from global partnerships helping developing countries manage air pollution, to community action groups incorporating health and safety into their neighborhood goals. It was noted that carrots often work better than sticks to motivate such collaboration, and that sometimes it's enough just to pick up the phone and call the other side.

Calkins closed by highlighting some of the one-line sound bites that caught his attention

- Gen Giuliano said that 38% of females born in 2000 would get diabetes.
- Mike Walsh noted that when automakers installed computers to regulate emissions, the computers also improved many other aspects of performance, which showed how regulations had good and bad unforeseen consequences.
- Dan Sperling showed the nonexistent link between car prices and the costs of pollution controls, and also saw a greater emphasis on changing behavior to affect global warming.
- Kristine Thalman noted the importance of finding solutions, not regulations.
- Mary Nichols wondered why it took so long to get clean air in LA, which was of course tied to the complexity of the problem.
- Joan Fenton noted how health concerns from air pollution had shifted from respiratory to cardiovascular, due to increased recognition of the dire effects of ultra fine particles.
- Arthur Winer presented a vast amount of health impact data, stressing the importance of indoor versus outdoor ambient monitoring, on-bus versus bus stop exposure, and the necessity of measuring microenvironments.
- Mike Walsh focused on the dearth of regulations affecting ships, the necessity of cleaner fuels, and how new diesel truck regulations would not affect most of the older trucks still on the road.
- Miriam Lev-On observed that energy demand would double by 2050, but technology was not keeping up. She also noted that technology changes were often based on product lifetimes, which arguably explained why a lot more work had been done on cars than on buildings, machinery, and factories.
- Hasan Ikhata reminded us that we had wasted \$3 billion in CMAQ money and ought to change our approach to conformity.
- Katherine Perez discussed what would happen if Latinos sprawled like the rest of the population.

Steve Heminger revisited the title of the symposium, and how "land use" was put in the middle for a reason--because it occupies a central position. He noted that Brian's truism ("if all you have is a hammer, then every problem looks a nail") was all too often applicable to transportation professionals. To them, land use choices were all about travel time, affordability, and jobs-housing balance, but that was hardly the end of the inquiry. Heminger then shifted his focus to another cliché: "you work where you have to, and you live where you want to." This seemed even more applicable today given the dramatic rise in housing costs and multi-job careers.

Heminger then addressed three issues that the symposium had not talked about much, but should have:

1. Crime

Anastasia Loukaitou-Sideris noted that if you don't feel safe you won't walk there. A corollary is that you won't move there either. Opinion surveys consistently rank public safety as one of the biggest factors affecting where we live, but as professionals we tend

to discount it. When a question was asked on Sunday about sexual predators, you could feel the eyes rolling in the audience. But, Heminger noted, even if someone is overreacting, telling them that they're overreacting will not calm them down.

2. Schools

An East Bay developer once told him that the best cure for Oakland sprawl would be to improve the Oakland public school system. Mayor Jerry Brown is building a lot of condos, but those will apparently serve mostly single people, because the schools still stink. From his personal experience in San Francisco, people with school-age kids either win the lottery because they live near a good school, or swallow hard and pay for private school, or move to a suburb with better schools. It is vital to treat schools as social assets, and build schools where people live.

3. Race

This is a difficult but clearly important subject to engage, in that it clearly intersects with the previous two issues: just consider all the racial stereotypes regarding criminal behavior and schools. We seldom talk about race at Arrowhead because it's uncomfortable, and also because most of the attendees are white and male, like me. When you consider that the most segregated hour in America is Sunday morning church service, that's a clear barometer of what racial patterns look like in American residential areas.

Certainly these were all large metasubjects and difficult to grapple with, Heminger added, and changing land use patterns based on these was not hopeless. Crime is down (although perception of high crime persists); public schools are innovating; and we're making progress with respect to race prejudice--but not enough, and the only way to advance was by open discussion. Heminger did mean to suggest, though, that our discussion of urban land use choices would be impoverished if we did not engage these policy challenges every bit as much as the ones we were perhaps more comfortable with. One reason this conference was particularly useful was because it made us uncomfortable at times, and forced us to think about things we're not used to talking about.

Reflecting a bit on environmental issues, Heminger commented that "the suburbs might make you fat, but the city could kill you." In the city, one was more likely to suffer exposure to fine particles, be hit by a car, live in a food desert, be the victim of a violent crime, or fall prey to the next epidemic disease. That was a grim picture! Heminger was reminded of his favorite rhapsody on the American Dream, from Harry Culver, the founder of Culver City, circa 1924:

“Whenever you can take a family out of an apartment house, out of the dust, dirt and smoke of a crowded city where it is throwing its rental money out the window each month and its health with it, and place that family in a fresh, pure, health-giving district in a home of its own, I want to say to you that you are not only starting that family out on the road to success, but you are rendering a service to the community and a service to humanity.”

Heminger usually uses this quote in mock-ironic form, he said, but perhaps there had been a healthy corrective, because there seemed to be some change from the overheated indictment of suburban living and the over exuberant salesmanship of smart growth and urban infill. Both urban and suburban life involved tradeoffs, and we ought to focus on the nature of those tradeoffs.

As a parting shot, he wanted to talk about climate change, which he thinks merits a great deal more attention. He pleaded to avoid creating a "conformity black box" for the entire

planet, noting that just as the EPA had advocated its role in regulating as much as possible on the ambient air side, the current administration refused to admit the existence of global warming, let alone take steps to address it. He did not mean to disparage local efforts in the face of federal inaction, but that should not cause us to take unexamined action. One worry he had was that discredited TCM strategies would be unearthed and proposed as solutions to climate change.

In closing, Heminger applauded the Arrowhead sponsors for stretching boundaries into public health and suggested stretching even further in future years, offering a newly coined cliché: "we need to tread with care when we break new ground."

DISCUSSION

Norm King noted that good design was important, but the benefits of smart growth have been so overstated that they created unrealistic expectations. The effects, he argued, were at the margins; good design and built environment do not have direct effects on reducing driving, the jobs/housing relationship, obesity or improving health. He worried that the trumpeted benefits of planning and design could be a diversion from the real issues (such as overdriving), because it defined the problem as growth, not behavior. Millions of people are already here, and rightly do not view themselves as growth. Ultimately, he argued, the key was personal accountability--instead of overemphasizing planning, we ought to challenge the system to account better for externalities.

Bob Leiter agreed with Smisko that economic growth and public health are not incompatible, but rather complementary. He thought a useful performance measure related to public health might be one that indicated the relationship between good public health, smart growth, etc. and the reduced cost to the community of providing health care.

Brian Taylor reiterated the reluctance of agencies to measure things over which they have limited control. For measures incorporating public health, transportation outcomes, housing affordability, and education outcomes, the agencies doing the measuring often have some public expectations for dealing with these problems, but limited control. No wonder they're reluctant to engage with such measures. Steve Heminger added that this was largely a casualty of conformity and attendant litigation. It's a numbers game, and you can't do good planning when you're mostly worried about who'll sue you when you put performance numbers on the page.

Alex Kelter queried the value of returning to an ethic of personal responsibility, noting that the entire history of the human race suggests that left to our own devices we're all too willing to do the wrong thing. We take cues from our environment, he said, and to the extent that we can provide better cues, people will make better choices about how to live, how to travel and what to eat.

Barbara Lupro observed that regulations are supposed to be solutions, arrived at cooperatively. It is important to recognize that a non-regulatory approach is not equitable for society as a whole.

A comment was made that if agencies were reluctant to measure things they can't control, did this imply the existence of fundamental governance structure problems? Steve

Heminger agreed, noting that school siting decisions were a disaster. Even in so-called smart-growth states, state facilities were locating in places where everyone has to drive to get there. A lot of good work in such areas was accomplished in spite of bureaucracy.

Eloisa Gonzalez, speaking about interdisciplinary collaboration, said she would be happy to provide contact information for the eight different Service Planning Areas designated by the Department of Health Services in Los Angeles County.

Jennifer Gress wondered where Kaiser was locating its new hospital facilities, and based on what criteria. Barbara Smisko did not know, because the land was bought so long ago, and different committees handled it. Speaking personally, she observed that Kaiser suffers from the same problem as individuals-- it thought about its own needs first. In any event, because many decisions on site location were made years ago, it was unclear how Kaiser would be able to incorporate new info (for instance, on travel time and mass transit) with its primary need to provide high quality health care.

Huasha Liu, SCAG, challenged the Arrowhead organizers to think of ways to put many of the symposium proposals into action, suggesting that ought to be the topic for the next year's conference.

Ryan Snyder noted that one valuable thing he learned was that, when faced with multiple issues at the same time, one can still move forward with practical solutions. He also noted the common (though unspoken) thread of public policy challenging the preeminence of the automobile. The car caused congestion, air pollution, exacerbating global warming, used up fuel supply, undermined quality of life in neighborhoods, and drove up housing prices. It was time to stop deferring to the car, subsidizing parking, and so forth. Steve Heminger commented that the news might be better than one thinks. In most of California's major metro areas, the vast majority of funding was not going to highway expansion. In the Bay Area, it was only 4% of the budget. Most of the transportation money was going to maintaining the existing roads and to transit. We did not need to fight the freeway wars of 30 years ago, he said.

Mark Brucker offered a solution to the apparent conflict between urban infill and the pollution near arterials: clean up and regulate the access of the dirtiest diesel vehicles, which create a disproportionate amount of pollution.

Douglas Koloszvari wondered what Kaiser was doing with respect to partnering with employers to reward good and/or healthy travel behavior. Smisko said they were partnering with employers to promote good behavior and preventative health care, but were not rewarding behavior per se.

Taylor added that one of his first research projects was research on Kaiser hospital siting, and the distances traveled by employees. Parenthetically, he added, Kaiser primarily sited its hospitals to minimize distances for its clients, not its employees. After surveying Kaiser employees, Taylor learned that they chose their housing locations and work locations primarily based on neighborhood and school quality; of twelve categories, the distance to work ranked tenth. In short, the employees were making decisions based on a number of factors (including where spouses worked), very few of which Kaiser could control. Smisko added that because Kaiser has many locations, they offer their employees opportunities to transition to sites closer to home. That said, their hospitals have never done well in non-urban areas.

A comment was made that future conferences might look at the evolution of governance on state and regional levels, and allocating resources more holistically, across a number of agencies. Heminger noted the difficulty of prioritizing goals that were interdisciplinary, important to many agencies but not of high importance to any.

Speaking of performance measures and partnerships, **Keith Killough** noted that SCAG had been issuing a state of the region report for the past 12 years, including things they had no influence over such as income, education, and employment. For those things they couldn't influence, they were seeking to establish partnerships.

Sheila King suggested including undergraduate and graduate students in future symposia to get them enthusiastic about the profession and share research.

Mark Brucker observed that people with long commutes were not just exposed to more pollutants but also more stress. Steve Heminger agreed in principle, but observed that the commute was merely a transaction cost that people were willing to pay and tolerate in exchange for other things they valued more highly.

Muggs Stoll observed that he had heard a lot about the necessity of tradeoffs, but this is what policymakers did: sift through conflicting info and make an informed decision.

For her parting shot, Smisko reiterated the importance of partnerships (including complex partnerships), measurement (including complex measurement), and taking action in complex situations by getting to parties' underlying interests.

For his parting shot, David Calkins agreed that the importance of partnerships also stood out as a symposium theme. Partnerships would be increasingly important in dealing with global warming and climate change, and would definitely affect future land use patterns.

For his parting shot, Steve Heminger recalled something Don Chen had said: how Smart Growth America started out as an environmentalist group but was now mostly concerned with housing. It was clear, Heminger added, that housing ought to play a much bigger role in future conferences. In the Bay Area, the transportation infrastructure was almost all built; the big changes were occurring with all the new housing being built over the next 20 years, and where it went and what it looked like would be extremely important.

III. CONCLUSION

The 15th Annual UCLA Lake Arrowhead Symposium on *The Transportation, Land Use, Environment Connection* added public health experts to the usual symposium mix of transportation, land use, and environmental professionals, and examined a wide range of data, theories, and projects. One could view this **Healthy Regions, Healthy People** symposium as addressing two major issues. First, in what ways could transportation, land use, and the environment be linked to health *problems*? Second, in what ways could transportation, land use, and the environment be linked to health *benefits*?

This symposium was by no means conclusive on either point, but it made clear the complexity of the problems and the need for interdisciplinary collaboration to solve them. Indeed, one of the recurring themes throughout the symposium was the need for partnerships: between private and public entities, among local, regional, national, and international agencies, between researchers and policymakers, and most importantly, between health professionals and those individuals working in transportation, land use, and the environment.

The primary health problems addressed were traffic-related injuries and mortality, the obesity "epidemic," and exposure to air pollution. Traffic-related collisions cause about 43,000 deaths and 3 million injuries each year, an enormous public health problem that will likely get worse with the aging of the American population--especially given how the aging baby boomers are more mobile than previous generations and will expect to remain that way.

The rapid rise in obesity in nearly every geographic and demographic category in America has been termed the worst epidemic in public health. Although participants were generally loath to blame the built environment (specifically, suburbs) for the rising obesity rates, preliminary research indicates that interventions in the built environment might be able to help by encouraging, or at least enabling more physical activity. Built environment interventions might include creating smaller, mixed-use, higher-density (i.e., New Urbanism) neighborhoods, Safe Routes to School projects, and specific programs to reduce crime and pedestrian-vehicle collisions. Although New Urbanism-type developments are positively correlated with increased levels of physical activity by residents, significant questions remain about the nature of causality.

Southern California has long been known for poor air quality, but of late the health focus has shifted from respiratory effects alone to both respiratory and cardiovascular effects, with a newfound recognition of the dangers of fine particulate matter. Additionally, there has been a paradigm shift in assessing exposure: from looking at regional air quality to taking extremely localized measurements. The 100 meters closest to freeways, inside passenger vehicles behind diesel trucks, and inside school buses, for instance, have incredibly high exposure rates to air pollution. That said, although diesel trucks are the worst polluters on the highway--and the biggest part of the global freight industry--they will be increasingly regulated in coming years. Another problem affecting Southern California's air quality is the huge growth in goods movement through the ports of Los Angeles and Long Beach, with concomitant growth in truck, train, and ship movement. In the face of emissions regulations, industry has typically responded with technological innovation, but as regulations become more stringent, larger percentages of pollution

come from unregulated entities. This is true at the ports, with the ships and the trains, and in areas like South Central, Los Angeles with a variety of small point sources.

Some argued that Conformity in reference to Clean Air Act regulations has become largely a numbers game, with little adherence to effective reductions or health issues. At the same time, the increased realization of the intensely local nature of exposure rates has led to the idea of localized solutions.

Several times, participants voiced concern that the current research was contradictory, or failed to make causal links between health effects and transportation, land use, or the environment--so much so that it threatened to create "paralysis by analysis." For instance, although high-density development near arterials and transit corridors were correlated with higher levels of walking and transit, recent research made clear the increased health dangers of living near arterial streets and transit corridors. Was this merely a case of picking your poison? At the same time, other participants argued that while we did not know everything, we did know enough to take action based on common sense. For instance, although nearly every town would like to encourage children to walk to school, many new consolidated schools are located on cheap land on the edge of town, miles away from most children's homes. Moving schools closer to children will not guarantee more walking to school, but locating the schools on the outskirts guarantees less walking and is viewed as failure.

In short, even when faced with multiple issues at the same time, one could and should still move forward with practical solutions. For instance, Safe Routes to School projects were popular, increased traffic safety, and seemed to increase walking rates (although the research was not conclusive). Such a program could certainly be justified as improving neighborhood quality of life and as having public health benefits--it just shouldn't be solely justified as a public health solution. In many other cases, local or regional programs have already begun without waiting for all the research. This was not cause for alarm, but for focus: research could and should go on even in the midst of promulgated policy.

Increasingly, transportation agencies, land use authorities, and environmental groups have become reluctant to engage with things they can't control, like health outcomes. While this might at first seem understandable, the same agencies have no qualms claiming that transportation projects will spur economic development, when the links to job creation are just as tenuous as those to public health effects. It is instructive to note that in Europe, transportation projects are justified both as improving congestion and air quality, without controversy.

Jane Berner, UCLA Institute of Transportation Studies
Matthew Dresden, UCLA Institute of Transportation Studies
Los Angeles, California
January 2006

APPENDIX A:

SYMPOSIUM PROGRAM

HEALTHY REGIONS, HEALTHY PEOPLE
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<i>October 16-18, 2005</i> <i>UCLA Conference Center at Lake Arrowhead</i> 850 Willow Creek Road Lake Arrowhead, California
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SUNDAY AFTERNOON, OCTOBER 16, 2005

12:30 pm REGISTRATION CHECK-IN AND REFRESHMENTS

1:00 pm **WELCOME**

Catherine Showalter, Director, UCLA Extension, Public Policy Program

PUBLIC HEALTH- THE TRANSPORTATION, LAND USE, ENVIRONMENT CONNECTION

This opening session lays the groundwork for the presentations and discussions to follow by exploring the unifying research and policy interests among transportation, land use, environment, and public health professionals, discussing the principal themes to be explored in the symposium. The second presentation consists of baseline information on the principal public health issues and trends in cities today. The third presents a framework for thinking about both the public health benefits and the costs of current land use/transportation systems.

Moderator: Catherine Showalter

Symposium Overview: The Waxing Focus on Public Health in Transportation, Land Use, and Environmental Policy and Planning

Brian D. Taylor, Visiting Scholar, Department of Civil and Environmental Engineering, University of Hawaii at Manoa

The Demographics of Public Health: Current Trends, Future Issues

Jonathan Fielding, Public Health Officer, County of Los Angeles, and Professor, Health Services and Pediatrics, UCLA

Mobile Regions, Healthy People: Exploring the Transportation-Land Use-Environment-Public Health Connection

Genevieve Giuliano, Professor, School of Public Policy, Planning and Development, USC

3:00 pm BREAK

3:15 pm **MEASURING AND EVALUATING THE EFFECTS OF TRANSPORTATION SYSTEMS ON PUBLIC HEALTH**

While few would disagree with the importance of public health in the transportation-land use-environment connection, how one might assess and incorporate public health into evaluations of land use developments or transportation systems remains open to debate. Accordingly, this session tackles this issue through three presentation on approaches to measuring and evaluating the effects of transportation systems on public health.

Moderator: Randall Crane, Professor of Urban Planning, UCLA School of Public Affairs

Analyzing and Measuring the Public Health Costs/Benefits of Transport and the Built Environment

Marlon Boarnet, Professor, Department of Planning, Policy and Design, UC Irvine

Incorporating Environmental and Health Costs/Benefits into Measures of Transportation System Performance

Steve Pickrell, Senior Vice President, Cambridge Systematics

The Price of Regulation: Measuring the Costs of Making Transportation Systems Cleaner and Safer

Daniel Sperling, Professor, Civil and Environmental Engineering and Director, Institute of Transportation Studies, UC Davis

5:00 pm ROOM CHECK-IN AND OPENING RECEPTION

6:30 pm DINNER

SUNDAY EVENING, OCTOBER 16, 2005

7:45 pm **LAND USE AND TRANSPORTATION ASPECTS OF RISK AND PUBLIC SAFETY**

Moving people and goods around neighborhoods, regions, and the globe inevitably entails risk. While significant strides have been made over the years in reducing the number and severity of crashes and other threats to public safety, transportation safety remains an important public health issue. This session examines the safety aspects of the land use/transportation system from a variety of perspectives: trends in travel risk, and the roles of land use/urban design and transportation in safety and exposure to environmental hazards.

Moderator: Martin Wachs, Roy W. Carlson Distinguished Professor in

Civil and Environmental Engineering and Professor of City and Regional Planning, UC Berkeley

Risky Business: Understanding Relative Risks and Safety Trends in Travel and Transportation

Susan Herbel, Senior Associate, Cambridge Systematics

Safety Considerations of Urban Design/Land Use/Transportation Planning

Anastasia Loukaitou-Sideris, Professor and Chair, Department of Urban Planning, UCLA

Exposure to Environmental Hazards: Understanding the Distribution of Risk Among Communities

Raul Lejano, Assistant Professor, Department of Planning, Policy, and Design, UC Irvine

Commentary

Christine Thalman, Chief Executive Officer, Building Industry Association, Orange County Chapter

Moderated Discussion

9:30 pm INFORMAL RECEPTION AND CONTINUED DISCUSSION

MONDAY MORNING, OCTOBER 17, 2005

7:30 am BREAKFAST

8:30 am **THE HEALTH EFFECTS OF EMISSIONS AND AIR QUALITY**
While mobile source emissions and their regulation have been frequent topics in this symposium series, this session focuses on the latest information on the effects of emissions, primarily from mobile sources, on public health, and current efforts to mitigate one important aspect of these effects, goods movement-related emissions, through public policy.

Moderator: Mary Nichols, Professor of Law and Director, Institute of the Environment, UCLA

Mobile Sources, Emissions, and Health

Joan Denton, Director, Office of Environmental Health Hazard Assessment (OEHHA)

Transportation-Related Air Pollution Exposure

Arthur Winer, Professor of Environmental Health Sciences, UCLA

The Rapid Growth of Goods Movement-Related Emissions Worldwide: Trends, Health Effects, and Needed Policy Responses

Michael Walsh, International Consultant

10:10 am BREAK

10:15 am **MITIGATING THE HEALTH EFFECTS OF MOBILE SOURCES**
The growing awareness of the effects of mobile sources emissions locally, nationally, and globally has led to significant efforts to assess the environmental impacts, health effects, and the use of regulatory measures. Using mobile source emissions trends as a foundation for discussion, the long- and short-term views of global warming, air/water toxins, and conformity regulations are explored.

Moderator: Elizabeth Deakin, Director, UC Transportation Center;
Professor of City and Regional Planning, UC Berkeley

The Long View: Trends in Mobile Source Emissions and Regulations Around The Globe

Miriam Lev-On, Executive Director, The LEVON Group, LLC

The Future Roles of Conformity Regulations

Abby Young, Director of Strategic Planning, International Council of Local Environment Initiatives (ICLEI)

Commentary:

Todd Campbell, City Councilman and Vice Mayor, City of Burbank, and Policy Director, Coalition for Clean Air

Angela Johnson Meszaros, Director of Policy and General Counsel, California Environmental Rights Alliance

12:15 pm LUNCH

MONDAY AFTERNOON, OCTOBER 17, 2005

1:45 pm **ACCESS AND PHYSICAL ACTIVITY: THE TRANSPORTATION-URBAN FORM LINK**

This session explores how land use/transportation systems affect access to goods and services, such as health care and recreational facilities, and how they support, or discourage, physical active lifestyles. The first presentation examines the latest of a burgeoning body of research on transportation, land use, and physical activity. The second focuses on nonmotorized travel among adults and children. And the third deals with the wide-ranging benefits of mobility for older adults.

Moderator: Asha Weinstein, Assistant Professor, Urban and Regional Planning, San Jose State University

Assessing the Relationships Among Transportation, Land Use, and Physical Activity

Susan Handy, Associate Professor, Department of Environmental Science

and Policy, UC Davis

Opportunities for and Barriers to Nonmotorized Travel Among Adults and Children

Noreen McDonald, Assistant Professor of Planning, University of Virginia

The Influence of Transportation and Access on the Well-Being of Older Adults

Bill Satariano, Professor, School of Public Health, UC Berkeley

3:30 pm FREE TIME

5:30 pm RECEPTION

6:30 pm DINNER

MONDAY EVENING, OCTOBER 17, 2005

7:45 pm **ROUNDTABLE ON CITY DESIGN, TRAVEL, AND PUBLIC HEALTH: WHAT SHOULD BE THE NEXT STEPS?**

Given the research on the links between land use, transportation, and well-being discussed in the previous session, this evening session asks a panel of experts from widely varying disciplinary backgrounds to discuss among themselves and the audience views on the next steps to be taken-in both research and policy/planning practice-to improve public health through the transportation-land use-environment connection.

Moderator: LeRoy Graymer, Founding Director, UCLA Extension Public Policy Program

Panelists:

Eloisa Gonzalez, Director, Physical Activity Program, L.A. County Department of Public Health

Patricia Mokhtarian, Professor of Civil & Environmental Engineering, UC Davis

9:30 pm INFORMAL RECEPTION AND CONTINUED DISCUSSION

TUESDAY MORNING, OCTOBER 18, 2005

7:30 am BREAKFAST

8:30 am **NEW EFFORTS AND INITIATIVES TO DEVELOP HEALTHIER CITIES**

This session presents information on an array of real-world transportation, land use, and environmental programs and projects that seek to explicitly

incorporate public health goals and objectives. These presentations show how physical well-being can be made a central part of the development and transportation decision making process by planners, developers, and elected officials. Local, regional, national and international projects described.

Quick Hits

Don Chen, Executive Director, Smart Growth America

Katherine Perez, Executive Director, Transportation and Land Use Collaborative of Southern California

Acquanetta Warren, Council Member, City of Fontana

Eric Schreffler, Principal, Eric Schreffler Transportation Consultants (ESTC)

10:00 am BREAK

10:15 am **CLOSING PANEL: WHERE DO WE GO FROM HERE?**

The program concludes with synthesis presentations by leaders representing three perspectives. They share their views on the ideas, strategies, and challenges discussed during the previous two and a half days. What have we learned that will help us move forward with transportation, land use, and environmental policies that will enhance public health? What important issues were left off the table, which need to be addressed before effective and collaborative policies can come to fruition?

*Moderator: **Brian Taylor***

Panelists:

David Calkins, Principal, Sierra Nevada Air, and Senior Consultant to Environ International

Steve Heminger, Executive Director, Metropolitan Transportation Commission

Barbara Smisko, Director of National Environmental, Health and Safety Operations, Kaiser Permanente

12:00 pm CONCLUDING REMARKS, LUNCH, AND ADJOURNMENT

APPENDIX B:

SPEAKER BIOGRAPHIES

MARLON G. BOARNET is Professor of Planning, Policy, and Design and Economics and Department Chair at the University of California, Irvine. Boarnet is guest editor of the forthcoming (Winter, 2006) *Journal of the American Planning Association* special issue on the topic of planning and health. Boarnet is co-author, with Randall Crane, of *Travel by Design* (Oxford University Press, 2001). That work provided methodological grounding and empirical evidence on the question of how the built environment influences travel behavior. Boarnet has since extended that work to examine the link between the built environment, walking travel, and physical activity. Boarnet's research on planning and non-motorized travel has been funded by the California Department of Transportation, the Robert Wood Johnson Foundation, and the University of California Transportation Center. In 2003, Boarnet was invited to write the background paper on data sources and empirical methods for a panel on transportation, physical activity, and health convened by the National Research Council's Transportation Research Board and the Institute of Medicine. Since that time, Boarnet's research on planning and health has resulted in publications in the *Journal of the American Planning Association*, the *American Journal of Preventive Medicine*, and the *Handbook of Urban Health*. In 2005, Boarnet spoke on the topic of planning and health at the annual conference of the Robert Wood Johnson Foundation's Active Living Research Program and in meetings or seminars at Caltech, the Southern California Planning Congress, and the California Planning Roundtable. Boarnet is co-editor of the *Journal of Regional Science*, is an associate editor of the *Journal of the American Planning Association*, and is on the editorial boards of *Papers in Regional Science* and the *Journal of Planning Literature*.

DAVID CALKINS has nearly 40 years experience in government and the private sector. Since leaving his position as Air Programs Branch Chief for U.S. EPA (Region 9) in 1995, he has worked as an independent consultant. His government career included time with the Bay Area Air Quality Management District, the World Health Organization, United Nations Development Programme, the U.S. Agency for International Development, various environmental organizations, and the National Commission on Air Quality (a congressional commission). In addition, Mr. Calkins was personally involved in the last three Clean Air Acts (1970, 1977, and 1990), both in providing direct assistance in writing and reviewing mobile source and land use measures for congressional staffs. As a consultant, Mr. Calkins has worked in the U.S. and abroad. He has special expertise in evaluating the relationship between transportation systems changes and their effects on air quality. His current projects include revising the CO SIP for Las Vegas, developing control measure strategies for the Dallas-Fort Worth 8-hour ozone SIP, evaluating air quality impacts of a new mixed-use development in Oregon, providing on-going air quality and transportation policy assistance to the San Joaquin Valley COGs, and participating in the development of an EIR for a major new international airport near Las Vegas. He was involved for EPA in planning the initial Arrowhead Symposium in 1991 and has participated in nearly all of the symposia since that time.

TODD CAMPBELL, Burbank Vice Mayor, serves as member of the MSRC representing the Los Angeles County Metropolitan Transit Agency. Todd has served as a member of numerous organizations and committees, many with an emphasis on environmental issues, including the California Natural Gas Vehicle Partnership, the California Fuel Cell Partnership, the Burbank Environmental Oversight Committee, the Arroyo Verdugo Subcommittee, the Southern California Association of Governments' Goods Movement Task Force, and the Center Trust/Downtown Revitalization Task Force. In addition to his public service, Todd also serves as Policy and Science Director for the Coalition for Clean Air. As Policy Director, Todd heads the policy and research arm of the organization and directly manages both the Transportation and Public Health and Air Toxics programs. Todd has an extensive background in public health, industrial hygiene, mobile source pollution, clean alternative fuel transportation technologies, and air toxicology. Prior to taking a position with the Coalition for Clean Air, Todd was a policy analyst with the Natural Resources Defense Council working on public health issues.

DON CHEN is the founder and Executive Director of Smart Growth America (SGA) and leads its coalition building, policy development, communications and research efforts. SGA is a national advocacy coalition promoting a better way to grow: one that preserves open space and farmland, reinvests in existing communities, keeps housing affordable and offers more transportation choices. Throughout his career, Don has published numerous writings on land use, transportation, social equity and environmental policy, including “The Science of Smart Growth,” which appeared in the December 2000 issue of *Scientific American*, and co-authoring *Once There Were Greenfields*, an authoritative review of the economic, environmental and social costs of sprawl. He has lectured widely in North America, Europe, Australia and Asia, has testified before the United States Congress on smart growth issues, and is frequently interviewed by the media, including recent appearances on CNN, National Public Radio, The New York Times and many other programs and publications. Don serves on the Boards of Directors for West Harlem Environmental Action, the Institute for Location Efficiency, *Grist Magazine* and the Growth Management Leadership Alliance. He was a founding Co-Chair of the Environmental Leadership Program and now serves on its Advisory Board. Prior to SGA, he was a researcher for the Surface Transportation Policy Project, World Resources Institute, and the Rocky Mountain Institute.

RANDALL CRANE (MODERATOR) studies travel behavior, the causes and impacts of sprawl, housing markets, the public finances of developing countries, and environmental governance initiatives such as smart growth. His most recent book is, “Travel by Design: The Influence of Urban Form on Travel,” Oxford, coauthored with Marlon Boarnet. He recently served on a National Academy of Sciences panel of experts looking at how the built environment influences travel and public health. At UCLA, Crane is Professor of Urban Planning, Associate Director of the Institute of Transportation Studies, and Director of Undergraduate Programs in the School of Public Affairs. He teaches courses on environmental policy, transportation policy, sprawl, and cities in developing countries. Abroad, he has consulted for the World Bank, USAID, and the governments of Guyana, Indonesia, Kenya, Mexico, Thailand, and Yemen.

ELIZABETH DEAKIN (MODERATOR) is Director of the University of California Transportation Research Center and Associate Professor of City and Regional Planning at UC Berkeley, where she also is an affiliated faculty member of the Energy and Resources Group and the Master of Urban Design group. Deakin’s research focuses on transportation and land use policy and the environmental impacts of transportation. She has published over 100 articles, book chapters, and reports over the past fifteen years, on topics ranging from environmental justice to transportation pricing to development exactions and impact fees. She currently is developing benchmarks for transit investment policy for Bay Area transit operators and is leading a project developing a system plan for express bus services for the San Francisco Bay Area. She recently served as chair of the National Academy of Sciences’ Advisory Board on Surface Transportation-Environmental Research, mandated by Congress. She has worked with Dan Solomon and Peter Calthorpe on new urbanist designs for infill development, transit station areas, and new towns, and has been a member of the Duany-Plater design charrette team for projects in California and Florida. She was on the selection committee for the Isla Vista (Santa Barbara Co.) design competition and has served on several UC Berkeley development plan review committees. She was a member of the team that developed the UC Santa Cruz campus plan update in the 1990s.

JOAN E. DENTON has been the Director of the Office of Environmental Health Hazard Assessment for the State of California (OEHHA) since November 1997. She is responsible for the performance of the scientific risk assessments for the regulation of

chemicals in the environment, providing information about the health and environmental risks of chemicals to government agencies and the public, providing overall scientific guidance and consultation to the Secretary of the Environmental Protection Agency and oversight of activities by regulatory agencies within OEHHA. Dr. Denton also oversees the implementation of the Safe Drinking Water and Toxic Enforcement Act of 1986. Before her appointment, Dr. Denton was a Senior Air Pollution Specialist for the California Air Resources Board and was a Research Specialist for the Air Resources Board Executive Office, Stationary Source Division and the Research Division.

JONATHAN E. FIELDING is Director of Public Health and Health Officer for Los Angeles County responsible for all public health functions including surveillance and control of both communicable and non-communicable diseases, and of health protection (including against bioterrorism) for the County's 10 million residents. He directs a staff of 3,600 with an annual budget exceeding \$650 million within the Department of Health Services. Dr. Fielding is also a Commissioner of the First 5 L.A. Commission, which distributes over \$100 million per year to improve health and development of children, ages 0-5. He chairs the US Community Preventive Services Task Force. He was also a founding member of the US Clinical Preventive Services Task Force. Dr. Fielding is also a Professor in the Schools of Medicine and Public Health at UCLA and has authored over 160 peer-reviewed articles, chapters and editorials on a wide range of public health and preventive medicine issues. He teaches the course "Determinants of Health" in the School of Public Health. He is Editor of Annual Review of Public Health, Chairman of the National Partnership for Prevention and an elected member of the National Academy of Sciences Institute of Medicine. Formerly Dr. Fielding was Massachusetts Commissioner of Public Health and was a Vice President of Johnson & Johnson.

GENEVIEVE GIULIANO is Professor in the School of Policy, Planning, and Development, University of Southern California and Director of the METRANS joint USC and California State University Long Beach Transportation Center. She also holds courtesy appointments in Civil Engineering and Geography. She conducted research at the UC Irvine Institute of Transportation Studies before joining USC in 1988. Professor Giuliano's research interests are interdisciplinary and wide-ranging. Her background is in geography, economics and political science, and her application field is transportation. Her research focus areas include relationships between land use and transportation, transportation policy evaluation, and information technology applications in transportation. Recent projects include mobility patterns of the elderly, international comparisons of metropolitan growth and travel patterns, and new technology applications in public transit. Current projects include intra-metropolitan freight modeling and analysis, evolution of employment centers in the Los Angeles region, and sensor networks applied to urban traffic monitoring. She has published over 120 papers, and has presented her research at numerous conferences both within the US and abroad. Professor Giuliano is a former faculty fellow of the Lincoln Institute of Land Policy and former member of the Executive Committee of the Association of Collegiate Schools of Planning. She serves on the Editorial Boards of *Urban Studies*, *Journal of Transportation and Statistics*, *Journal of Transport Policy*, as well as on Advisory Boards for transportation institutes at UC Davis and University of Minnesota. She is a member and past Chair of the Executive Committee of the Transportation Research Board, and has been named a National Associate of the National Academy of Sciences. She has participated in several National Research Council policy studies; currently she is a member of the Committee on Climate Change and Transportation.

ELOISA GONZALEZ is a resident of Los Angeles, where for the past five years she has been the Program Director for the Physical Activity Program at the Los Angeles County Department of Health Services. In this capacity, Dr. Gonzalez creates, implements, and evaluates programs to promote physical activity among youth and adults in Los Angeles

County. Some of her focus areas include increasing the quantity and quality of physical education in schools, and advocating for walkable/bikeable communities in order to increase the opportunities for LA County residents to engage in physical activity everyday. Dr. Gonzalez is an active member of the California State Senate's Task Force on Youth and Workplace Wellness, a Board Member of the Los Angeles Chapter of the American Heart Association, and is the spokesperson for the California Latino 5 A Day Campaign.

LEROY GRAYMER (MODERATOR) is Founding Director Emeritus of the Public Policy Program at UCLA Extension, which he established in 1979. The program addresses public policy issues of state, national and international importance through numerous conferences, seminars, workshops, and facilitation activities. Graymer was formerly Associate Dean of the Graduate School of Public Policy at the University of California, Berkeley, and Vice President and Professor of Political Science at California State University, Dominguez Hills. Recent work includes a special research project for the Hewlett Foundation on California governance reform options and the State Transportation Plan for the California Department of Transportation.

ELLEN GREENBERG is Principal at Freedman Tung & Bottomley Urban Design. She is a city planner focused on resolving problems at the complex intersection of land use, transportation, and urban design. Her ability to solve questions that cross the usual boundaries between both professional disciplines and governmental agencies have made her a highly-regarded leader of comprehensive and strategic plans, policy studies and research. Ms. Greenberg is an authority on new techniques in emerging practice areas including zoning reform, street and circulation network design, and transit oriented development. From 2000-2004, Ms. Greenberg was on the staff of the Congress for the New Urbanism, serving as Director of Research and Interim Executive Director. She is a contributing author to "The New Transit Town," "Codifying New Urbanism," and "Civilizing Downtown Highways."

SUSAN HANDY is an Associate Professor in the Department of Environmental Science and Policy and the Institute of Transportation Studies at the University of California at Davis. Her research interests focus on the relationships between transportation and land use. She is well known for her work on the link between the built environment and travel behavior, and her studies of the influence of neighborhood design on walking have been widely cited in the physical activity literature in recent years. She is currently working on projects funded by the California Department of Transportation and the Robert Wood Johnson Foundation on this topic. She recently served on the Institute of Medicine Committee on the Prevention of Obesity in Children and Youth and completed a report for the Transportation Research Board and Institute of Medicine Committee on Physical Activity, Health, Transportation, and Land Use.

STEVE HEMINGER is Executive Director of the Metropolitan Transportation Commission (MTC). MTC is the regional transportation planning and finance agency for the nine-county San Francisco Bay Area. It allocates more than \$1 billion per year in funding for the operation, maintenance and expansion of the Bay Area's surface transportation network. Since 1998, MTC has served as the Bay Area Toll Authority (BATA) responsible for administering all toll revenue from the seven state-owned bridges. BATA has a "AA" credit rating and plans to issue over \$6 billion in toll revenue bonds to finance bridge, highway, and transit construction projects over the next several years. MTC also functions as the region's Service Authority for Freeways and Expressways (SAFE) and operates a fleet of 70 tow trucks and 2,000 roadside call boxes to assist motorists in trouble. In addition, MTC manages the TransLink® universal fare card program for public transit and the popular 511 traveler information telephone number and web site. Mr. Heminger serves as Vice Chair of the Policy Committee of the Association of Metropolitan Planning Organizations. He is also a member of the Board of Trustees for the Mineta

Transportation Institute, the Board of Advisors for the ENO Transportation Foundation, and the Research and Technology Coordinating Committee for the Federal Highway Administration. Prior to joining MTC in 1993, Mr. Heminger was Vice President of Transportation for the Bay Area Council, a business-sponsored public policy group. He also has served as a staff assistant in the California State Legislature and the U.S. Congress.

SUSAN B. HERBEL is a Senior Associate with Cambridge Systematics. She has nearly 25 years of experience in the fields of highway safety, transportation safety planning, federal programs, highway safety research and evaluation, public policy analysis, and program development, implementation and evaluation. Dr. Herbel has been instrumental in developing and implementing strategies associated with the TEA-21 requirement for integrating safety as a priority planning factor in the transportation planning process. She also works with a number of state and regional jurisdictions on the development of comprehensive state or regionwide transportation safety plans.

ANGELA JOHNSON MESZAROS is the Director of Policy and General Counsel for the California Environmental Rights Alliance (CERA). She has more than a decade of experience working with communities and organizations on environmental justice issues in the Los Angeles region. During this time, Angela has used a range of tools to enhance the health, safety, and quality of life of impacted communities including: litigation in federal court, filing regulatory challenges, lobbying state legislators, providing community legal education, testifying before relevant boards and commissions, serving on agency policy work groups, engaging in media advocacy, and negotiating with wide ranging stakeholders. Angela's efforts have been focused on policy development, implementation, and enforcement in a variety of environmental issues including: childhood lead poisoning, freeway siting, siting of sources of air pollution, land use policies and their impact on community health, health impacts of air toxics from mobile and stationary sources, and air permit development and compliance. Prior to joining CERA, Angela was a Research Associate at the University of Southern California's Sustainable Cities Program where she explored the intersections between environmental sustainability and social justice, the role of networks in environmental justice work in the Los Angeles region, and the need for more parks in the urban core of cities. Previously, Angela was the Executive Director of the California League of Conservation Voters Education Fund where she worked to understand, encourage, and engage voters of color on environmental issues. Angela also has served as a staff attorney with Environmental Defense and she was an echoing green fellow for three years where she provided legal, community organizing, and policy development support to several Los Angeles area communities and organizations.

RAUL LEJANO's primary research interest revolves around developing new models for policy analysis. The research incorporates differing ethical theories into models for environmental governance. For example, in the area of environmental risk, he and colleagues have developed new descriptives for understanding cumulative risk and vulnerability --these problems, in turn, lead to new approaches for regulation and advocacy. Dr. Lejano is an assistant professor in the Department of Planning, Policy, and Design at UC Irvine. He has also previously been on the faculty of the Environmental Policy Group at MIT and a lecturer at UCLA.

MIRIAM LEV-ON is Executive Director of The LEVON Group, LLC. Dr. Lev-On has over 25 years of professional experience in environmental and sustainability issues. She provides worldwide consulting and facilitation services in the areas of greenhouse gas inventories, clean fuels and energy technologies and their linkage to urban air quality. During her 15 years tenure at ARCO and BP, Dr. Lev-On conducted studies on vehicles and facilities emission characterizations and their impact on urban air quality and global atmospheric processes. She was the founding chair of the API Greenhouse Gas Emissions

Working Group and led the development of the API Compendium of Greenhouse Gas Emissions Methodologies. She worked with the International Petroleum Industry Environmental Conservation Association (IPIECA), the United Nations Environmental Program (UNEP), the US EPA, and other partners to launch the Partnership for Clean Fuels and Vehicles (PCFV), where she is currently a member of the Sulfur Working Group.

ANASTASIA LOUKAITOU-SIDERIS is professor and chair of the Department of Urban Planning at UCLA. Her work focuses on issues of transportation, land use, and urban design. She has published extensively on issues of transit safety and security, transit-oriented development, downtown development, inner city revitalization, cultural determinants of design, and parks and open spaces. Current or recent projects include a study that examines pedestrian-automobile collisions in Los Angeles, research on domestic and international responses to transit terrorism, and studies on the relationship between walking and physical activity and safety and security considerations. Her projects have been funded or commissioned by the California Department of Transportation, the Transportation Research Board, the Mineta Transportation Institute, the University of California Transportation Center, the California Policy Research Center, the National Endowment for the Arts, the Poverty and Race Research Action Council, the John Randolph and Dora Haynes Foundation, and the UCLA International Institute. She has served as a consultant to the Transportation Research Board, Federal Highway Administration, Southern California Association of Governments, South Bay Cities Council of Government, Los Angeles Neighborhood Initiative, Los Angeles Department of Transportation, Roger Wood Johnson Foundation, the Greek government, and many municipal governments on issues of urban design, land use and transportation. She is the co-author of the book *Urban Design Downtown: Poetics and Politics of Form*, published by the University of California Press in 1998, and the co-recipient of the 2003 Rapkin Award for her work on transit crime.

NOREEN MCDONALD is an Assistant Professor in the Department of Urban and Environmental Planning at the University of Virginia. Her primary teaching and research interests are in transportation planning, with an emphasis on children's travel behavior and the relationship between transportation and land use. Her previous research focused on mode choice for the school trip and the decline in walking to school over the past thirty years in the United States. Noreen's current research looks at how neighborhood social factors, such as trust, influence where children are allowed to walk within their communities.

PATRICIA MOKHTARIAN is a Professor of Civil and Environmental Engineering, Associate Director for Education of the Institute of Transportation Studies, and Chair of the interdisciplinary graduate program in Transportation Technology and Policy at the University of California, Davis. She joined UC Davis in 1990, after nine years in regional planning and consulting in Southern California. Dr. Mokhtarian has specialized in the study of travel behavior for more than 20 years. A key research interest has been the impact of telecommunications technology on travel behavior, with additional interests in congestion-response behavior, attitudes toward mobility, adoption of new transportation technologies, land use and transportation interactions and the transportation/air quality impacts of transportation demand management measures. She has directed or participated in more than a dozen projects related to these and other areas, involving extramural funding totaling about \$7 million. She has authored or co-authored more than 100 refereed journal articles, technical reports, and other publications. She currently serves on the editorial boards of the Transportation Research Part A and Transportation journals.

MARY NICHOLS (MODERATOR) currently serves as Director of the UCLA Institute of the Environment (IoE). In addition to leading the Institute, she also has a joint appointment at the UCLA School of Law where she will teach a seminar on State Environmental Law and policy in spring 2005. Nichols brings a breadth of environmental experience within the government sector to her teaching at UCLA. She began practicing law at the Center for Law in the Public Interest in Los Angeles where she brought the first litigation under the then recently passed Clean Air Act. She was employed by the state of California as the Secretary of Environmental Affairs and the Chair of the Air Resources Board and briefly served as Los Angeles Chief Assistant City Attorney in charge of the civil branch. After a brief stint in private practice she helped found the Los Angeles office for Natural Resources Defense Council as senior attorney. In 1993, Nichols was appointed s Assistant Administrator of Air and Radiation for the U.S. Environmental Protection Agency where she was responsible for tightening the nation's air quality standards. She then headed the Environment Now Foundation as Executive Director. Prior to joining UCLA, she served as the California Secretary for Resources, overseeing natural resources, including parks, wildlife, forestry, coastal protection, and energy and water.

KATHERINE AGUILAR PEREZ is the Executive Director of the Transportation & Land Use Collaborative of Southern California (TLUC), a non-profit dedicated to educating the region's diverse communities about issues of planning that affect their lives. She was recently recognized as an "Outstanding Leader" in Business Life Magazine based in the San Gabriel Valley. Before coming to TLUC, Katherine served as the Deputy to Pasadena Mayor William Bogaard, Pasadena's first city-wide elected Mayor. She was able to work with community on many developments such as the Gold Line Light Rail Extension, a 13 mile project from Los Angeles to Pasadena. Katherine is a frequent speaker at national, state and local conferences, and has been featured on FOX11 News, KNX News radio and KPCC FM, the *Los Angeles Times*, *California Real Estate Journal*, *Architecture Magazine*, the *Oregonian* and *USA Today*. She was commentator for "Surviving Sprawl" a three part series on KCET's *Life & Times*.

STEVEN M. PICKRELL is a Senior Vice President of Cambridge Systematics and national manager of the firm's transportation planning practice. He is actively involved in performance measurement for transportation, and has worked with a variety of transportation agencies to apply system condition and performance data in planning, investment and management decisions. Mr. Pickrell was principal author of National Cooperative Highway Research Program (NCHRP) Report 446, *A Guidebook for Performance-Based Transportation Planning*. His recent work for public agency clients has focused on integrating performance measures into the long-range multimodal system planning process, as well as developing performance-based management approaches to the broad spectrum of agency internal and external operations. Mr. Pickrell will speak at the symposium on incorporating environmental and health benefits and costs into measures of transportation system performance.

WILLIAM SATARIANO is Professor of Epidemiology and Community Health in the School of Public Health at the University of California at Berkeley. Prior to his appointment at UC Berkeley, he served as Deputy Director of the Division of Epidemiology and the Metropolitan Detroit Cancer Surveillance System at the Michigan Cancer Foundation from 1980-89. His research interests include the epidemiology of aging and disability, functional assessment, cancer rehabilitation and survival, physical activity and health in older populations, and the effects of social factors and the built environment on health and functioning.

ERIC SCHREFFLER is an independent transportation consultant located in San Diego with over 20 years of experience in planning and evaluating transportation demand

management (TDM) programs. He specializes in quantifying the travel and emission impacts of various measures aimed at reducing vehicle miles of travel. Mr. Schreffler has advised various governmental clients, including metropolitan planning organizations, state agencies, the US EPA and US DOT, the European Commission, and the Organization for Economic Cooperation and Development. He was formerly the Planning Manager at Commuter Transportation Services and managed the southern California office of COMSIS Corporation. He currently chairs the Transportation Research Board's Committee on TDM and serves on several advisory boards, including the National Center for Transit Research, the Transportation Planning Council of the Institute for Transportation Engineers, and the TDM Institute of the Association for Commuter Transportation.

CATHERINE SHOWALTER (SYMPOSIUM CO-CHAIR) has recently joined UCLA Extension as Director of the Public Policy Program. She is known throughout California and the nation for her leadership role in areas that have long connected to the work of the public policy program, specifically, transportation demand management, environmental resources protection, and regional economic development. She has had executive responsibilities within the public, private, and not-for-profit sectors, and has earned praise and trust from all the constituencies with which she has worked. Catherine is skilled and experienced in disseminating technical information in a straightforward manner for ease in understanding by diverse audiences, nationally and internationally. Catherine led a non-profit organization, RIDES for Bay Area Commuters, Inc. She has had executive positions within government agencies, notably first as manager and then Director of Transportation Programs for the South Coast Air Quality Management District. And before turning to public service, she was the vice president of a specialized consulting firm, Transportation Management Services.

SARAH J. SIWEK & Associates specializes in advising public and private sector organizations on transportation and air quality issues. Ms. Siwek has over 25 years experience including work with transportation and air quality agencies in New York, New Jersey, Illinois, Mississippi, Missouri, and California. Ms. Siwek has extensive experience in the development, integration, financing, and implementation of transportation and air quality programs as required under the Clean Air Act Amendments of 1990 (CAA), the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1990 and the Transportation Equity Act for the 21st Century (TEA-21). Her work has included county, regional, and state agencies, and the U.S. DOT's Federal Highway Administration and Federal Transit Administration. Over the past 12 years, Ms. Siwek has provided a range of consulting services to the U.S. Department of Transportation and other clients. Projects have included: initiation and management of the Gateway Cities Clean Air Program, writing publications including the Basic Guide to Transportation Conformity for Local Officials, the Transportation Conformity Reference Guide, Guides to Metropolitan and Statewide planning requirements, integration of Intelligent Transportation Systems into the planning process, and others. Current work includes for the National Transit Institute, courses for the Institute of Transportation Studies at the University of California, and conducting a research study of the integration of transportation and air quality planning through the SIP and conformity processes in six areas throughout the country.

BARBARA SMISKO has twenty years of experience in environmental, health and safety and is the Director of National Environmental, Health and Safety (EH&S) at Kaiser Permanente. Her areas of expertise include environmental management, injury and illness prevention and management, industrial hygiene management, EH&S training and recruiting. In her role as Director, Western Environmental Health & Safety Hub, Barbara

was responsible for Kaiser Permanente's EH&S program in California including transportation systems management. Prior to Kaiser Permanente, Barbara was hired as part of the first Corporate Environmental Safety department at United Airlines, where she was a Senior Staff Representative - Environmental Compliance. Prior to United Airlines, Barbara worked in consulting for six years, first with IT Corporation, coordinating their regional EH&S Training programs, and then with ENSR Consulting and Engineering as a project manager. Barbara is a Certified Safety Professional (CSP), Certified Professional in Disability Management (CPDM), Certified Professional in Healthcare Quality (CPHQ), Certified Professional In Healthcare Risk Management (CPHRM) and a Certified Healthcare Environmental Manager (HEM).

DANIEL SPERLING is Professor of Civil Engineering and Environmental Science and Policy, and founding Director of the Institute of Transportation Studies (ITS-Davis) at the University of California, Davis. He is also co-director of UC Davis's Hydrogen Pathways Program and New Mobility Center. ITS-Davis is staffed by over 100 faculty, staff, and student researchers. Dr. Sperling is recognized as a leading international expert on transportation technology assessment, energy and environmental aspects of transportation, and transportation policy. In the past 20 years, he has authored or co-authored over 200 technical papers and reports and eight books. Daniel Sperling is Associate Editor of Transportation Research D (Environment) and a current or recent editorial board member of four other scholarly journals. He is a member of U.S. National Academies committees on Highway Gas Taxes, Hydrogen, Personal Transport in China, Surface Transportation Environmental Cooperative Research Program Advisory Board, Biomass Fuels R&D, Enabling Transportation Technology R&D, Transportation and a Sustainable Environment, Transportation Options for Megacities, and Liquid Fuel Options. He was selected as a lifetime National Associate of The National Academies in 2004, is founding chair and emeritus member of the Alternative Transportation Fuels Committee of the U.S. Transportation Research Board, and serves on many advisory committees and Boards of Directors. He consults for international automotive and energy companies, major environmental groups, and several national governments. Professor Sperling worked two years as an environmental planner for the US Environmental Protection Agency and two years as an urban planner in the Peace Corps in Honduras. During 1999-2000, he was on leave as a visiting scholar at OECD (European Conference of Ministers of Transport).

BRIAN D. TAYLOR (SYMPOSIUM CO-CHAIR) is an Associate Professor of Urban Planning and Director of the Institute of Transportation Studies at UCLA. He is currently a Visiting Scholar in the Department of Civil and Environmental Engineering at the University of Hawaii at Manoa. His research centers on both transportation finance and travel demographics. He has examined the politics of transportation finance, including the influence of finance on the development of metropolitan freeway systems and the effect of public transit subsidy programs on both system performance and social equity. His research on the demographics of travel behavior has emphasized access-deprived populations, including women, racial-ethnic minorities, the disabled, and the poor. His work in this area has also explored the relationships between transportation and urban form, with a focus on commuting and employment access for low-wage workers. His current research examines both security and ridership on public transit systems, and on the causes and consequences of traffic congestion. Professor Taylor teaches courses in transportation policy and planning and research design. Prior to coming to UCLA in 1994, he was an Assistant Professor in the Department of City and Regional Planning at the University of North Carolina at Chapel Hill, and before that a Transportation Analyst with the Metropolitan Transportation Commission.

KRISTINE THALMAN joined the Orange County Chapter of the Building Industry Association (BIA/OC) as the organization's new chief executive officer. Kristine is charged with managing the operations of the largest chapter of the BIA of Southern California. Kristine oversees all aspects of a very active educational organization that organizes more than 30 programs and functions annually for over 900 member companies, representing over 112,000 employees in the homebuilding industry in Orange County. Kristine also serves as the chief spokesperson for the homebuilding industry in Orange County before administrative and legislative bodies and the media on California land use planning and environmental laws. Prior to joining the BIA/OC, Kristine served as Director of Local Government Affairs with KB HOME, where she created the company's government affairs program in the Greater Los Angeles and Orange County Divisions four years ago. Coupled with her prior experience as government relations manager for the City of Anaheim, Kristine has proven experience in public policy development and superior skills in local, state and federal legislative advocacy on issues related to the industry. Kristine has a unique understanding of the complex issues the residential construction industry is addressing today. Kristine also has experience in transportation systems management, and public affairs and community outreach in the homebuilding industry. She is currently serving on the Orange County Council of Governments Board of Directors as the Private Sector representative.

MARTIN WACHS (MODERATOR) is Professor of Civil and Environmental Engineering and Professor of City and Regional Planning at UC Berkeley. He earlier spent 25 years at UCLA, where he served three terms as Chairman of the Department of Urban Planning and was Director of the Institute of Transportation Studies. Professor Wachs is the author of 160 articles and four books on subjects related to relationships between transportation, land use, and air quality, transportation needs of the elderly, techniques for the evaluation of transportation systems, and the use of performance measurement in transportation planning. His research also addresses issues of equity in transportation policy, problems of crime in public transit systems, and the response of transportation systems to natural disasters including earthquakes. His most recent work focuses on transportation finance in relation to planning and policy. Professor Wachs has served on the Executive Committee of the Transportation Research Board and was the TRB Chairman during the year 2000. He is currently a member of the Advisory Committee on Research and Development for the California Department of Transportation, and recently completed his term as the first Chair of the Advisory Panel for the Travel Model Improvement Program of the U.S. Department of Transportation.

MICHAEL WALSH is a mechanical engineer who has spent his entire career working on motor vehicle pollution control issues at the local, national, and international level. For the first half of his career to date, he was in government service, initially with the City of New York and subsequently with the U.S. Environmental Protection Agency. With each, he served as Director of their motor vehicle pollution control efforts. Since leaving government, he has been an independent consultant advising governments and industries around the world. For several years he served as the Chairman of the World Bank Advisory Panel to the Mexico City Transport/Air Quality Management Program. He then served in a similar capacity with the Chinese National Environmental Protection Agency. During the 1980's he was an advisor to the U.S. Senate Environment and Public Works Committee during development of the 1990 Clean Air Act Amendments. In addition he currently co-chairs the U.S. EPA's Mobile Source Advisory Subcommittee and is actively involved in projects in several countries. He has extensive and unique international experience with unleaded gasoline, alternative fuels, inspection and maintenance, vehicle pollution control technology, vehicle emissions standards and regulations and other motor vehicle pollution control strategies. He recently served as Chairman of the transportation subgroup of the IPCC Good Practices in Emissions Inventory Workgroup and is a contributing member of the IPCC Technology Transfer Workgroup. More recently, he was the principal author of the transportation chapter in a major study of common strategies for reducing both conventional pollutants and greenhouse gases

sponsored by the Association of State and Territorial Air Pollution Control Administrators and the Association of Local Air Pollution Control Officials. The United Nations Environment Program has recently published two of his reports to assist developing countries in addressing motor vehicle pollution problems.

ACQUANETTA WARREN is a Deputy Public Works Director in the City of Upland. She joined the City of Upland as a consultant in Housing Programs and later became a City employee in Fire, Building, Police, Code Enforcement and Integrated Waste Management Departments. Acquanetta is a member of the California Recreation Parks Society, Municipal Assistants of Southern California and League of California Cities Community Service Policy Committee. Previously she worked in banking as Vice President/Group Product Manager for Cash Management Services. Acquanetta was appointed to the Fontana City Council in December 2002. Prior to her appointment, Acquanetta served as Co-Chairperson of the General Plan Advisory Committee and Chairperson of the Village of Heritage Landscape Committee. She also participated with the City of Fontana Public Works Department on the development of the landscape specifications and new program standards to lower costs and increase quality. She is the first African American on the City of Fontana City Council. Governor Arnold Schwarzenegger recently appointed Acquanetta to the State Park Commission. Acquanetta is the Chairperson of the Fontana Housing Authority. She represents Fontana on the San Bernardino County Flood Control and the San Bernardino County Solid Waste Task Force and recently became a Board Member for The Oldtimers Foundation. Healthy Fontana is the brainchild of Fontana Councilwoman Acquanetta Warren. Alarmed with the growing rates of diabetes obesity and heart disease in her community of Fontana, Acquanetta decided to create a program that would inform, educate and change the way people eat, exercise and live.

ASHA WEINSTEIN (MODERATOR) is an Assistant Professor in the Department of Urban and Regional Planning at San José State University. Her research and teaching interests include transportation planning and policy issues related to pedestrian travel and designing livable streets, and transportation finance. She also works in the field of transportation and planning history. She recently published the article “Curing Congestion: Competing Plans for a ‘Loop Highway’ and Parking Regulations in Boston in the 1920s” in the *Journal of Planning History*. Other projects she has finished recently include “Addressing the Equity Implications of HOT Lanes,” “How Much Do Americans Walk? An Analysis of the 2001 NHTS,” “Can Consumer Information Tighten the Transportation/Land-Use Link? A Simulation Experiment,” and “The Congestion Evil - Public Perceptions of Traffic Congestion in Boston in the 1890s and 1920s.”

ARTHUR WINER is Professor of Environmental Health Sciences in the UCLA School of Public Health and a core faculty member in the UCLA Environmental Science and Engineering Program. Over the past 30 years, he has published more than 190 peer-reviewed journal articles and book chapters on a wide range of air pollution topics. His current research is focused primarily on air pollutant exposure measurements, with an emphasis on children’s exposure in diesel school buses, portable classrooms, homes and other relevant microenvironments. In addition to his research contributions, Dr. Winer has worked extensively at the local, state, and national levels to promote legislation and public policies designed to address a broad range of air pollution and public health concerns.

APPENDIX C:

PARTICIPANT ROSTER

Gregg Albright
District Director
California Department of Transportation
San Luis Obispo, CA

Deborah Barmack
Director of Management Services
SANBAG
San Bernadino, CA

Dan Beal
Managing Director, Pubic Policy and Programs
Automobile Club of Southern California (AAA)
Costa Mesa, CA

Jane Berner
Graduate Student, Department of Urban Planning
UCLA School of Public Affairs
Los Angeles, CA

Susan Boyer
Program Manager
Southern California Edison
Rosemead, CA

Christopher Cabaldon
Sacramento Area Council of Governments
Sacramento, CA

David Calkins
Principal
Sierra Nevada Air Quality Group
Orinda, CA

Ping Chang
Lead Programmer Analyst Data and Monitoring
SCAG
Los Angeles, CA

Walter Arenstein
President
Writrac Consulting
San Jose, CA

Judith Battey
President/CEO
Inland Action, Inc.
San Bernandino, CA

Ruthane Taylor Berger
Deputy Executive Director
Western Riverside Council of Governments
Riverside, CA

Marlon G. Boarnet
Professor & Chairman
Department of Planning, Policy and Design,
UC Irvine
Irvine, CA

Mark Brucker
Transportation Planning Coordinator
Mark Brucker Consulting
Berkeley, CA

Ricardo Calderon
Area Health Officer, LA County SPA '3 and 4
LA County Dept. of Health Services, Public
Health
Los Angeles, CA

Honorable Todd Campbell
Policy Director, Coalition for Clean Air
Councilmember and Vice-Mayor, City of
Burbank
Los Angeles, CA

Deborah Chankin
Director of Program Development
Gateway Cities Council of Government
Paramount, CA

Kelly J. Chastain
Mayor Pro Tem
City of Colton
Colton, CA

Tom Christofk
Air Pollution Control Officer
Placer County AQMD
Auburn, CA

Michael Claggett
Air Quality Modeling Specialist
Federal Highway Administration/ FHWA Resource
Ctr
Lakewood, CO

Maribel de la Torre
Director of Policy, Planning and Development
Transportation and Land Use Collaborative
Azusa, CA

Joan Denton
Director
Office of Health Hazard Assessment, State of CA
Sacramento, CA

Matthew Dresden
Graduate Student, UCLA School of Public Affairs
Student, UCLA School of Law
Los Angeles, CA

Suzanne Ekerling
Director of Community Development
Gilmore Associates
Los Angeles, CA

Scott Fruin
Air Pollution Engineer
California Air Resources Board
Sacramento, CA

Carol Gomez
Planning and Rules Manager
South Coast Air Quality Management District
Diamond Bar, CA

Don Chen
Executive Director
Smart Growth America
Washington, DC

Moises Cisneros
International Trade Manager
Los Angeles Chamber of Commerce
Los Angeles, CA

Randall Crane
Professor of Urban Planning
UCLA School of Public Affairs
Los Angeles, CA

Elizabeth Deakin
Director, UC Transportation Center
Professor of Civil and Environmental
Engineering, UC Berkeley
Berkeley, CA

Honorable Richard Dixon
Councilmember
City of Lake Forrest
Lake Forrest, CA

Ted Droettboom
Regional Planning Program Director
ABAG/BAAQMD/MTC
Oakland, CA

Jonathan Fielding
Prof., UCLA School of Public Health, Dir. of
Pub. Health Ofcr., LA County Dept. of Health
Services
Los Angeles, CA

Genevieve Giuliano
Director, METRANS Transportation Center
Professor, USC School of Policy, Planning &
Development
Los Angeles, CA

Eloisa Gonzalez
Director, Physical Activity Program
LA County Dept. of Health Services, Public
Health
Los Angeles, CA

Rachel Gossen
Associate Transportation Planner
Metropolitan Transportation Commission
Oakland, CA

Ellen Greenberg
Principal
Freedman Tung and Bottomley
San Francisco, CA

Susan L. Handy
Associate Professor, Dept. of Env. Science &
Policy & Inst. of Trans. Studies UC Davis
Davis, CA

Karen Heit
Transportation Deputy
Gateway Cities Council of Government
Paramount, CA

Susan Herbel
Senior Associate
Cambridge Systematics, Inc.
Heathrow, FL

Henry Hilken
Director of Planning and Research
Bay Area Air Quality Management District
San Francisco, CA

Angela Johnson Meszaros
Director of Policy and General Counsel
California Environmental Rights Alliance
El Segundo, CA

Sheila King
Continuing Education Specialist, Dept. of
Humanities, Sci. & Soc. Sci, UCLA Extension
Los Angeles, CA

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