Building a New Paradigm: Improving Public Health Through Transportation

ite TECHNICAL Conference & Exhibit

Following is a summary of a white paper presented at the ITE 2003 Technical Conference and Exhibit, held March 23–26, 2003 in Fort Lauderdale, FL, USA.

This feature describes the emerging active living movement, explains the potential health benefits that can result from a transportation system that supports walking and bicycling, articulates the role transportation professionals can play in improving public health and recommends what can be done to create and support an active transportation system. It identifies significant relationships between the built environment and travel choices, progress in building healthier communities and a need for better methods, data and improved multidisciplinary collaboration and decision-making.

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AN EMERGING MOVEMENT

The inclusion of public health in city planning and transportation is not an entirely new concept. Most recently, this movement has been consistent with traditional city planning applications such as the environmental health impacts of development.[1]

Beginning in the 1980s, however, a shift in orientation occurred in public health. This change began to develop with the incorporation of the sociological and environmental analysis of health and disease. As research evolved, it supported the hypothesis that socio-environmental conditions were important health determinants.[2]

In parallel, a new approach to the creation of communities began to emerge in architecture and urban planning that endorsed a development philosophy called new urbanism.[3] From these changes in thinking emerged a belief that the built environment, particularly the infrastructure supporting transportation, may have important implications for health-promoting behaviors.

The purpose of this feature is to articulate the role of public health in transportation, explain the potential health benefits that can result from a transportation system that supports physical activity and identify what can be done to help make a transportation system more supportive of active transportation and active living.

Active living is a new way of framing an old concept: How physical activity historically has been obtained through daily routines. For example, walking is the most regular physical activity for most people. However, through new technologies, changes in community design and skewed investments in transportation, this basic mode of transportation and form of physical activity essentially has been engineered out of daily routines.

Changes in the built environment combined with the introduction of devices that promote convenience have created subtle adjustments in behavior resulting in less physical activity.

TRANSPORTATION'S IMPORTANCE TO PUBLIC HEALTH

According to data from the U.S. Department of Transportation's 1995 Nationwide Personal Transportation Survey, automobiles accounted for 89.3 percent of all trips whereas walking and bicycling accounted for only 6.4 percent of trips.[4] This disproportionate trip allocation toward the automobile may have a far-reaching impact—more so than the typical outcomes measured by transportation researchers.

One consideration is the impact on physical activity. Recent estimates suggest that nearly 70 percent of American adults do not obtain recommended physical activity levels—30 minutes of moderately intense physical activity for five or more days per week.[5] A sedentary lifestyle is believed to be a primary contributing factor in at least 200,000 deaths annually in the United States, which is equivalent to approximately 25

percent of all chronic disease deaths and 10 percent of all deaths in the country each year.[6,7]

Similarly, a sedentary lifestyle has been associated with the rapid increase in the percentage of adults who are overweight and obese. Sixty-four percent of American adults are now overweight and nearly one in three is obese.[8]

There has been considerable debate about the causes of a sedentary lifestyle. The focus of research now is shifting toward the impact of environmental conditions and social circumstances on behavioral choices related to physical activity. Many researchers support the belief that the automobile-dominant design of most communities has contributed to unsafe environments for walking and bicycling, thereby influencing decisions to adopt those behaviors for transportation or recreation.

Another negative outcome of the automobile-dominant environment is the thousands of pedestrian and bicyclist injuries and fatalities recorded annually.[9–12] Furthermore, these automobile-oriented environments negatively affect air, land and water quality and contribute to noise pollution, urban heat island and ecosystem damage.[13,14]

Why are these data important? There is mounting evidence that moderately intense physical activity—walking and bicycling in particular—can improve health and prevent disease and disability. The evidence from many studies on walking and bicycling demonstrates that regular participation in these activities provides a health benefit for people of all ages, genders and races.[15,16]

The basic assumption is that changing trip-making behavior to include more non-motorized trips can translate into favorable public health outcomes. For people who are sedentary, choosing even moderately intense activities such as walking and bicycling may provide substantial improvements in health status. This is the primary reason public health officials are interested in developing an infrastructure that supports these behaviors as part of active transportation.

Developing support for active transportation becomes even more apparent considering that nearly 25 percent of all trips in the United States are less than one mile in distance but approximately 75 percent of these trips are made by automobile. Fewer than 30 percent of trips to school that are less than one mile in distance are made by walking or bicycling (by children aged 5–15).[17] These data suggest that it is reasonable to assert that a significant number of automobile trips could be shifted to walking and bicycling if communities were designed accordingly.[18]

A SIGNIFICANT NUMBER OF AUTOMOBILE TRIPS COULD BE SHIFTED TO WALKING AND BICYCLING IF COMMUNITIES WERE DESIGNED ACCORDINGLY.

Furthermore, integrating additional walking and bicycling into a daily routine may be a better public health strategy than traditional structured and organized programs. Several studies have shown that physical activity promotion programs, which require a participant to alter daily routines to accommodate the program (such as by joining and participating in a fitness facility), have been less effective in promoting regular physical activity than solutions that more easily integrate physical activity into daily routines.[19,20]

ADVANCING ACTIVE LIVING THROUGH TRANSPORTATION

The primary challenge in advancing the active living concept is effectively communicating its role within the context of the overall missions of transportation and city planning. While non-motorized alternatives are being recognized as solutions to public health dilemmas, walking and bicycling have been largely ignored as viable modes of transportation in these disciplines. This may be because there is not a specific mandate in either transportation or city planning to address active transportation. However, both disciplines have a role in improving the quality of life and livability of the communities they serve.

Therefore, the current challenge lies in integrating active transportation strategies into current city planning and transportation practice. Considering the significant positive impacts offered by active transportation (such as health, mobility, environmental preservation and conservation and quality of life), it is time for the transportation sector to fully embrace the opportunities offered by walking and bicycling.

A REVIEW OF THE LITERATURE

Increasingly, researchers have studied the impact of the built environment on travel behavior, but they have done so primarily from the perspective of its impact on automobile travel. Generally, in examining community design and transportation investment, data have suggested that residents of pedestrian- and bicycle-oriented neighborhoods make more walking, bicycling and public transit trips compared to residents of automobile-oriented neighborhoods.[21–25]

Community design that provides opportunities for non-motorized travel behavior (in the form of higher density, high land-use mix and high pedestrian environment factors such as grid-pattern streets, sidewalks and safe and convenient street crossings) also should provide the same opportunities for recreational walking and bicycling.

Although the decisions to engage in walking and bicycling for transportation versus recreation are very different, the infrastructure needed to perform the activities remains the same. It is unclear, however, how factors such as sidewalks, bikeways, or trails impact sedentary individuals' decisions to be physically active through walking and bicycling. It is not known whether sedentary individuals are the same individuals who, due to poor community design, are driving

automobiles more and walking and bicycling less. Many community design variables have confounding relationships, making it difficult—if not impossible—to disentangle their separate effects as independent variables.

Therefore, although studies have shown that there is potential for creating environments conducive to active transportation and physical activity, more research still is needed to fully appraise the relationship.[26]

DEVELOPING THE CALL TO ACTION

The call to advance active transportation is both for increased interdisciplinary collaboration in research and practice and for the transportation field to operate on an expanded vision of its mission. Specific to this call is integrating public health and quality of life concerns and moving beyond the traditional transportation system performance framework. This work will be helpful in engaging transportation professionals to take a more active role in land-use reform, transportation alternatives, community design and public health.

Theoretical Research

Research in the transportation field has not been able to fully characterize the link between the built environment and non-motorized travel and has not yet attempted to incorporate measures of physical activity in its forecasts. The transportation mode-choice modeling framework is incomplete and particularly ill adapted to study non-motorized travel. This is because of the assumptions underlying random utility theory and its traditional application in travel forecasts.

Research is needed, which would include in mode-choice modeling considerations that take into account that experiential and cognitive factors may enter the decision-making process and that individuals may seek to fulfill goals other than monetary savings and time-cost minimization (such as well-being, happiness, moral obligation and desire for good health).[27]

The transportation modeling framework also fails to take into account how individuals perceive their environment, process information, form habits, are affected by socio-cultural factors and are influenced by risk and uncertainty.[28] All of these psychologically and sociologically meaningful behavioral concepts are missing in transportation modeling but are familiar to experts from other fields including architecture, health behavior and environmental psychology. These fields could help in describing the built environment in measurable ways for use in future adapted models.

THE TRANSPORTATION MODE-CHOICE MODELING FRAMEWORK IS INCOMPLETE AND PARTICULARLY ILL ADAPTED TO STUDY NON-MOTORIZED TRAVEL.

Furthermore, health experts may be more familiar with multi-level modeling techniques that allow the separation of different levels of influence such as individual and community factors. The transportation field would benefit greatly from partnering with different fields to add new perspectives in both theory and practice.

Data

Along with a theoretical framework to incorporate psycho-social concepts, data are needed to characterize the environment in which people make decisions—whether for transportation, physical activity or leisure. Following are specific examples of measures that need to be developed and collected in transportation planning and health surveys:

- Measures of non-motorized travel, both for utilitarian purposes and for physical activity and leisure
- Measures of the opportunities for physical activity in the built environment, including types of facilities (such as sidewalks and bikeways) and convenience to destinations of interest
- Detailed descriptions of micro-scale design to objectively measure the quality of the pedestrian and bicycle environment
- Measures of individuals' perception of the environment and attitudes about travel
- Socio-demographic measures to study how environments fulfill the needs of people at different life stages and from different economic, ethnic and gender categories

Visions and Performance Measures

To promote active transportation effectively, engineers and planners must be able to relate their work to a broader set of goals than traditionally has been considered by the field. Concerns such as air and water quality, safety, protecting wildlife habitat, or minimizing travel time already are relevant in the transportation planning process. However, the planning process does not consider physical activity an outcome of interest, nor does it provide incentives for building non-motorized transportation systems.

Transportation engineers can take a leadership role in legislative work to incorporate mandates that consider the full spectrum of health outcomes (including physical activity) when evaluating transportation plans through the existing National Environmental Policy Act process. Concerns about physical activity can be integrated easily in tools and programs used in transportation planning, such as community impact assessments and context-sensitive design.

An essential way to invite transportation practitioners to incorporate a broader vision in their work is to implement a set of performance measures that relate to active transportation, including:

- The transportation system's ability to offer choices for transportation, especially to those who do not drive (such as children, people with dis-

abilities, the elderly and low-income individuals), those who do not wish to drive, or those who wish to walk or bike for physical activity
- The quality of different travel options, especially the quality of pedestrian and bicycle environments, which are rarely evaluated
- The system's ability to generate non-motorized transportation and encourage physical activity
- The impact of the existing transportation system on people's mental and physical health, social networks and the environment

Building Active Living Environments

Although transportation experts operate within a constrained framework and are not directly responsible for decisions affecting the built environment as a whole, they are a vital part of the solution. Transportation professionals must work with communities to create active transportation options by supporting mixed-use developments that provide safe, well connected and welcoming pedestrian and bicycle networks. Specific challenges involving low-income population, crime and traffic safety should be addressed as a priority.

WHERE ARE THE COMMUNITY MODELS?

Numerous communities are creating and supporting models for active transportation. Across the United States, barriers to active transportation are being addressed by examining transportation policy and practice within the broader contexts of community building, public health, integrating transportation with land-use reform, encouraging transportation choice, providing transit, developing non-motorized infrastructure and enhancing streetscapes.[29–33]

The success of these communities can be attributed to a variety of features, including:
- multidisciplinary collaboration;
- improved community participation;
- careful and informed community design;
- updated policies at the federal, state, or local government level or for employers and lenders (such as zoning, street standards, building codes, incentives for desirable development and redevelopment, funding flexibility, parking policies and school site location);
- targeted programs (such as health promotion programs, walk-to-school initiatives and walking clubs); and
- creative funding arrangements (such as incentives for housing construction near transit and location-efficient mortgages).

PEOPLE ARE MORE LIKELY TO WALK OR BIKE IF IT IS CONVENIENT, SAFE AND ENJOYABLE AND IF THERE ARE PLACES TO GO AND THINGS ALONG THE WAY TO CAPTURE THE ATTENTION AND SENSE OF IMAGINATION.

These communities serve as models for others to follow. The work done thus far certainly provides a foundation from which to build more successful models and to identify the policies, programs and physical projects that can be replicated on a larger scale.

CONCLUSION

The emerging active living and active transportation movements have begun to show that built environments do have an impact on travel and physical activity choices. In many cases, the research and anecdotal evidence also show that people are more likely to walk or bike if it is convenient, safe and enjoyable and if there are places to go and things along the way to capture the attention and sense of imagination.

Attempts are being made to build what are believed to be active and healthy communities. Unfortunately, at this time, there is not a specific professional mandate in any discipline to address such large and complex social and environmental problems. This too may be changing as consensus builds and innovative strategies are implemented to improve people's health.

Understandably, many questions remain about the relationships between the built environment, transportation choices and decisions to walk and bike. Therefore, recognizing the deficiency of data available to guide evidence-based policy decisions and intervention strategies, professionals in city planning, transportation, urban design and public health should seek to collaborate to develop a new paradigm that will utilize multi-disciplinary approaches to increase physical activity, promote health and advance the concept of active transportation. ■

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