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**Design for a Healthy World**

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**INTRODUCTION** (Sallis)

Physical activity, sedentary, and eating behaviors are known to be affected by a complex array of influences, but most efforts to understand those influences have examined mainly characteristics of individuals and their social connections. An alternative view advocated by some scientists, policy makers, and practitioners is that societal changes, including the planning of cities and the design buildings, over the past few decades are largely responsible for unhealthy patterns of eating and physical activity (1-6). This alternative view is affecting public health policy worldwide. Obesity control, physical activity, and healthy nutrition strategies that emphasize environmental and policy changes are the primary focus of Healthy People 2010 (7), Centers for Disease Control and Prevention (CDC) (6), Institute of Medicine report on preventing childhood obesity (8), International Obesity Task Force (9), and World Health Organization (10).

One concern with the environmental and policy approach is the relatively weak evidence base. Though individual behavior change interventions are limited by low recruitment, modest effect sizes, and poor maintenance (11,12), evidence that environmental and policy changes are feasible and effective in changing behavioral and health outcomes is mostly lacking. This report provides an overview of the current evidence base, and it identifies the opportunities and

challenges related to the collaborative work needed to advance research, policy, and practice. Further, it illustrates efforts around the world to improve eating and physical activity in entire populations.

### ***Technological roots of epidemiologic transitions worldwide***

There are biological mechanisms that lead people to seek foods high in sugar and fat (13) and to limit physical activity (14). Technological innovations and industrial developments have allowed an unprecedented number of people to satisfy these biologically-based drives. There is an ever-increasing diversity of highly palatable, processed foods available conveniently and at low cost, and they are promoted incessantly. Physical activity at many jobs has been eliminated by mechanization and computerization. Walking and cycling for transport have largely been replaced by motorized travel. Labor saving devices have reduced physical activity at home, and new modes of sedentary entertainment are continually developed, yet opportunities for physically active leisure do not seem to have increased to compensate.

Urban planning and building practices have created an extensive infrastructure that supports unhealthful behaviors. Since World War II most new communities in the United States have been built on the assumption that people will use their cars for all travel (15). This has been facilitated by zoning laws that separate retail and residential areas beyond walking distances so driving becomes necessary. This suburban sprawl is a major cause of the loss of farmland, which reduces access to locally-grown foods. Fast food restaurants that provide high-energy, low-nutrient foods at low prices and promote driving with drive-through windows, represent another way in which the built environment favors unhealthy lifestyles. Workplaces are commonly sited in office parks that must be accessed by cars, stairwells are inconveniently located or unattractive, and vending machines with foods of low nutritional value are easily available.

These technological changes have been underway since the industrial revolution, but the changes have accelerated in recent decades, especially in the most developed nations. However, many developing nations are making rapid transitions from physically active lifestyles and prevalent under-nutrition to sedentary occupations, access to processed foods, and rapidly rising rates of obesity (??). Lifestyle-related chronic diseases are expected to become leading causes of

disability and death in developing countries in the next few years, and the medical care systems in these countries are unlikely to be prepared to the new demands.

### ***Built environment, obesity, and chronic diseases***

At least four recent studies documented an association between neighborhood design and body mass index (BMI) (16-19). Walkable neighborhoods have many destinations within walking distance of homes and grid-like street patterns that allow pedestrians direct routes. Low-walkable neighborhoods are found in sprawling suburbs that have separated uses and disconnected streets. People who lived in more walkable neighborhoods or less sprawling cities had lower BMI than demographically similar people in less walkable areas. One study showed that the rates of chronic diseases were lower in less-sprawling cities (20). Thus, direct associations between neighborhood design and health outcomes have been reported.

### ***Built environment and physical activity***

There is a substantial evidence base linking aspects of the built environment with physical activity, but many hypotheses remain to be examined.

*Community design.* Researchers in the transportation and planning fields have studied the relation between community design and walking and bicycling for transportation for over 20 years. A review of about 20 studies documented adults living in walkable neighborhoods reported 1-2 more walking or biking trip per week (amounting to 15-30 minutes per week) than those living in low-walkable neighborhoods (11). The Task Force on Community Preventive Services concluded there was “sufficient evidence” to recommend creation of walkable neighborhoods as public health intervention to increase physical activity (21).

*Facilities for active recreation.* Health researchers have examined the relation between access to recreational facilities and participation in recreational physical activity. A review of 19 studies of adults concluded that accessibility of facilities, opportunities for activity (i.e., programs), and aesthetic attributes were related to physical activity (22). For children and adolescents, access to recreational facilities and programs were consistently related to physical activity (23).

*Walking.* There are different environmental correlates of walking for various purposes (24). Walking for recreation was associated with aesthetics, convenience of facilities, and traffic

concerns. Walking for transportation was related to traffic concerns, access to open space, and a walkable neighborhood design. In a study of 34 metropolitan areas of the U.S., utilitarian walking was significantly correlated with parkland acreage (Zlot et al., 2005).

*Buildings and workplaces.* The only aspect of building design that has been studied repeatedly in relation to physical activity is stairs. Increasing the attractiveness of stairways has increased stair use (25), and many studies have demonstrated the effectiveness of promotional signs when there is a choice to take stairs versus elevators or escalators (26). Other aspects of buildings and workplaces that need to be examined include the layout of buildings that require walking to common destinations, and placement of workplaces in walkable neighborhoods (27).

### ***Built environment and healthy eating—defining food environments***

Research on built environment and eating behavior is in its infancy, but several studies have appeared in recent years. Although increases in portion sizes (28), access to convenience foods (29,30), and frequency of eating out appear to be related to less healthful eating patterns, they are not variables in the built environment. However, notable increases in the number of fast food restaurants enhance exposure to inducements to eat food of limited nutritional value.

*Disparities in access to healthy foods.* When residents of an area lack access to stores and restaurants with healthful foods, this is an important barrier to healthful eating. Supermarkets are less common in lower-income and minority neighborhoods (31,32). Density of fast-food restaurants is higher in minority and lower-income neighborhoods (33). In addition, disadvantaged neighborhoods had lower availability or poorer quality of healthful options compared to more affluent and/or white neighborhoods (34-36). In a study of Los Angeles restaurants, there were fewer healthful menu selections in the lower-income areas (37). More recently, statistically significant clustering of fast-food restaurants around schools were found in Chicago (Austin et al., 2005).

*Linking access and behavior.* A few studies have reported that access to healthful foods was related to eating behaviors. For example, access to supermarkets was associated with fruit and vegetable intake among African Americans (31) and household use of fruits (29). A state-level analysis in the United States showed the prevalence of fast-food restaurants was a significant but modest contributor to state obesity rates, (38). However, overweight was not associated with proximity to fast-food restaurants among low-income children (39).

Although a few food environment studies have been funded by the National Institutes of Health, this field should be strengthened dramatically by the Robert Wood Johnson Foundation's new Healthy Eating Research Program. Initiated in 2005, this program will fund research on food environment and policy correlates and interventions, with an emphasis on disadvantaged youth. Research conducted outside the United States has not been apparent, and international studies will be complicated by the wide diversity of foods, distribution systems, and types of food sources.

## **BARRIERS TO COLLABORATION**

A multi-disciplinary approach is necessary in the complexity of designing healthy environments. However, this means that collaboration must occur between fields that may not have experience working with each other. For example, architects and urban planners may need to work intimately with epidemiologists and other public health practitioners in new ways. Even though the orientations are basically different, there is particular common interest in an important health behavior: walking (Coogan & Coogan, 2004). The fields intersect at the critical understanding of the structural and individual factors that influence walking behavior and other health behaviors of leisure time physical activity and healthy diets.

### ***Physical inactivity as an environmental hazard***

One of the fundamental issues precluding the collective research and policy work in the area of the built environment and how it affects the health of the population is the lack of understanding of physical inactivity (or disuse) as a primary risk factor for disease. According to the Centers for Disease Control and Prevention, physical activity now ranks as the third actual cause of death in the United States (citation). Furthermore, lack of adequate physical activity and exercise plays an important role in many chronic diseases leading to early mortality. Unfortunately, choice and control over the determinants of a *current* "leisure-filled" lifestyle outweigh, in the public's mind, the perceived *delayed risk* associated with a sedentary lifestyle. In contrast to views about toxic waste, hand guns or cigarettes, society has yet to view automobiles, drive-thru windows, lack of sidewalks, or elevators as environmental hazards. Normative changes within a society often require dramatic attitude shifts – this is true within science and public policy as well. It is only recently that issues of physical inactivity and the

role of the built environment have assumed public health significance, despite decades of trend data pointing toward the now present epidemics of inactivity and obesity.

### ***Barriers within science***

Even within the public health sciences there are differences in the approach to solving health problems affecting the population. Traditional biomedical scientists form and test etiologic hypotheses and the data generally are not considered to be True until a certain level of confidence in the findings has been achieved (e.g., a 95% Confidence Interval that excludes the null value or a p-value <0.05). In contrast, public health practitioners making important decisions on behalf of the health and safety of the public often must assume the data are True despite limited evidence. This disconnect between “sound science and sound public health practice” more often than not delays action in ameliorating many environmental hazards.

### ***Collaboration among Non-traditional Partners***

A recent report from the Transportation Research Board (TRB) and the Institute of Medicine (IOM) (TRB-IOM Report) outlines a number of recommendations pertaining to physical activity and the built environment. These recommendations state the primary need for multidisciplinary and inter-agency research (particularly longitudinal research and “natural experiments”) linking specific aspects of the built environment with different types of physical activity. While these ideas are commendable, they do indeed involve collaboration among professionals in different disciplines who are not used to working together, such as physiologists, epidemiologists, architects, city-planners, and social marketers. Thus, a number of barriers may affect the ability of so-called “non-traditional partners” to work together toward a common goal of improved health through the built environment, although these barriers certainly are not insurmountable.

The first potential barrier to collaboration is that of linking the different types and sources of data used by these professionals in studying the environment and/or human health. With regard to information on the built environment and physical activity, the “Gold Standard” for data would rely on: 1) a comprehensive and objective measure of daily energy expenditure (PAL); 2) behavioral and geographical data that are maintained and made widely available to researchers by a host organization; 3) data that represent a wide regional scope; 4) data that allow

geo-coding of the respondents home location; 5) longitudinal data collection; and 6) the ability to add data. These data sources do not exist, however, and therefore, scientists must rely on less precise data on self-reported physical activity to be linked with environmental data. In general these environmental data come from standardized census or land use data, but are also constructed via automated resources (GIS or remote sensing), by environmental audits, or by self-report. Thus, like the physical activity data, they have a wide range of precision and accuracy. In addition, data on features of community infrastructure (condition of sidewalks, pedestrian circulation, or sunlight analysis) may not be available.

Ecological studies that can geocode physical activity and health data from surveillance systems such as the Behavioral Risk Factor Surveillance System (BRFSS) or from the National Health and Nutrition Examination Survey (NHANES) could provide useful information on the environment and the specific locations of where low activity and/or high prevalence of overweight is occurring. Similarly, statistical tools such as Geographical Information Systems (GIS) can provide more detailed information on the built environment (land use, sidewalks, green space) to link with surveillance data on physical activity patterns and various health indicators like obesity within a community. These data are also quite useful in tracking how changes to the environment affect changes in behavior and in subsequent health outcomes.

### ***Joint advocacy for policy change***

In order to improve the ability to work together effectively toward policy change, these partner organizations can begin by: 1) jointly seeking funding for seed money to support small research projects; 2) sponsoring roundtables and symposia at local, national, and international meetings; and 3) serving as a conduit for the dissemination of research findings. In addition, public health training should foster more joint-degrees that combine with forestry, architecture, or marketing to train professionals for this type of collaborative research and action. These training programs should adopt a political and global perspective in order to increase awareness and understanding of successful community design and policy changes adopted by other countries.

Modifications to the built environment will most likely work best at the local level. The Health Impact Statement historically has been used in environmental risk assessment to inform the public of the health consequences of various actions (e.g., the building of a new

manufacturing plant in the community; the addition of another fast-food restaurant with drive-thru windows). These Impact Statements generally are effective at involving inter-agency action and public consensus. Evidence suggests that the built environment plays a major facilitating role in promoting an active lifestyle. Therefore, urban planners, local zoning officials, those responsible for the construction of residences, developments, and supporting transportation systems, and members of the community must work together in the design of more activity-friendly environments.

## **EXPERIENCE FROM A DEVELOPING COUNTRY: THE *AGITA* EXAMPLE**

Much of the research on the built environment and its influence on physical activity and related chronic diseases have been done in the U.S., Europe, Australia and other developed countries. However, data (citation) show that population-wide interventions to reduce chronic diseases are needed even in developing countries. Still, the economic, social, political, and cultural realities of developing countries pose particular challenges to implementation. Launched in 1996, the Agita São Paulo Program presents a practical and innovative example of physical activity promotion in a developing country.

### ***Agita São Paulo Program***

As a strategy to promote healthy lifestyles, Agita São Paulo literally translates to “Get Moving, São Paulo.” Its aim is to prevent and control chronic diseases by supporting and promoting municipal initiatives for the control of hypertension and diabetes, as well as other risk factors that require changes in behavior or daily habits. Staying active is vital to health, as is maintaining a balanced diet, not smoking, and not consuming alcohol or drugs. Agita São Paulo works to extend the benefits of physical activity to protect the population against the risk factors for chronic diseases.

*Key elements.* Vital components of Agita São Paulo include program identity, cultural relevancy (pleasure principle), scientific basis, theory-driven interventions (inclusion and one-step-ahead from the Transtheoretical Model), clear and simple message, acquisition of stakeholders, Mobile Management, and the formation of partnerships.

*Major partnerships.* Cooperation between governmental and nongovernmental institutions, supported by a Ministry of Health initiative, forms the basis of the program. Intellectual partnerships were instrumental in obtaining experiences from other national and international programs. Thus, several professionals with well-established expertise in intervention were invited to visit the Agita Center, and to compose a national and international scientific board. More than 300 institutions comprise its Executive Board, and various society sectors are represented, from education, sports, health, industry, commerce and to service. (Institutional partnerships ... political and technical support).

*Results.* Between 1996 and 2002, 17 scientific articles on the program were published, and 76 presentations of scientific papers were made, both in Brazil and other countries. The São Paulo Metropolitan Area survey was conducted in September of 1999, 2000, 2002, and 2003 on over 600 subjects/year (sample selected at random and stratified by age, gender, and socioeconomic status) who were representative of the area and were interviewed at home in each of those years. The 1999 survey found that 54.8% of the population reported they received the recommended amount of PA for health (moderate PA at least 30 min/d, 5 or more d/wk, and/or 20 min of vigorous PA at least three times per week). The prevalence of sufficiently active was 54.8% in 1999, 45.8% in 2000, 54.2% in 2002, and 60.4% in 2003. Other studies have indicated sustained, increased knowledge about the program and its objectives (Matsudo et al., 2004) and lower inactivity rates (Andrade et al., 2001) due to this knowledge.

### ***Changing social climate comes first***

The Brazilian experience in creating a healthy environment starts with building a new “reaction” and social climate of the community, emphasizing the need for social mobilization. The guiding theory comes from the Ecological Model of Influences on Physical Activity (Sallis and Owen, 1997), which highlights the relationships between intrapersonal, social environmental and physical environmental factors.

*Politicians more aware of social climate, more likely to listen.* Because Agita was a collaboration between an independent scientific institution and a Secretary for Health, the program was well positioned to create partnerships with those in the political sector as well as those in the non-governmental sectors. Further, the free media approach was clearly enhanced by the dual approach, because media representatives were more likely to support a non-

governmental organization. However, the "official" character of the program provided by the state government support helped in establishing links with other governmental sectors as well as with other international bodies, such as WHO, Pan American Health Organization, and the CDC. In Brazil, the shift in the political environment facilitates other modifications to the social and physical (built) environments.

### ***Intervention for Intrapersonal Factors***

Targeting the Cognitive component of the Intrapersonal factors in ecological model, the Program invited the State of São Paulo Educational Authority to organize a series of activities to promote an active lifestyle among the students, trying to enforce the two main purposes of the Program: (a) to increase level of PA in the São Paulo state population, and (b) to increase knowledge about the benefits of active living. The most important intervention was the Agita Galera Day (Agitate the Crowd Day), which involved 6000 public schools and over 6 million students on the last Friday of August. The preparation of the event included videoconferences, special meetings with the educational and health authorities, and the printing of over 18,000 manuals/ year, 6,000 posters/year, and 6 million flyers. This permitted every child to take the program messages home and indirectly reached another social segment: the parents and relatives who comprise about another 10 million people.

### ***Intervention on Social Environmental Factors***

Along these same lines in the ecological model, Social Environmental factors will become heavier and more important when Intrapersonal factors receive a successful intervention. The program coordination could target, for example, Social Climate to change the equilibrium in the “mobile” and raise the ecological model overall to a higher level than before the interventions. One way the Program found to be highly effective is to work with the municipalities in the state to promote PA in the general population.

Because of the cultural, economic, and social diversity of the 645 municipalities in the state, no single, rigid model for implementing health promotion efforts is appropriate. In addition, the diversity of approaches allows for various effective solutions to the same problem. The Program offers municipalities a range of suggested strategies that can serve as the basis for their activities, and the Program has also made available educational materials and a program

handbook. So far, the Program has established more than 50 municipal committees in small, medium, and large cities throughout the state.

Two main decisions made by the Governor of the São Paulo State illustrate the Policies Governing Incentives component: (a) the government passed a resolution naming April 6th Physical Activity Day throughout the state of São Paulo; and (b) as a result of the success of 6 consecutive years in which the “Agita Galera” mega-event was performed in public schools, the Program and the Education Authority of São Paulo decided to disseminate that experience by preparing a videotape, describing the Program’s most successful activities; the target groups were teachers, health providers, educational, and health authorities, with the main purpose of developing permanent actions in the school, and additional purposes to learn from other experiences and better prepare the next event. In addition, in August 2002, the State of São Paulo Education Authority created a permanent committee to promote PA studies at school settings. The committee’s suggestions include most of the Program’s proposed items, such as an increase in quality physical education classes, horizontal integration with other curriculum disciplines, building the capacity of the physical education teachers to conduct lifestyle physical activity interventions, and increased attention to physical activity literature and videos in the school libraries.

### ***Intervention in Physical Environment Factors***

To address a Natural Environment component of the ecological model, Weather, the Program organizes different events to promote PA according to the seasons of the year, and special dates, like Carnival. With the help of one partner institution, ACM (YMCA), we developed special festivals at beaches during the summer season (“Agita Verão”), thereby reaching thousands of people on vacation. At the same time, with the help of another partner, the State Road Department, Agita São Paulo Program over 100,000 car/truck drivers and families on the way to the beaches received a special Agita flyer at the toll station. Among the interventions for the Constructed Environment component, the State Education Authority developed a Recreation program.

In 1998, because of the lack of facilities and physical spaces, particularly in São Paulo Metropolitan area, the Partners of the Future, a program to open schools on the weekends, was launched. At the beginning, approximately 40 schools were opened in regions with higher

indices of violence. Progressively, it was expanded to 400 schools because of the high level of principals' approval (83% reported good and very good rates). As a consequence, recently, the program was extended to all 6000 public schools of the state under the new name of Family School, identifying the aim to reach all students' families and school neighborhoods.

Other examples of Constructed (Built) Environment intervention is the reform made in the sidewalks in São Caetano do Sul. In the city, the sidewalks of the downtown main streets and avenues were rebuilt larger and flatter. Also, in Ilhabela, the largest island of the State, a 6-km cycle walkway was constructed with the name of "Agita Way."

*Physical Activity and Environment Evaluation.* A randomized and stratified sample consisting of 2400 people, 14 to 88 years old, 2000 from São Paulo State and 400 from Curitiba (considered a model in urban planning in Brazil), was taken to compare the PA level and Environment factors related to PA in two different regions in a developing country. Subjects were interviewed at home using eight environmental questions, which have been developed by the International Physical Activity Questionnaire (IPAQ) group. They also answered the short, last-week IPAQ version. Among environment factors, we noted that people from Curitiba reported they have more places to go walking in relation to São Paulo (78.8 \_ 67.8%), more facilities to bicycle (17.0 \_ 10.0%), and more recreational facilities (12.0 \_ 9.2%), yet they also considered walking at night unsafe (70.3 \_ 53.1%). PA level results showed 64.0% sufficiently active people (according to the PA recommendation proposed by Pate et al.; 8) in São Paulo and 71.3% in Curitiba.

### ***Bogotá Experience***

One of the best experience in developing country changing environmental are being developed in Bogotá that is Colombia's largest financial, political, and cultural center. It has enhanced quality of life indexes (especially in the areas of public health and education) with and adequate provision of public spaces in the form of parks, bicycle paths and sidewalks among many others.

First created in 1974, the Ciclovía was an initiative from the local government of Bogotá that made certain streets and main avenues closed for cars, during Sundays and holidays. This allowed people to engage in leisure activities, such as walking, bicycling, jogging and dancing, among many others. The new cycle routes project was conceived under the development plan of

the 1998-2001 administration. The network of 300 kilometers of bike paths, one of the most extensive of the world, has the primary goal to reduce vehicular congestion, but has added benefits:

1. Save time and money
2. Improve the natural environment
3. Help the city's aesthetics and
4. Provide health benefits.

When the First Car Free Day was carried out during the workday, 98% of all activities functioned normally. These strategies have allowed the city to improve the mobilization of pedestrians in the streets, which increases security perception. The program has also had the effect of keeping cars off the sidewalks, locating bollards on the sidewalks, relocating street vendors in special plazas, and restoring and recovering public parks.

### *Factors to Success in a developing country*

The governmental and non-governmental partnership and the involvement of representatives from a wide-range of social sectors are key factors in Agita's implementation and success. Along with a clear program identity and message, multiple intervention strategies, and evaluation, Agita influenced policy decisions to create a social and physical environment that supported healthy behaviors. Additionally, Agita dealt with the economic, social, political, and cultural realities of a developing country through innovative partnerships and resourceful interventions.

*Diffusion of the Program.* The successful example of the Agita program in São Paulo quickly spread nationally (Agita Brazil) and eventually, internationally. Several other countries have followed: Colombia (Muevete Bogota, Risaralda Activa), Argentina (Amoveverse) and Uruguay (Movete Uruguay). The WHO considers Agita as a model, and it is published in the World Health Report. Also, the Pan American Health Organization in conjunction with the CDC is supporting the creation of the network to promote physical activity in the Americas, the Agita America.

In October 2002, a Network organization named for the "Agita Mundo—Move for Health" had its preliminary meeting in São Paulo. In April 2003, the organization was officially launched, with the support of over 180 international and national institutions. Its main purpose is

to promote physical activity around the world as an instrument to promote people's biological, psychological, and social health for people of all ages.

## **PARTICIPATING IN THE DESIGN PROCESS**

Current examples of public health participation in local planning are outlined by urban planner Malizia (2005) in an article in the *Journal of Health Promotion*. The examples exhibit various approaches for public health practitioners to have an active role in the design process.

### ***Ingham County, Michigan***

Examination of the connection between land-use and public health is exemplified by the Ingham County Health Department in Michigan. An alliance with state agencies, 50 jurisdictions, Michigan State University (MSU), and local planning boards, has created an effort that combines geographical information system (GIS) analysis of demographic and economic data, vital statistics, and land use patterns to study the county's public health and safety. The public health department has also involved the community by sending out newsletters depicting numeric and visual information about the built environment's impact on health. The effect in the land-use review process is the shift to a health and safety perspective. Even though the relationships may not be causal, the public health participation has clearly influenced the direction of long-term land-use decisions in the Lansing region.

### ***Tri-county Health Department, Colorado***

The expanded role of Tri-county Health Department (TCHD) near Denver, Colorado, moved beyond wastewater and water management and onto physical activity promotion and reduction of vehicle emissions through pedestrian- and bicycle-oriented community design. As a result, the TCHD has been directly involved in preparing one particular county's master plan. The most effective approach in this context was to get involved early in the review process in face-to-face meetings. This was found to be more effective than single appearances at public hearings. Another key element to their approach was ensuring regulatory compliance to promote public health.

### ***San Francisco Department of Public Health***

Led by the objectives of effective collaboration and capacity-building, the San Francisco Department of Public Health has devoted considerable effort in improving the health and safety of urban residents. With particular attention to low-income populations, the department has integrated human health impact in the health impact assessments (HIA) required by California State Law. For example, the health department identified negative health impacts on the community from a luxury high-rise development project, and the city reacted by requiring the developer to fund affordable housing. By making the HIA a collaborative and consensus-building process in urban areas of San Francisco, low-income populations have been empowered in their role in the development process.

### **CONCLUSIONS**

Environmental interventions that promote change in *risk conditions* at the community level have a greater public health impact than attempting to change *risk factors* at the individual level. Environmental strategies more directly related to promoting an active lifestyle involve altering the built environment in which people spend the majority of their time – the community, the workplace, and the school.

This report outlined the current evidence for designing and sustaining the built environment that supports physical activity and other health behaviors. It also identified barriers to collaboration between the fields of public health, architecture and urban planning, and development. Further, the report outlined examples of implementation in both the U.S. and the developing world. Due to the economic, social, political, and cultural realities of developing countries like Brazil, changes in social environment were necessary primary conditions before any modification to the physical environment. Implementation will need customized approaches to the urban-suburban-rural environment, with special attention to the megacities of the developing world. Particularly in fast growing cities of Asia, Latin America, and Africa, there are opportunities for minor policy changes to have tremendous payoffs.

## References

[Part 1 of paper – Sallis section]

**(in a variety of formats)**

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