

Governmental policy opportunities to address the environmental determinants of obesity

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Abstract:

This report identifies promising inter-sectoral policy opportunities to reduce levels of obesity and sedentary lifestyle, and presents criteria for weighing the pros and cons of different policy options. The aim is not to supplant careful, local judgment, but rather to highlight where the most promising policy options may be and to identify potential problems and barriers. Hopefully, guidelines such as those presented here will make these judgments easier, less time-consuming, and ultimately more effective.

When weighing policy options to address obesity it is important to consider: (1) Nexus (i.e. through what pathways is obesity impacted and how good is the evidence?); (2) Population impacted; (3) Reach to high-risk populations; (4) Efficacy and effectiveness; (5) Cost (including cost of implementation and cost/benefit (i.e. ratio of implementation cost-to-health impact)); (6) Challenges to implementation.

Among the over forty policies examined, a few of the more promising inter-sectoral policy options to address obesity and sedentary lifestyle include: (1) Restrictions and relocation of parking spaces to encourage walking and transit use; (2) Increased police patrols and neighborhood watches along walking/biking routes to school; (3) Improved sidewalk and bikelane connectivity, traffic separation, warning lights; (4) Expansion of after-school opportunities for physical fitness activities for youth (other than traditional team-based sports).

Rationale for public policies to control the environmental determinants of obesity

To what extent can government policies help stem the growing health and economic toll of obesity and its underlying causes of unhealthy dietary patterns and sedentary lifestyle? What policies are likely to be most effective? How can policy-makers and the public assess the value and costs of these policies? While some policy options lie within the usual purview of health and public health agencies, policies in other sectors, such as transportation, land-use planning and education may be as, or even more effective. This report examines the case for inter-sectoral action on obesity and sedentary lifestyle, identifies promising policy options, and presents criteria that policy-makers and the public might use to weigh different policy options.

Governmental policies have long been used as a means of improving the public's health by creating healthier environments and encouraging healthier behaviors (Milio, 1981; Tesh, 1988.). Food labeling laws, restrictions and taxes on sales of tobacco products, minimum ages for purchases of alcohol, workplace safety standards, air and water quality standards, and funding of municipal drinking water and sanitation projects are a few examples of the policies that federal, state and local governments have used as a means to protect and improve the public's health. Not surprisingly then, governmental policy is increasingly looked to as a means to address one of the greatest health problems of our time—the epidemic of obesity and obesity-related disease.

For the sake of convenience we use the term “obesity-related” as shorthand to substitute for the constellation of intertwined risk factors, diseases and other health conditions related to patterns of unhealthy eating, sedentary lifestyle, and overweight. Of course, obesity, defined in adults as having a body mass index over 30 kg/m^2 , is just the tip of the iceberg. According to the latest 2003-2004 National Health and Nutrition Examination Survey (NHANES), nearly one-

third of Americans are obese (National Center for Health Statistics, 2007), but many more are overweight, and suffer a host of diseases and disorders that share etiologies rooted in unhealthy eating and insufficient physical activity, including type 2 diabetes, cardiovascular diseases, certain cancers, osteoporosis, precocious puberty, and impaired mobility (CDC, 1996).

Increasingly, public health experts have come to realize that obesity-control interventions that are focused exclusively on individual behavior change have, at best, only modest, short-lived effects and typically succeed in impacting only a narrow, highly motivated segment of the population who are often not those at highest risk (King, 1995). While individual-level interventions have value when utilized appropriately, researchers, advocates and policy-makers working in this field are giving considerable attention to interventions that address changes in the physical and social environment that make it more conducive to a healthier lifestyle. Public health experts now speak about the necessity of changing our “obesogenic” environment (Koplan, 1999; Swinburn, Egger & Raza, 1999). Even many clinical behavior-change, such as KidShape, recognize the importance of changing an individual’s environment as a necessary condition for successful and sustained behavior change.

Policy actions to create environments that support healthier eating and more physical activity involve cooperation across traditional departmental and sectoral boundaries. Whether trying to promote healthier food options in schools, more walkable neighborhoods, or increase opportunities for physical activity in the workplace, public health advocates increasingly find that many of the opportunities to combat the causes of obesity lie beyond the traditional purview of public health and health care agencies.

In the past decade, work has begun in earnest to understand the ways to promote healthy eating and increased physical activity through changes in the physical and social environment,

particularly for populations who are most at risk of overweight, obesity and their related health consequences. Physical and social environments need to be changed in ways that make healthier nutrition and activity choices easier and more appealing for those most at risk. Creating recreational trails that are utilized only by people who already jog and expanding the offerings at farmers markets that are patronized primarily by people who eat healthy diets will do little to stem present trends in obesity and related health conditions.

In this report we identify and discuss policy opportunities that appear particularly promising. There is no single best policy. We caution against taking a ‘one-size fits all’ approach. Some policies might be considered attractive because they are easy to adopt and implement, while others appear attractive because they are believed to have a large potential benefit, or because they seem particularly likely to succeed in addressing issues among high-risk populations. Not only will different policies be more appropriate for different communities and populations, but also different policies are better suited for different levels of government. Obviously, large-scale economic policy, such as agricultural subsidies will be better addressed at a national level, while land-use issues are usually better addressed at the local level. Even when an issue is better handled at a local level, state and federal policy can still play an important enabling role, for instance by providing block grants for local transit projects and operations, or by providing model zoning standards that help create better opportunities for healthier eating and more increased physical activity.

In order to identify public policies to bring down rates of obesity, sedentary lifestyle and related diseases, we need to address three questions:

- (1) Through which levers can public policy effectively bring about change?
- (2) In what sectors can government policy bring about change?

(3) What criteria should be used to prospectively judge policy options?

Before exploring specific policy options we will briefly discuss these three questions. Not only do they guide our own examination of policy options to control obesity and sedentary lifestyle, but they can also help generate new, creative policy options beyond those considered here.

Public policy levers to effect change

When most people think about government efforts to address obesity and sedentary lifestyle they typically think in narrow terms about government mandates, such as food labeling requirements or bans on smoking in public places. Critics refer to these as actions of a “nanny state” (See http://en.wikipedia.org/wiki/Nanny_state). Whether one agrees with this characterization or not, it is important to acknowledge that people chafe at being told what to do, especially when it involves personal practices that are valued traditions or sources of enjoyment, and all the more so when the directive is coming from government. We will take it as given that there is a compelling need for government involvement, but we can agree with critics’ sentiment that such approaches can come across as an unwarranted government intrusion into areas of personal discretion. In addition to any ethical concerns, from a practical viewpoint strong-handed approaches may trigger resistance to the uptake of healthier behaviors, particularly among those who are at highest risk, and fuel resentment that makes it difficult to promulgate other obesity-control policies. While mandates are sometimes necessary, there are many means through which government can influence change. Government policies can also influence individuals and organizations by penalizing unhealthy practices, rewarding healthier practices, cajoling and communicating, funding and building. Sometimes how these methods are classified will depend on the eyes of the beholder; for instance, a tax credit may be seen as a reward for

someone who receives it, while it is seen as a penalty to someone to whom it is denied. Some of the public policy levers useful to obesity control include:

- (1) *Tax relief* (e.g. tax credits for landlords (or employers) who provide physical activity facilities for residents (or employees));
- (2) *Tax penalties and surcharges* (e.g. taxes on high sugar beverages, surcharges on employer-provided parking spaces);
- (3) *Building* (e.g. wider, more pedestrian-friendly sidewalks, more extensive transit systems);
- (4) *Funding* (e.g. farm-to-school programs to bring fresh fruits and vegetables into schools, agricultural subsidies for fresh fruits and vegetables);
- (5) *Communicating* (restaurant menu nutrition information and labeling);
- (6) *Model standards* (e.g. zoning for increased non-motorized mobility and physical activity);
- (7) *Mandates, required standards* (e.g. minimum minutes of P.E. instruction and physical activity in P.E., open access stairwells with minimum lighting and aesthetic requirements in multi-floor buildings);
- (8) *Relief from existing laws that have unhealthy consequences* (e.g. parking space requirements for retail establishments, acreage requirements for new schools).

Sectors

Effects in some sectors may be more far-reaching, but every sector can help—even the military.

Some sectors may be more interested in partnering with public health agencies to address obesity and sedentary lifestyle. For instance, land-use planners have demonstrated a great deal of interest in partnering with public health. However, public health advocates cannot expect all sectors to see the value of supporting a public health agenda. It is incumbent on public health advocates to learn about other sectors and frame policy proposals that further health promotion in

a way that other sectors see value in terms of their own agendas. Sectors where we see obvious opportunities for collaboration in developing policies to control obesity and related risks include:

- Communications/media
- Food and agriculture
- Housing
- Parks and recreation
- Planning/Land-use
- Public health
- Public safety
- Tax policy
- Transportation

Specific policy examples for each of these sectors are evaluated later in this report.

Criteria for judging policy options

A number of different researchers have created criteria for comparing community-level physical activity, nutrition and related interventions (Blumberg, 2003; Finkelstein et al, 2004, James et al, 2005; Jha et al, 2001; Lightwood, 2003; Pavlovich et al, 2004; Summerbell et al, 2006; Tengs, 2004; Tsai et al, 2005; Wang et al, 2003; Weightman et al, 2005). For our present purposes we offer a very abbreviated list of issues for policy-makers and the public to consider when weighing inter-sectoral policy options to address obesity:

- 1) *Nexus* (i.e. through what pathways is obesity impacted and how good is the evidence?);
- 2) *Population impacted*;
- 3) *Reach to high-risk populations*;
- 4) *Efficacy and effectiveness*;
- 5) *Cost* (including cost of implementation and cost/benefit (i.e. ratio of implementation cost-to-health impact));

6) *Challenges to implementation.*

Nexus (pathways and evidence);

There are multiple pathways through which the policy levers available to government can influence the social and physical environmental factors that shape patterns of eating and physical activity. Sometimes the pathways linking the policy and health goals are obvious, such as restricting sales of sugary beverages, sometimes less obvious, such as creating fewer parking spaces and making them more expensive. These pathways and the relevant evidence need to be communicated to policy makers and the public in order to make informed decisions. Evidence on the potential effectiveness of environmental change strategies to control obesity tends to come from the frontiers of existing knowledge, not well-established bodies of research, evidence may be lacking, inconsistent or controversial, particularly for policies that are not purely public health interventions, such as promotion of mass transit. This does not necessarily mean that no action should be taken. In determining medical practice guidelines insufficient evidence of intended effects and mixed evidence will all lead to a conclusion that the intervention in question should not be utilized, which is in accord with the medical dictum “first do no harm.” In the realm of public policy, however, policies are being made every day for a variety of reasons that may or may not be related to public health goals. Inaction on the part of public health advocates due to less than conclusive evidence can often be tantamount to doing harm. Of course more studies are always needed, but we also need to recognize that the complexity and uncertainty around understanding the direct and indirect effects of new policies is usually not mere ignorance that will be remedied by a few more research studies. Obviously then, the standards for judging evidence for these policies will need to be more flexible, holistic and subjective than standards

typically employed in evidence-based reviews of planned interventions, such as those developed for planned interventions in medicine (e.g. The Cochrane Collaboration (<http://www.cochrane.org>)), public health (e.g. the Task Force on Community Preventive Services (<http://www.thecommunityguide.org>)), and other social services (e.g. The Campbell Collaboration (<http://www.campbellcollaboration.org>)).

Population impacted

Obesity, unhealthy eating and sedentary lifestyle are seen in all demographic groups: young and old, male and female, urban and rural, rich and poor, and all ethnic groups. Of course, some groups are at greater risk and should receive special attention, however, virtually all population groups could benefit from policies to control obesity. Advocates need to clarify which population groups will be most impacted by policies. For instance, expanded mass transit will generally differentially benefit the poor, the young and the elderly. Middle income and middle age individuals could make use expanded transit but are generally less likely to be users. On the other hand, rural residents would almost certainly not be able to benefit from expanded transit service.

Reach to high-risk populations

How effective is the policy in reaching high-risk populations (i.e. populations with a high prevalence of poor nutrition, sedentary lifestyle or obesity-related disease)? Is it efficient and equitable or is there a trade-off (see Blumberg, 2003; James et al, 2005) of one in favor of one in favor of another? Many policies that hinge on expanded access to healthy foods and place for recreational physical activity are problematic since they are likely to attract motivated

individuals who already have healthier behaviors. The key is to augment access with programs that encourage utilization by high-risk individuals.

Efficacy and effectiveness

‘Will it be effective?’ is a simple, reasonable question to ask of a policy proposal that has complex, multiple answers. Wrapped together in the concept of effectiveness are multiple issues of efficacy and effectiveness, intended and unintended effects, likelihood and magnitude.

‘Efficacy’ refers to the impact in a target or trial group, while ‘effectiveness’ refers to the impact in a population. If evidence of a policy’s potential effect is available, it is often a measure of efficacy derived from a small pilot study, not a measure of effectiveness in a large population. Crossing over into other policy sectors, effects on public health are likely to be considered secondary effects. Secondary effects can be either positive (e.g. increased walking resulting from a crime control campaign) or negative (e.g. less walkable neighborhoods resulting from transportation policy that maximizes vehicle flow). While virtually all quantitative studies report measures of association, information on the strength of association says nothing about effect size (Lightwood, 2003). Measures of effect size, such as odds-ratios and risk ratios, are reported much less frequently, yet they are crucial for any projection of policy effects. Ideally, effect size information is available for a range of “exposures” and for different population groups.

Cost

Decision-makers need information about the estimated cost of a policy proposal, their distribution (i.e. who bears these costs) and the value of benefits relative to cost. Even if a

proposal is considered highly valuable, perhaps even cost-saving, high total costs may make a policy impossible to implement.

Various measures have been developed to measure the value and efficiency of investment relative to benefit, including “intervention efficiency ratio,” “cost-effectiveness,” “cost-utility,” and “return on investment (ROI), however these are problematic when applied to assessing benefits that fall outside the bounds of the primary rationale for a project or policy. For instance, if streetside pedestrian infrastructure is enhanced in order to improve safety and one is examining potential effects on physical activity, it would be improper to use all the costs of the project in calculations of the project’s cost effectiveness as an intervention to improve physical activity. Sometimes there are clearly defined marginal costs related to implementation of specific health-promoting components, such as the cost of building a road versus the cost of building a road with pedestrian amenities that make it highly walkable. Usually, however, parceling out marginal costs related to health promotion of policies in other sectors will be a matter of judgment.

In our table we have combined rough estimate of the magnitude of implementation cost (categorized high, moderate, low) with an estimate of potential benefits (categorized high, moderate, low). Note that the ratio of cost-to-benefit can be high either when the total cost is high or when the expected benefit is small.

Challenges to implementation

What are the special challenges to implementing the policy? Is it technically and politically feasible? To a large extent political feasibility will depend on the unique characteristics of each locale and time, however some general statements can be made regarding challenges that are likely to be seen in most situations. Due to differing missions and constituencies, inter-sectoral cooperation will always be a challenge. It is important for public

health advocates to understand how the mission and constituencies of their agency partners differs from their own.

A frequent challenge that should be anticipated is encouraging utilization and participation by those individuals who are at highest risk of obesity and physical inactivity. Public investment in these interventions will yield little public health benefit, if the only people who make use of facilities and programs are those who already practice patterns of healthy eating and physical activity. Realization of the potential benefits of policies in other sectors, especially infrastructure projects, will often require complimentary outreach and promotion programs.

Assessment of potential policies to control obesity

In the table below we have given our assessment of this information for several dozen policies in nearly a dozen different sectors. The aim is not to supplant careful, local judgment, but rather to highlight where the most promising policy options may be and to identify potential problems and barriers for less promising policies. Due to uncertainty, ambiguities and trade-offs, such as the trade-off between equity and efficiency (Blumberg, 2003; James, 2005), gauging information about policy effects will always involve judgment. Hopefully, guidelines such as those presented here will make these judgments easier, less time-consuming, and ultimately more effective in making progress in reducing the burden of obesity and related conditions on the health of the public.

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Table 1: Assessment of potential obesity-control policies by sector

POLICY EXAMPLES	Nexus	Impacted Populations	Reach to High-Risk Populations	Cost-to-Health Impact Ratio ^{1,2}	Implementation Challenges
Communications/Media					
Restrict outdoor advertising of unhealthy foods and beverages around parks and schools	Reduce consumption of unhealthy foods and beverages.	General, esp. children	High	Moderate ² (costs to government mostly indirect, e.g. lost revenue from ad space leases)	Legal: 1) Constitutional limits on regulation of advertising, esp. content. May be less difficult to simply restrict all billboards, 2) Limited ability to eliminate existing billboards means that billboards are likely to persist in older communities (where the poor are concentrated) Effectiveness: Likely to have little or no impact on behavior unless part of a comprehensive healthy eating campaign.
Restrict TV advertising and other media advertising of unhealthy foods and beverages.		General, esp. children	High	Moderate ²	Advertising guidelines are regulated by the Federal Communications Commission (FCC) & many restrictions already in place. Further restriction to total ban on advertisement difficult to achieve due to Industry pressure. Likely to have little or no impact on behavior unless part of a comprehensive healthy eating campaign.
Public education campaigns to promote health eating and physical activity via various media outlets such as TV, internet, print, etc.	Encourage healthy eating and physical activity	General, esp. children	High	High ²	Likely to have little or no impact on behavior unless part of a comprehensive healthy eating campaign.
Education					
Support for daily physical education classes at all grade levels	P.E. offers a great, but under-utilized opportunity for daily physical activity. It can also build interest and self-efficacy in physical activity.	School age children, esp. elementary school (where PE quality is often poor)	Good	Low	For large, population-level change it is essential that P.E. engage all children, not just the most physically adept, in moderate-to-vigorous physical activity for a substantial portion of the PE period. This will require monitoring and teacher training.
Expansion of after-school opportunities for physical fitness activities for youth (other than traditional team-based sports)	Non-sports after-school programs offering tutoring and after-school supervision when parents are working can add PA sessions to get kids active and encourage enjoyment of physical activity	Low-to-middle income youth whose parents work outside the home	Fair-to-good, depending on the community and targeting	Low	Importance of structure and supervision in order to ensure that PA sessions actually take place and that sedentary kids participate.

POLICY EXAMPLES	Nexus	Impacted Populations	Reach to High-Risk Populations	Cost-to-Health Impact Ratio ^{1,2}	Implementation Challenges
Funding and regulations for healthy school lunches and breakfasts	Depending on the age of students and access to off-campus foods during the school day, school foods may make up a substantial portion of students' daily nutrition. Increased knowledge of healthy eating patterns and familiarity with healthier food options at school can also influence family food choices at home.	Low income students, esp. elementary age	good	Low	Students may decline healthier food options at school in favor of unhealthier options out-of-school, thus minimizing dietary change. Still, these policies may serve an important educational function.
Restrictions on snack food and soft drink sales in schools		School age children	Fair	low	
Comprehensive, on-going nutrition education		School age children	Fair	Low-to-moderate	
Promotion of walk-to-school programs	Potentially low-cost opportunity for daily physical activity with additional social and educational benefits.	School-age children, esp. elementary schools where the catchment area is small	Low	Low-to-high (depending on whether pedestrian infrastructure is in place)	Potentially easy to implement, but resistance may be encountered from parents concerned about their children's safety and school officials concerned about student tardiness. Effectiveness and safety contingent on having good pedestrian infrastructure in place. Additional infrastructure may greatly increase costs, although many spillover benefits.
Liability protection to facilitate establishment of joint-use agreements to allow community use of school facilities during after school hours.	In communities with few parks or other public recreational facilities, opening up school facilities for public use during non-school hours can provide a vital opportunity for physical activity	Probably those most inclined towards PA (esp. sports) in under-resourced communities	Low-to-good, depending on outreach and promotion to encourage PA among sedentary	Low-to-moderate	Potential resistance from liability lawyers. Under current law there may be little true liability risk, but passage of additional laws can help clarify.
Food and Agriculture					
Promotion of farmers' markets	Promoting farmers markets (e.g. though WIC) provides access to fresh fruits and vegetables, particularly in areas where options for nutritious foods are scarce.	General	Fair- dependent on the promotion of the farmers' markets	Low to Moderate	Evidence shows that vulnerable populations require education and/or financial incentives to initiative shopping at farmers markets. Farmers markets often require infrastructure and certainly require farmers willing to supply food.
Promotion of community gardens	Increase social capital in community, increase access to healthy fruits and vegetables and reduce hunger	General	Fair- dependent on the promotion of the community garden	Low to Moderate	Creation of community gardens is not sustainable without the support of a program to promote its use. Requires land and supplies (crops, etc).
Expanded/modified nutrition labeling of packaged and unpackaged foods	Encourage healthy eating	General, esp. middle-higher income	Low	High	Strong lobbying against this provision is likely from the food manufactures/distributors due to high cost to label packaged and unpackaged goods for sale. Must elicit buy-in, support and enforcement of new provisions from FDA.

POLICY EXAMPLES	Nexus	Impacted Populations	Reach to High-Risk Populations	Cost-to-Health Impact Ratio ^{1,2}	Implementation Challenges
Crop subsidies for fresh fruits and vegetables to make them more affordable	Current food system (including subsidy system) favors production and sale of highly processed, calorically dense foods. Changing the current regime of agricultural subsidies to favor fresh fruits and vegetables would make them cheaper and increase their consumption.	General	Fair	Moderate ²	Theoretically, making healthier foods cheaper and less healthy foods more expensive could improve consumption patterns, but: 1) Subsidizing production of fresh fruits and vegetables may do little to change consumer prices, since marketing, distribution and transaction costs make up a large portion of consumer prices. 2) Although subsidies of corn, sugar, soy, etc. helped create the current food system, changing subsidies will not necessarily undo this system.
Housing					
Tax credits for apartment building owners to provide and maintain physical fitness facilities	Encourage active living by providing access to physical activity opportunities in residential communities.	General, esp. lower income since they make up a disproportionate number of apt. dwellers	High	Low-to-high depending on preexisting PA facilities in the community, as well as adjuncts to encourage utilization of facilities by sedentary individuals	Important to target to those under-resourced communities and neighborhoods where the need is greatest. Also challenging to determine the amount of tax credit that will be sufficient to induce landlords to put in facilities.
Financial incentives (e.g. tax credits) to housing developers who include physical fitness facilities, walking trails, parks, and other amenities that promote physical activity into housing development plans.		General, esp. children	Low	Moderate-to-high (see note above)	
Transit-oriented development	(see Planning/Land-Use)				
Parks and Recreation					
Expansion and maintenance of parks and recreation facilities	There is increasing evidence that utilizing park and recreational services has a positive relationship on health. Studies show that the majority of park users are physically active during their park visits.	General, esp. poor, children, elderly	High	High	Opposition to the implementation of additional parks include: a fear of potentially unwanted or illicit activities – loitering, vandalism, graffiti, etc.; liability concerns, and increased costs for facility maintenance or personnel. In addition, the quality and quantity of space for physical

POLICY EXAMPLES	Nexus	Impacted Populations	Reach to High-Risk Populations	Cost-to-Health Impact Ratio ^{1,2}	Implementation Challenges
Liability protection to facilitate establishment of joint-use agreements to allow community use of school facilities during after school hours.	Communities with few parks or public recreational facilities could expand access by opening up school facilities for public use	Youth and young adults in park-poor areas	Good reach to lower income, poor reach to sedentary	Low	activity at school sites may be low in communities that have few parks or other recreational facilities, thereby limited the added benefit of opening up schools to after-hours use.
Planning/Land-Use					
Anti-sprawl tax measures, zoning	Policies that shape the built environment can be used to reduce automobile travel; e.g.- residents of neighborhoods with mixed land uses and pedestrian-friendly designs tend to travel less by car and use more non-motorized travel, such as walking and cycling	General pop.	Low	Low	Some argue that anti-sprawl measures limit choice and opportunity. In addition, the associated taxes and fees increase housing costs and reduce home ownership, particularly for minorities. Many are still hesitant to invest in something, "new".
Development & integration of scenario planning tools		General pop	Low	Low	
Parking	Measures that rely less on an individual's initiative to be more physically active, such as semi-distant parking spaces, may have greater population impacts than initiatives dependent upon a person's volition.	General, esp. poor and children	High	Low- even relatively small changes in physical activity can translate into potentially large changes in weight trends at the population level	Measures that "push" people to become more physically active may be considered inconvenient, uncomfortable and an inefficient use of space and resources. Parking measures may deter customers, or employee from patronizing or working at establishments that support such initiatives.
Public Transit	Public transit is associated with greater physical activity compared to automobile use. Studies suggest that mass transit may be the solution to increase walking and thus physical activity of populations.	General, esp. poor, children, elderly	High	High	Skeptics believe that outside the metropolitan downtown district, very little can be done to reduce traffic congestion. Additionally, they believe that public transportation will never be able to contend with the convenience of the automobile.
Public Health					
Restaurant nutrition labeling/rating	There is a growing body of literature emphasizing the importance of education and environment in food choices. Measures that provide nutrition education in an easy format can facilitate better decision making.	General	High	Moderate	Opposition from restaurants. High administrative costs to implement these changes requiring ample resources and manpower to implement rating systems.

POLICY EXAMPLES	Nexus	Impacted Populations	Reach to High-Risk Populations	Cost-to-Health Impact Ratio ^{1,2}	Implementation Challenges
Restaurant full disclosure requirements (if foods exceed specified fat/sugar/caloric density thresholds)	Measures providing consumers with information on food choices can alter decisions they make. Additionally, full disclosure requirements may facilitate restaurants to make modifications to menu items exceeding specified thresholds.	General	Low-Fair	Moderate	High administrative costs to implement these changes. Resistance from restaurants is likely. Some consumers might not understand caloric density, fat, sugar threshold measures.
Zoning/ Moratorium on fast food restaurants	Many community organizations working in low income areas in Los Angeles are interested in changing zoning laws to limit the amount of fast food restaurants in low-income communities. Research shows that availability of fast food restaurants encourages consumption of non-nutritious foods	General, esp low-income	Fair-High	High (Magnitude High)	Very difficult to impose and change zoning laws. Violates economic principles of supply and demand- fast food chains will continue to open in areas with consumer demand. Also, raises issues of fairness since food selections at sit-down restaurants are not necessarily healthier (just more expensive).
Public Safety					
Improved community safety (policing, lighting, etc.) in parks and recreation facilities	Encourage recreational activities, physical activity.	General, esp. poor, children, elderly	High	Low to Moderate	Unlikely to affect the behavior of highest risk individuals, unless complimented by outreach and other promotion activities.
Improved safety (lighting, shelter, etc.) at transit stops	Encourage the use of public transit/ active commuting.	General, esp. poor, elderly	High	Low to Moderate	Although costs may not be large, they may be a significant obstacle in communities with a poor tax base. State funding could help overcome this obstacle. Will not affect behavior unless there is a well developed transit system in place.
Increased police patrols and neighborhood watch along walking/biking routes to school, esp. just before/after school.	Encourage walking to school for children in neighborhoods where safety concerns inhibit walking to school.	Elementary, school-age children, esp. in lower income neighborhoods	High	Low to Moderate	Easy to implement. Spillover benefits include crime reduction, possible increases in neighborhood economic activity and social capital.
Tax policy					
Tax incentives for participation in physical activity	Financial rewards promote physical activity behavior.	General	Low	Low (low cost, modest to high impact depending on the \$ rewards)	Unlikely to affect the behavior of highest risk individuals, unless complimented by outreach and other promotion activities. May be unfair to those individuals who due to environmental and time constraints are less able to engage in additional physical activity.

POLICY EXAMPLES	Nexus	Impacted Populations	Reach to High-Risk Populations	Cost-to-Health Impact Ratio ^{1,2}	Implementation Challenges
Tax on high caloric density and high fat foods and beverages	Financial disincentives to consume goods that are high in calories, fat, and low in nutritional value.	General, esp. poor, children	High?	Low (low cost, low/modest impact)	Regressive taxation hurts poorer individuals who spend more of their limited income on food.
Tax on total annual vehicle-miles driven	Financial disincentives to use the car for transportation. Encourages active transport.	General	Low	Low (low cost, low/modest impact)	Though higher-income commuters are more likely to be affected by the tax, the burden of this tax is higher on low income commuters as this tax is also regressive.
Tax on gasoline		General	Low	Low (low cost, low/modest impact)	
Transportation					
Development of more attractive mass transit options	Encourage active transport options, esp. walking and biking as part of daily routine. Since transit usage is associated with increased walking, better, more attractive transit can also increase daily PA.	General, esp. poor, children, elderly	High	Very High	High costs require political will to prioritize transit funding
Expanded sidewalks and bikelanes		General, esp. poor, children, elderly	High	High	Added benefits of safety and improved access for individuals with limited mobility can generate support
Improved sidewalk and bikelane connectivity, traffic separation, warning lights		General, esp. poor, children, elderly	High	Low to High	
“Complete streets” design requirements for street projects		General, esp. poor, children, elderly	High	High	
Expanded recreational walking and biking trails		General	Low	Very high	If right-of-way is not already publicly owned, trails may entail high costs relative to the limited user base. If trails connect places people want to go (e.g. residences and shopping) then user base (and potential benefits) will be expanded
Workplace					
Promotion of transit use and active commuting through incentives (e.g. and disincentives (e.g. parking space taxes)	Employers and local govt can encourage commuting by transit, which is associated with more physical activity than commuting by auto.	Working pop. in urban areas well-served by transit	Fair	Low (but contingent on feasibility of alternatives to commuting by auto. See notes right)	Effectiveness is contingent on the feasibility of alternative modes of transport to work, i.e. transit access and/or proximity of worksite to workforce residences.

POLICY EXAMPLES	Nexus	Impacted Populations	Reach to High-Risk Populations	Cost-to-Health Impact Ratio^{1,2}	Implementation Challenges
“Point-of-decision prompts” (e.g. signs at elevators suggesting use of stairs)	Elevator trips in office buildings are a wasted opportunity for workers to engage in routine physical activity	Office workers in urbanized areas with high-rise building	Low-to-moderate, depending on ancillary physical activity promotion activities	Low-to-moderate ²	Fairly easy to implement, but increased PA likely only if prompts are accompanied by changes in facilities to make them more appealing, and supportive social norms and organizational practices.
Employer incentives (e.g. tax credits) to provide opportunities for physical activity in the workplace	Workers with limited time or access to gyms could use facilities at workplaces during breaks and before/after work	Lower income workers, appeals mostly to already active/motivated workers	Low	Moderate-to-High. ² Facilities may attract only workers who are already active	Without special provisions to support uptake at worksites with high numbers of high-risk workers, these incentives will probably only benefit higher-income, higher level workers. Even then, there will be challenges to ensuring utilization by sedentary workers

NOTES

¹ Ratio of implementation cost-to-health impact is relatively high due to the high cost of implementation

² Ratio of implementation cost-to-health impact is relatively high due to the likelihood of only a small average impact