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Structural Interventions for Addressing Chronic Health Problems

Mitchell H. Katz, MD

THE CHRONIC HEALTH PROBLEMS OF OBESITY, DIABETES, heart disease, and cancer commonly affect adults living in developed countries and are both difficult to treat and costly, leading experts to stress the importance of prevention.¹ Elimination of the 3 behavioral risk factors of sedentary lifestyle, poor diet, and smoking would decrease mortality by 35%.² But how do we get individuals to exercise more, eat better, and stop smoking?

Health education has been effective in diminishing these risk factors, especially smoking, but education alone is unlikely to bring further progress. In fact, it would be difficult to find a sedentary obese smoker who did not know that he should exercise more, eat less, and stop smoking.

Intensive one-to-one and group behavioral interventions have been demonstrated to increase activity,³ reduce obesity,⁴ and promote smoking cessation,⁵ but effects have been modest and difficult to maintain. Moreover, translating these findings into practice has been hampered by insufficient funding and difficulty reaching those persons in greatest need.

Structural interventions offer a complementary approach to improving health by focusing on changing the physical, social, and economic environment.⁶ The interventions are structural in that, unlike individualized interventions, persons do not enroll or even know that they are participating.

Structural interventions are not a new idea. The increase in longevity that occurred in the early 20th century was largely due to physical improvements in the environment (eg, sewage treatment) and at work sites (eg, safer equipment). Other successful structural interventions include seat belts in cars, road safety standards, elimination of toxins such as lead in paint and gasoline, and water fluoridation. What is new, and potentially more challenging, is the use of structural interventions for chronic diseases.

Structural Interventions to Increase Physical Activity, Improve Diet, and Decrease Smoking

A nonexhaustive list of structural interventions to increase activity, improve diet, and decrease smoking appears in

the TABLE. Structural interventions can be accomplished in a variety of ways including zoning regulations (designing urban neighborhoods with retail services and public facilities proximal to homes), building codes (eg, widening of sidewalks), infrastructure improvements (eg, creation of walking trails within parks), institutional practices (eg, removal of vending machines from schools), certification authority regulations (eg, smoke-free hospital standard of the Joint Commission), insurance benefit provisions (eg, no co-pays for smoking cessation products), tax incentives and disincentives (eg, excise tax on cigarettes), and laws (eg, ban on smoking in restaurants).

Effectiveness of Structural Interventions

Data on the effectiveness of structural interventions for chronic diseases are limited for 2 major reasons. First, the use of structural interventions for chronic diseases is relatively new. Second, structural interventions are implemented where and when political will exists⁷; it is therefore often difficult to identify an appropriate control group. Also, preintervention vs postintervention comparisons are challenging because of the dynamic nature of communities.

Nonetheless, after conducting a systematic review, the Task Force on Community Preventive Services⁸ concluded that there is strong evidence for the effectiveness of (1) improving access to places for physical activity, (2) enhancing school-based physical education classes, (3) excise taxes on tobacco, (4) public smoking bans, and (5) reducing patient co-pays for smoking cessation products. The task force also concluded that there is sufficient evidence for the effectiveness of (1) urban design to increase exercise by improving the physical environment, (2) point-of-service signs for increasing activity, and (3) restricting minor access to tobacco products when accompanied with community mobilization. For the other interventions listed, the available evidence is not sufficient to conclude that they are effective.

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Table. Examples of Structural Interventions to Increase Physical Activity, Improve Diet, and Decrease Smoking

	Type of Intervention
Increase physical activity	
Increased access to places for physical activity (eg, walking trails in parks)	Infrastructure
Enhanced school-based physical education classes	Institutional policy
Urban design of neighborhoods with proximity to retail, schools, and recreation areas	Zoning regulation
Point-of-service signs to increase stair walking	Institutional policy
Street closures	Institutional policy
Widening sidewalks	Building codes
Bicycle paths	Urban design, transportation regulations
Creation of bicycle parking	Institutional policy, building codes
Bicycle racks on trains and buses	Institutional policy, transportation regulations
Car, road, and fuel taxes	Tax
Improve diet	
Ban on use of <i>trans</i> fatty acids in restaurants	Law
Menu labeling in restaurants	Law
Removal of vending machines in schools	Institutional policy
Adding salad bars at schools	Institutional policy
Incentives for putting supermarkets in neighborhoods	Zoning regulation
Creation of farmers' markets	Institutional policy
Limitation on advertising of high-caloric, low-nutrition foods directed at children	Law
Tax on high-caloric, low-nutrition foods	Tax
Decrease smoking	
Tobacco excise tax	Tax
Public smoking bans	Law
Reducing co-pays for smoking cessation products	Insurance benefit provision
Youth restrictions on smoking	Law
Stings on stores selling to minors	Institutional policy
Requirement of licenses to sell tobacco	Law
No sale of individual cigarettes	Law
No sale of tobacco at pharmacies	Law
No smoking in hospitals	Certification authority

Cost of Structural Interventions

One reason for the increased interest in structural interventions by local governments is that some may produce health benefits at low cost to the government. For example, structural interventions that require only changes in policies (eg, removal of vending machines) or enactment of laws (eg, tobacco bans) may cost little to enact. Some costly interventions (eg, infrastructure improvements) can be charged to developers of large land

projects. Some structural interventions may increase revenue (eg, excise taxes) to governments.

Although they may cost little to the government, some interventions will increase costs to consumers (eg, excise tax) or the producer (eg, higher cost of housing developments).

Challenges in Implementing Structural Interventions

Despite their low cost to government, many structural interventions (including those with strong supporting evidence, such as tobacco excise taxes) have not been widely implemented or have been implemented only in scattered localities (eg, bans on use of *trans* fatty acids in restaurants).

There are several impediments to implementing structural public health interventions. First, there is a large gap between the researchers and practitioners who are interested in structural interventions and the policy makers who have to implement them. Policy makers may have little understanding of the structural (physical, social, economic) determinants of health or how structural interventions could improve health. Based on their own experiences, they may feel that other solutions (eg, joining a gym) are better, not recognizing that some may not have the time or money to pursue this option.

Elected officials may also fear protests from businesses or other interest groups. For example, the tobacco industry has fought bans and the restaurant industry has opposed menu labeling laws.

Even within government it may be difficult to harness the different disciplines necessary to implement structural interventions (ie, urban planners, transportation experts, engineers, economists, and health planners) because these professionals typically work in different departments with different missions.⁹

Progress on structural interventions is also impaired by the disconnect between those who pay for health care services and those who implement structural interventions to reduce illness. For example, the Medicaid program would benefit financially from structural interventions in the areas of exercise, diet, and smoking given that low-income individuals have fewer outlets for physical activity, inadequate fresh food choices, and higher smoking rates.² However, Medicaid requires that their dollars be spent only on Medicaid recipients thus excluding community-wide interventions.

Moreover, despite the success of the law for improving public health,¹⁰ use of the law to influence individual behavior remains controversial; some believe that it undermines personal responsibility. Although, increased acceptance of smoking bans suggests that public support of restrictive laws has grown, much of the antitobacco movement has been propelled by concerns about secondhand smoke. In contrast, sedentary lifestyle and poor diet do not have negative effects on the health of others.

Methods of Increasing Adoption of Structural Interventions

Broader implementation of structural interventions will require that a segment of the government take responsibility for convening discussions between researchers, practitioners, advocates, and elected leaders on promising interventions. Local public health departments are a logical choice for this role because they have expertise in implementing policy changes and are often viewed as trusted health experts by the public, but they will need additional resources and political clout to take on this role.⁷

Conclusion

A potential criticism of classifying the interventions listed in the Table as structural interventions is that the interventions are so disparate that the term is meaningless. However, this critique misses the commonality underlying these interventions: changing individual behavior by changing the environment. This perspective not only differs from that of most clinical interactions, but it also differs from other public health approaches to behavioral change (eg, media campaigns to eat more vegetables). Focusing on environmental (rather than individual) change should help to encourage development and research of structural interventions, and broader implementation of those that have been shown to be effective.

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