

# Preventing Diabetes

Diabetes is a significant public health problem; nearly 21 million Americans have the disease, including one in five people age 60 or older<sup>1</sup>. Health care for people with diabetes costs an average of \$10,000 annually, totalling over \$100 billion<sup>2</sup>.

Public health practitioners know how to prevent Type II diabetes; people need to lose weight and become more physically active<sup>3</sup>. There is no question that adopting a healthier lifestyle will significantly decrease a person's risk of diabetes, along with a host of other diseases. Unfortunately, interventions that promote physical activity and healthy diets have been largely ineffective at producing long-term behavior change.

Eating and physical activity are complex behaviors, influenced by a host of competing factors. To combat the diabetes problem, a piecemeal solution will not do. Instead, public health needs a systems solution, one that is sensitive to the means by which individual choices are made. So what is currently keeping people from being healthy?

## ***Healthy Eating***

Thinking about lifestyle decisions in terms of costs to individuals yields a useful framework for action planning. For instance, inexpensive, energy-dense fast food is readily available and requires a minimal time commitment to acquire. Fruits and vegetables have a relatively low-energy-density, can be expensive to purchase, and take time to prepare. It is not surprising that the unhealthy options win out. The systems framework, however, makes it easier to organize what needs to be done.

Lower the price of fruits and vegetables and raise the price of processed food by revising agricultural subsidies, to stimulate fruit and vegetable production and reduce that of corn and soy. Raise taxes on restaurant menu items that do not meet minimal nutritional requirements. Allow Medicaid reimbursements for nutritional counseling by health professionals.

Make healthier food options more accessible by improving food distribution to disadvantaged communities.

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## ***Physical Activity***

- o Invest in infrastructure to decrease the costs associated with travel by foot or bicycle.
- o Improve public transportation systems, such that bus and train stops are within walking distance of most residences.
- o Increase gasoline taxes and parking fees, to discourage unnecessary driving.
- o Revise building codes to require windows in stairways in buildings with elevators, to make stairway use a more attractive option.
- o Encourage employers to offer flexible scheduling options to workers, to make it easier to schedule leisure-time activity.

## ***Healthy Eating***

- o Repeal farm subsidies that promote excessive surpluses of corn and soy.
- o Increase availability of quality fruits, vegetables, and other healthy foodstuff in disadvantaged urban and rural communities.
- o Restrict availability of foods of minimal nutritional value from schools, and incentivize workplaces to do the same.
- o Work with local governments to pass laws and ordinances banning unhealthy food products such as trans-fats from restaurants.
- o Incentivize restaurants to change menus, such that a majority of food offerings meet standards for portion size and nutritional value.

## ***Changing Social Norms***

- o Disallow product placement contracts for food products in G-rated movies and youth-targeted television shows.
- o Institute minimal nutritional requirements for food products that license children's television or movie characters.
- o Fund research projects to test interventions to influence social norms.
- o Investigate how interventions using "new media" like social networking websites or text messaging technology can impact normative behavior.

## The Principle of Least Action

The Principle of Least Action is fundamental to the study of systems, and was known as early as the 18th century. In 1744, French mathematician Pierre Louis Moreau de Maupertuis wrote “Nature always acts in the simplest possible manner to produce its effects.” In other words, systems always evolve on paths that minimize the energy expended.

The same principle can be applied to human decision-making about diet and exercise. Every action has a cost, and people are programmed, in a very real sense, to minimize the costs required to obtain food and procreate. There is no advantage, evolutionarily speaking, to the expenditure of energy that does not go directly towards one of these goals. There are other factors that influence these decisions as well (Figure 1). Time is a concern, with a preference given to actions that take less time. Money is another important factor; people’s choices are limited by available funds. And humans are social creatures, subject to pressures to conform to social norms. Costs associated with not being compliant include physical stress and the risk of being shunned by peers.

Make unhealthy options less accessible by restricting vending machine options in school, instituting closed campus policies to keep students from fast food restaurants, and enacting local ordinances discouraging the construction of new restaurants with drive-thru windows. Pass laws to ban restaurants from using trans-fats.

Work to shift social norms about eating unhealthy food. Ban payment for product placement of food items in children’s television shows and movies, and restrict licensing deals to keep popular television and movie characters off food products that do not meet minimal nutritional requirements. Promote nutrition programs and community gardens through churches and social organizations. Encourage schools, worksites, and organizations to provide healthy foods at gatherings.

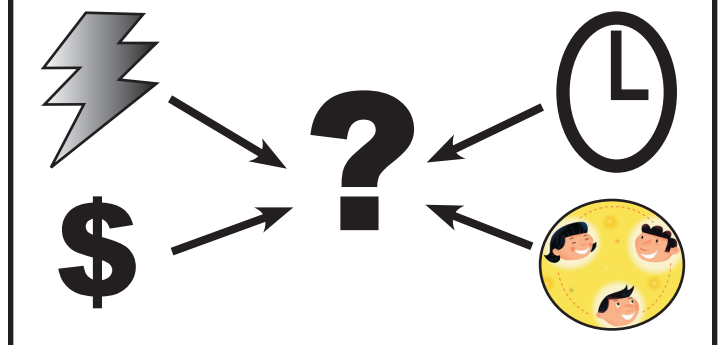
### Physical Activity

Roads and sidewalks may be unsafe for walking or bicycling to work or school. After daytime obligations, few leisure hours may be left in the day; leisure-time physical activity must compete with other priorities. Driving saves times, while walking can take substantially longer. If no safe walking areas exist nearby, people must travel elsewhere, buy a gym membership, or purchase home exercise equipment in order to remain active. Activity is also influenced by family and friends. Friends may get together to play video games or to play basketball.

Increase gasoline taxes, tolls, and parking fees to discourage driving. Invest in public transportation, and place bus and train stops within walking distance of most residences. Fully subsidize public transportation with tax dollars, so that no fares need be collected. Subsidize gym memberships and exercise equipment purchases, as long as people demonstrate they are using them.

Improve roads and sidewalks to make commuting by foot or bicycle safer. Encourage employers to offer more flexible schedules, so employees can better schedule lei-

Figure 1. Energy, money, time, and social costs influence decisions.



sure time activities. Change building codes to make stairways in buildings with elevators more attractive and easier to access.

Work to shift social norms regarding physical activity, through the media, social organizations, and the internet. Portray sedentary behavior as undesirable, and not in keeping with group identities.

### Conclusions

Comparing costs across difference domains is a difficult proposition, and will vary greatly by individual. No one area can be ignored, as all factors influence lifestyle decisions. For population-wide change, then, all domains contributing to unhealthy lifestyles must be improved.

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### References

1. Centers for Disease Control (2005). National Diabetes Fact Sheet. Retrieved April 22, 2007 from [http://www.cdc.gov/diabetes/pubs/pdf/ndfs\\_2005.pdf](http://www.cdc.gov/diabetes/pubs/pdf/ndfs_2005.pdf).
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3. Ratner, R. E. (2006). An update on the Diabetes Prevention Program. *Endocrine Practice*, 12(Suppl 1), 20-24.