

## Original Article

# The challenge of managing body weight in the modern world

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Obesity prevalence has increased dramatically in parallel with rapid economic development and rising standards of living around the world. There is growing recognition that this 'epidemic' of overweight is being driven by environmental factors that affect our eating and physical activity behaviours. In effect, the environment overwhelms our biological capacity to maintain a healthy weight. There is little scientific evidence to quantify the relative contributions of various environmental factors to risk of overweight and obesity. However, it is easy to characterize the environment as one in which food is readily available, convenient, inexpensive and great tasting. Likewise, the modern environment discourages physical activity at work, at home and in the community, and attractive sedentary pursuits compete with activity for leisure time. In fact, the causes of obesity in our society are so manifold as to be inseparable from the way we live. Many of the forces that drive individuals to eat too much and move too little are coupled to a desire for self-efficacy and increased productivity. It can be argued therefore that obesity is an unintended consequence of the emphasis we collectively place on productivity and a desire to achieve 'the good life'. In this sense, obesity is not really a biological problem, but a social problem that requires a multifactorial social solution. In order to create demand for environmental change to promote healthy lifestyle behaviours, we will need to create a greater sense of crisis among average citizens. We will need to explore solutions that make economic sense for everyone. We will need to create a new social norm for healthy eating and active living. The magnitude of the challenge is daunting, but we can begin by engaging broad scale public private partnerships. After all, we are all part of the global community that is affected by this emerging crisis.

**Key words:** environmental determinants, lifestyle behaviours, obesity, overweight, social change.

## Introduction

Rapid technological advancement over the past two to three decades has fueled tremendous economic growth in both the developed and developing worlds. Although millions of people still suffer from under-nutrition and food insecurity, never before have standards of living been so high for so many. Globalisation of markets has brought accessibility to the latest technologies and everyday conveniences as well as more food energy to continually broadening segments of the world's population.

An unintended consequence of this tremendous economic growth and social change has been a parallel increase in the prevalence of overweight and obesity in nearly every country around the globe. Experts have characterized this alarming trend among children and adults alike as an epidemic.<sup>1</sup> Obesity in turn dramatically increases the risk for chronic diseases such as diabetes, hypertension and cardiovascular disease, and exacts a tremendous social cost as well. The tremendous, and likely unaffordable, health care costs of treating these problems on such a massive scale has prompted public health officials to call for development and implementation of effective obesity prevention strategies. As we face this emerging crisis we must ask ourselves, what is causing this epidemic and what should we do?

## What is causing the obesity epidemic?

Much progress has been made in recent years identifying numerous genetic factors that influence obesity susceptibility. However, genetic factors, per se, cannot be responsible for the tremendous increase in population obesity prevalence that has occurred over the last two decades. The human gene pool has not changed significantly in the past century, whereas secular obesity trends have increased at an alarming rate. In the US, for example, obesity prevalence has increased by 50% over the past decade such that 64% of adults have a body mass index (BMI) exceeding 25, and 31% of adult Americans have BMIs exceeding 30.

It has become clear that the rising rate of obesity is being driven not by our genes but by our changing environment and the way this environment encourages and rewards individuals to make lifestyle choices that promote obesity.<sup>2,3</sup> The environment we have built for ourselves promotes a high level of food and energy consumption and a very low

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level of physical activity, unintentionally promoting positive energy balance and weight gain.

So, what is this 'obesigenic' environment exactly? Unfortunately, there is little hard scientific evidence documenting the various environmental influences on individual behaviours and their relative contributions to obesity risk. However, many aspects of the environment have been hypothesized as contributors to the problem, and on the surface, many of these seem like reasonable culprits.

Changes in the availability, composition and marketing of food in developed countries have led some to describe today's situation as a 'toxic food environment'.<sup>4</sup> Food is available nearly everywhere at nearly any time of the day or night. It is available at low cost, comes in a tremendous variety of choices, many high in energy density, is served in large portions, and is often heavily advertised. Due to advances in both preservation and preparation, food has become very convenient, much of it coming in 'ready to eat' form, and above all, it tastes great. All of these factors and others likely have some influence on whether or not an individual decides to eat, what food is selected and how much is consumed (Table 1). After all, humans were essentially designed to eat.

Because food was scarce throughout much of human evolution, we developed multiple redundant biological mechanisms to ensure that we would get enough food for survival and reproduction. These mechanisms drive us to eat (or at least consider eating) whenever food is present and

they also bestow upon us preferences for foods that are rich in energy. Foods rich in energy are also likely to be high in fat and sugar. In the historical and evolutionary environment, when such high calorie foods were scarce, these preferences were a survival advantage. In today's abundant food environment, these built-in preferences may promote excess energy intake.

A similar situation exists when one examines the physical activity environment. Numerous changes have occurred that have essentially engineered physical activity out of our daily lives (Table 2). Throughout human existence, high levels of physical activity were required for survival. Physical activity was required to secure food, water and shelter, and to defend and protect family and community. Food preparation was labour intensive, as was nearly every other aspect of daily life. Because of the intensely active lifestyle required for subsistence, humans likely developed a preference for rest or inactivity when it was not otherwise essential for immediate survival. In the absence of a strong biological drive to be active for activity's sake, then it is no wonder, in today's environment, people often prefer sedentary activities over those requiring significant energy expenditure.

### Obesity as a social problem

It can be argued that the hypothetical factors promoting obesity discussed above are not root causes, but are symptoms of deeper socio-cultural drivers that affect how we behave and shape the environment around us. It seems ridiculous to suppose that people design and build neighbourhoods and buildings to promote obesity. Likewise, food companies and producers of computers and televisions do not have mission statements that espouse obesity promotion. Instead, our individual and collective social values and institutions inadvertently promote behaviours leading to obesity and they do not provide incentives to make choices that encourage behaviours that would prevent obesity.

As a society we have always aspired to make a better life for ourselves and for our children. To many this means that we should work to insure that we never have to worry about food, and we don't have to do hard physical labour to subsist. In developed countries, this has largely been achieved. Tremendous advances in technology have improved the quality of life for millions, and have created the demand for further improvements.

**Table 1.** Food environment factors hypothesized to increase energy intake

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Portion size
High fat, high energy density
High glycaemic index
Availability of soft drinks
Sugar
High accessibility
Low cost
Great taste
Variety
Advertising
Fast/convenient

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**Table 2.** Physical activity environment factors hypothesized to decrease energy expenditure

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Declining need for physical activity in the workplace, computerization, automation
No required Physical Education in school, reduction in free play
Physical activity 'unfriendly' community design
'Drive through' conveniences
Automobile based transportation system
Elevators/escalators
Inaccessible/inconvenient stair access
Remote controls
Television, computer games, the internet, sedentary entertainment
Household appliances, labour saving devices

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Perhaps one of the strongest underlying forces promoting an obesigenic environment in developed countries is our quest for greater and greater economic productivity. No matter what it is, we can never seem to make and sell enough, and we are always striving to build a bigger nest egg. Productivity is a key enabler of improving our quality of life. Nearly every incentive system in society today rewards greater productivity, whether on an individual or collective level. This value system shapes every aspect of our environment.

Because of this we work ever harder at our jobs, at home and away from home. This places an increasing demand on our time, which in turn increases demand for timesaving technologies and services in every aspect of our lives. Drive-through restaurants, banks, pharmacies, dry cleaners etc. all help us save time so we can be more productive. Everything from household appliances to car maintenance is now designed to make our lives as 'speedy' as possible. On top of this, the Internet and globalisation of the information environment has provided us with 24-hour access to news, information and other services that can make our lives even more efficient.

Interestingly, while the pace of life seems frenzied on a mental level, laboursaving technology has made it possible to be tremendously productive without getting any appreciable physical activity. To make matters worse, at the end of a busy day we feel 'stressed-out' and spend little of our leisure time being physically active. Our high level of productivity has given us increased personal wealth and freedom and we have more disposable income to spend on entertainment and attractive sedentary pursuits, like watching television and playing computer games.

### What can we do?

The collective values we have shared for centuries to make a better life for future generations are now the same forces that provide incentives for us to shape our environment in a way that inadvertently promotes overweight and obesity. Reversing the overweight trend will first require recognition of these deeper causal elements and will require a multifaceted strategy across all sectors of society to make meaningful progress. Public-private partnerships will be essential to success as it will be necessary to link individual and collective behaviour change to the economics and incentive structures within existing institutions and industries.

We can learn much from examining previously successful social change movements (in the United States), such as smoking cessation, seatbelt use and recycling.<sup>5</sup> A careful examination of these previous efforts revealed many common elements that seemed to be present across these very different social change movements. Not all of the factors listed in Table 3 were present in each movement, but several were key.

Importantly, there had to be a clear and present crisis that would resonate with the average citizen. How does this crisis affect me personally? For example, in the case of tobacco cessation, the publication of the 1986 report revealing the

**Table 3.** Elements of successful social change

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A crisis
Advocacy
Science base
Government intervention
Economics
Mass communication
'Spark plugs'
Environment/policy change
Coalition building
A plan

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health risks of 'second hand smoke' was a turning point in the grass roots movement. The notion that someone else's decision to smoke could affect my health went against the deeply rooted American value of individual freedom and choice.

Economics also played a key role in many of these social movements. For example, in the recycling movement, advances in technology that reduced recycling costs and the invention of novel uses for recycled materials (e.g. recycled plastics for manufacture of thermal insulation fabrics) provided an economic framework that made recycling much more affordable and sustainable.

Finally, environmental change and policy played key roles in previous social change movements. These changes tended to come later in the process, once there was a clear sense of what changes were needed and there was enough political will to make changes happen. Policy change can help institutionalise social behaviour, which can be key to long-term sustainability.

### Where to begin?

It is unlikely we can muster the political will to reject the technological advances, and consequent increased productivity, that have contributed to the rise in overweight. Rather, we need to look for ways to build protection back into today's modern lifestyle, in a way that is acceptable. As a starting point, we should focus on preventing further weight gain in the population. This goal is within reach if one considers the absolute energy imbalance that can explain the rise in weight within the population today.

For example, in the United States, the average adult is gaining about one pound per year. This represents an excess of intake over expenditure of only about 10 kcal per day if the excess energy were deposited with 100% efficiency. Even if the efficiency of deposition were only 50%, this translates to a caloric excess of only 20 kcal per day. Preventing this excess would theoretically abolish the average population weight gain.

How can this be accomplished? One promising approach is to start by promoting 'lifestyle' physical activity, mostly walking. Leading with physical activity makes sense because that is how the biological system evolved, with physical activity driving food intake. The amount of physical activity

needed to burn 20 kcal is only one fifth of a mile of walking, an activity nearly everyone could do. This approach is being tested on a pilot scale in the US under the banner of the program 'Colorado on the Move!' Critical to the success of this approach is to leverage key elements that have proven successful in other social change movements. Among these is the economics of self-interest. Social behaviour can be changed and maintained as long as there is a benefits exchange that makes economic sense.

In parallel with promoting lifestyle physical activity we must also explore sustainable ways to help people reduce energy intake. For example, in the US food portion sizes served in restaurants have increased by several times over the past decade, likely contributing to essentially inadvertent increased energy intake. We must explore incentive-based opportunities to reverse this trend so that both consumer and food producer/provider reap a benefit.

While the challenge in combating obesity in the US is huge, there are tremendous opportunities to prevent a similar epidemic in other countries where the problem is still in its infancy. Opportunities include implementing monitoring

capabilities that can capture longitudinal changes in physical activity as well as food intake behaviours. The technology exists for doing this, relatively inexpensively. In addition, studies of the economics of eating and physical activity behaviours in developing countries are critical to being able to identify appropriate economic incentives that will ultimately drive desired behaviours.

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