

International strategies to address obesity

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Summary

Obesity rates are increasing in most countries throughout the world. The reasons for the increase are complex and involve biological, behavioural and environmental factors. We have unintentionally created environments that encourage overeating and discourage physical activity. Despite the recognition of the seriousness of obesity to public health, no interventions have been effective in reducing obesity rates on a population basis. Reversing obesity rates within populations will require addressing both individual behaviour and the obesogenic environment. Obesity rates could be reduced by treating affected individuals or by preventing the gradual increase in body weights of the population. Success in long-term obesity treatment is poor and appears to require that large behaviour changes be made and sustained. An alternative approach is to promote small lifestyle changes to prevent the gradual increase in the body weight of populations. America On the Move is an initiative based on promoting small lifestyle changes to prevent weight gain in the US population. This is one strategy could be used in other countries to reduce obesity rates.

Keywords: America On the Move, obesity prevention, pedometers, small changes.

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Introduction

Obesity rates are increasing rapidly in all parts of the world (1). Despite growing recognition of the threat to global public health, no interventions have been found to reduce the prevalence of obesity on a population-wide scale. Obesity is an international problem and there is an urgent need to develop international strategies to address it.

While some low level of obesity seems to have always been present, a noticeable increase has been seen in the past few decades. This is evident in data from the US (Fig. 1) that shows obesity rates in adults and children over time (2). While less consistent data are available throughout the rest of the world, the recognition of obesity as a problem seems to be a recent occurrence. Furthermore, there seems to be a gradual increase in obesity rates in most countries in tandem with areas of rapid economic development (1).

In the US, which is a country where obesity has been recognized as a problem for decades, obesity rates are still increasing. This seems to be occurring as a consequence of gradual weight gain in the entire US population that has resulted in a shift of the entire body mass index (BMI)

distribution to the right (2,3). Those who were already obese become more obese and even those who were the leanest in the population gained weight. It appears that the entire population is in a state of positive energy balance where energy intake is slightly higher, on average, than energy expenditure. A similar shift is occurring in BMI in the Chinese population (4), and it is likely that a similar increase in the weight of the population is also occurring in many other countries.

Why is energy balance positive in the population?

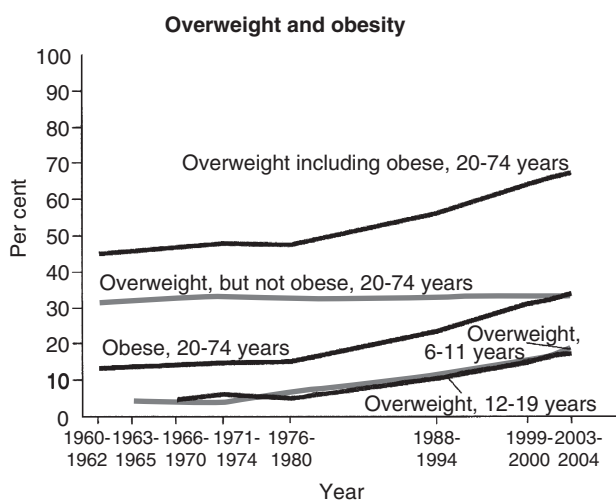
What is producing the positive energy balance that is fueling the increasing prevalence of obesity? Understanding this issue may help in developing effective strategies to address obesity. Whether or not obesity occurs in individuals and populations is dependent on biological, behavioural and environmental factors. There is a clear genetic component affecting body weight (5) but the gradual weight gain of the population has occurred much too rapidly to be due to a shift in the population gene pool. The same human

biology that allows high rates of obesity in today's environment dictated low rates of obesity in our ancestors. Why then can humans achieve energy balance in some environments but not in others?

Shaping of the environment by biological and economical forces

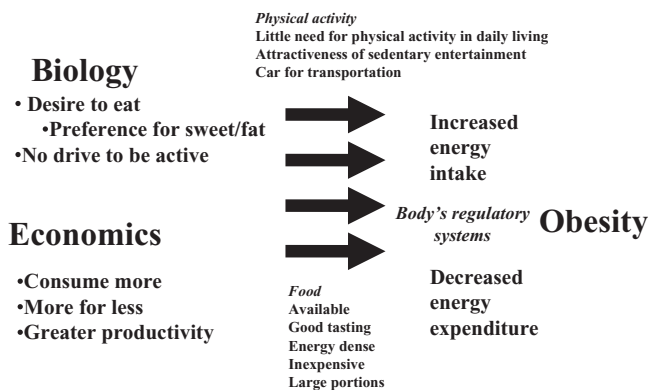
Given that there is an elaborate biological system controlling energy balance (6), the high prevalence of obesity suggests that external forces sufficiently powerful to overwhelm biological regulation are at work, promoting positive energy balance and weight gain. Figure 2 suggests how some of those forces may be acting to promote positive energy balance in the population.

Obesity experts have described the environment in US and many other Western countries as obesogenic (7,8). This obesogenic environment has been shaped both by human biology and economics. Human biology was designed to



SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, *Health, United States, 2006*, figure 13. Data from the National Health and Nutrition Examination Survey.

Figure 1 This figure shows the increases in overweight and obesity in the US since 1960s for adults and children.



maintain energy balance in the face of large daily variations in energy intake and physical activity (6,9), and the system is biased to oppose negative energy balance more than positive energy balance (6). Human biology developed to promote food intake, not food restriction. Furthermore, there are strong preferences for foods high in sweet, fat, salt and high energy density (10). Humans do not appear to have any strong biological drive to be physically active when there is no reason to be active. These biological preferences have had a major influence on the way we shaped our food environment to provide ample quantities of good tasting, high-calorie food and our physical activity environment so that little physical activity is required in daily living.

Economic factors have also helped create an obesogenic environment (11–13), from the way work and transportation are structured to the way communities are built and food is produced to the way we spend our leisure time. Economic factors are at the core of why the food and dining industry provides such large portions where we get more food for a given amount of money and where sitting in front of a computer in the workplace has become associated with maximum productivity. Biology and economics have inadvertently conspired to create a home entertainment industry that provides many attractive forms of sedentary leisure which further limits physical activity. The structure of our lives today is a reflection of what we value under the current motivational circumstances. The forces promoting positive energy balance in many westernized countries have become strong enough to overwhelm the biological systems facilitating achievement of energy balance in most individuals, resulting in the gradual weight gain observed in these populations.

Effectiveness of current interventions to address obesity

Previous efforts to address obesity in the population have been unsuccessful. This is because most interventions to prevent or treat obesity focus primarily on producing individual changes in dietary and physical activity patterns.

Figure 2 Biological and economic forces have helped shape an obesogenic environment that encourages energy intake and discourages physical activity. The body's physiological systems for regulating energy balance are not sufficient to oppose the forces creating positive energy balance and obesity.

What has been missing is a strategy that also concurrently recognizes and deals with the ubiquitous economic, environmental and cultural forces promoting positive energy balance and weight gain. There are interventions that have been successful in producing short-term improvements in diet, physical activity and weight (14,15), but few, if any, have been found to produce sustainable behaviour change. The problem is that intense resources can be marshaled to help people resist the obesogenic environment for only a short time. Once the resources are exhausted, behaviour relapses.

We can use Fig. 2 to think about strategies that might be more effective in reducing the positive energy balance in the population. Two general strategies come to mind. First, efforts can be aimed at reducing the strength of the forces promoting positive energy balance. Second, interventions could be aimed at providing stronger motivation to engage in behaviours that oppose positive energy balance.

Reducing the strength of forces promoting positive energy balance

Can we reduce the biological predisposition to over-eat and under exercise? It may be difficult to modify human biology, but this is a strategy being pursued by the pharmaceutical industry. Drugs are being developed to modify individual human biology in such a way as to reduce the drive to eat or to reduce absorption of foods consumed. Whether this strategy will be useful on a population-wide basis is unclear. Similarly, it may be difficult to modify the impact of economic factors promoting weight gain. Can people be taught to 'just say no' to the value represented by more food for less money? Is there a way to redefine productivity to include the need for physical activity? Instead, it seems more reasonable to try to modify the current food and physical activity environments that were shaped by these biological and economic forces.

While efforts to address environmental changes are in their infancy, some approaches for modifying the food environment have been suggested. These include:

- Requiring provision of information so that people have the facts to enable informed decisions about food and physical activity (e.g. food labelling, location of stairs);
- Restricting the availability of foods that are suggested to contribute to weight gain (e.g. banning sodas or vending machines in schools);
- Artificially manipulating the price of foods in controlled settings so that healthier foods are cheaper and unhealthy foods are more expensive (e.g. subsidizing healthy food; taxing unhealthy foods);
- Banning or limiting advertising of unhealthy foods.

Approaches have also been suggested to promote physical activity; most involve simply creating opportunities for

physical activity. For example, it has been recommended that communities implement policies to create sidewalks and walking paths in order to increase availability of places to safely engage in physical activity. In addition, posting public health messages about physical activity could potentially impact behaviour when there is a choice between an active and sedentary option (16).

There is little research to evaluate whether these approaches would change behaviour sufficiently to oppose the powerful biological and economical forces promoting weight gain. Most approaches suggested to change the environment are aimed at changing the 'point of behaviour' environment so that if an individual is motivated to make a healthier choice, the option is available, less expensive and accessible. There has been disappointingly little discussion about what systems change would be necessary and how to make them to support a future state where, for example, free market forces dictated prices of healthy food that were equal to or less than those of less healthy fare. In order to work on a population scale, the economics must work throughout the entire value chain. In today's environment, the value chain from farm to table is working against reversing the price disparity between healthy and less healthy foods.

Increasing motivation to resist positive energy balance

In addition to the need for more dialog about what future state is desirable and economically sustainable, there also needs to be much more emphasis on exploring policies that would affect an individual's internal or external motivation to change their behaviour. Without sufficient motivation to make healthy choices, it is not clear that simply making healthier options available, even at attractive pricing, will have a major impact on weight gain. There are at least two approaches to providing motivation. First, we could make healthy lifestyles the norm in society so that people have sufficient internal motivation to maintain healthy behaviour patterns. This may not be feasible as a tactical goal given that creating such a magnitude of social change will likely require multiple levels of intervention across multiple sectors over a long time. This is akin to shifting the social norm for smoking, which is still in progress. Second, we can begin exploring incentives/disincentives that are big enough to shift behaviour towards health goals.

We have had short-term success in changing behaviour with sufficient incentives. It may be possible to implement policies to provide and sustain incentives for healthy behaviours. A good way to start would be to examine the current external motivational systems for other behaviours in our society. Where is it possible to incorporate sustainable incentives for healthy behaviours into already existing motivational systems?

Worksites

Employees typically receive incentives to increase productivity and/or adhere to company policies in the workplace. In the worksite, incentives can be offered to provide greater external motivation for healthy behaviours and policies can be established that lessen the forces promoting weight gain. For example, a worksite could have a health behaviour code just as some worksites have dress codes. If your job depended on participation in a wellness programme and granted you time to participate in this programme, you might be more inclined to get some activity. Alternatively, employees who achieve a target level of physical activity or maintain a constant BMI could receive discounted or subsidized health insurance.

Schools

A major question for schools is whether they see the health of students as their responsibility. There are clearly other sources of influence (e.g. the family, the community) on lifestyle behaviours of children. However, there is growing information that better health behaviour promotes better learning and better discipline in schools. If these links are solidified with additional research, ensuring that school children engage in healthy behaviours could be included in the way we provide education to our children.

Communities

With growing recognition that the built environment and policy environment influences physical activity and may influence food behaviours, there are opportunities for communities to implement policies to create healthy lifestyle environments. For example, most communities already have the infrastructure to evaluate the environmental impact of new commercial development. This infrastructure could be used to evaluate the impact of new development on the food and physical activity patterns of community residents, and we should use the policy to ensure that any new development supports healthy behaviours.

The two strategies to reduce positive energy balance – providing better ways to help people ‘push back’ against the forces promoting positive energy balance and changing environmental factors that promote positive energy balance – are not mutually exclusive and should be pursued in parallel.

Goals for addressing the global epidemic of obesity

Obesity rates could be reduced either by reversing obesity once it is present or by preventing it from occurring.

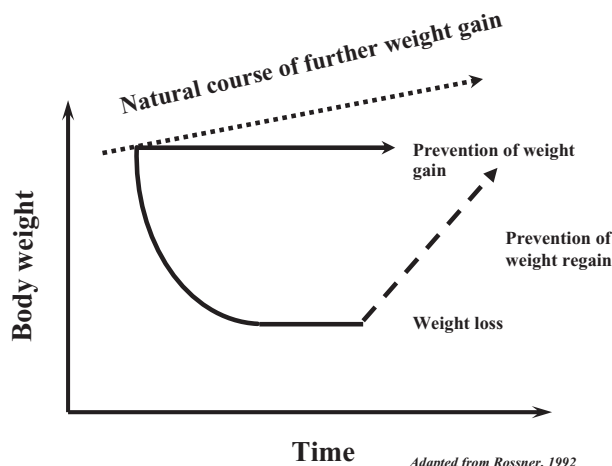


Figure 3 This figure shows that most populations are experiencing gradual weight gain (dotted line). One strategy to address the increasing prevalence of obesity worldwide is to stop the gradual weight gain that is occurring in most populations. Another strategy is to try to reverse obesity through weight loss and prevention of weight gain.

Figure 3, which is modified from the work of Dr Stephan Rossner (17), is illustrative of these two different approaches. The dotted line in Fig. 3 shows what will happen if no weight management intervention occurs. The gradual weight gain of the population and rising rates of obesity will likely continue until most susceptible people in the population are overweight or obese. One strategy would be to treat obesity in those already affected. This involves producing negative energy balance to attain weight loss followed by achieving energy balance permanently at a lowered body weight.

Obesity treatment

Once present, obesity is difficult to treat and few people succeed in losing significant amounts of weight and keeping that weight off long-term treatment (18,19). The problem lies more in maintaining weight loss than in producing it. Many overweight and obese individuals succeed in losing weight but few succeed in avoiding the regain of most or all of the weight lost (18,19). Our work with the National Weight Control Registry (NWCR) (20,21), a group of over 6000 individuals who have been successful in long-term weight loss maintenance, suggests that keeping weight off requires different behavioural strategies than losing weight, and that large behaviour changes are needed for sustained weight loss maintenance. This may be due to metabolic changes that occur with obesity that favour weight regain after weight loss (22,23). Certainly, we should work to improve our ability to treat obesity. However, given the poor ability to maintain weight loss over the long-term,

obesity treatment does not currently seem like a viable strategy for reducing obesity prevalence in the global population.

Prevention of weight gain

An alternative strategy to obesity treatment is prevention of excess weight gain. This strategy does not require producing negative energy balance but only requires preventing positive energy balance. This strategy would represent a long-term approach to addressing obesity in the population, and is based on the notion that it is easier and more feasible for people to make and sustain small rather than large lifestyle changes. The first goal with this strategy would be to initially stop obesity rates from increasing, and then gradually over a few generations, to reduce levels to those seen decades previously. If we could prevent primary excess weight gain starting today among both children and adults, the prevalence of obesity would drop dramatically in one generation.

We have provided a theoretical basis for this strategy (24). We found that the average weight gain in the US population is 0.5–1.0 kg year⁻¹, and we estimated that the average daily degree of positive energy balance causing this weight gain was <50 kg day⁻¹. We termed this value the 'energy gap'. Even the 90th percentile for weight gain in the US population could be explained by an energy gap of only 100 kcal day⁻¹. Brown *et al.* (25) have found a similar energy gap in middle aged Australian women, and Wang *et al.* found a slightly higher energy gap in US children (26). Investigators in China have found an energy gap that is small and varies in different sectors of the population (27). The energy gap provides an estimate of the degree of behaviour change needed to stop the gradual weight gain of a population and could be individualized for each country from the yearly weight gain in that country.

America On the Move: a promising success model based on the small changes approach to preventing population weight gain

In order to translate research into action to prevent weight gain in the population, America On the Move (AOM) was created as an initiative by the non-profit America On the Move Foundation in the United States. AOM aims to prevent weight gain in adults and prevent excess weight gain in children through the promotion of small increases in steps and small decreases in energy intake. The goal of AOM is to alter energy balance by at least 100 calories per day to prevent weight gain. Rather than set specific guidelines for how many calories to consume and how much physical activity to attain, AOM's strategy is to help people make small reductions in energy intake and small increases in physical activity. AOM aims to move people from where

they are now to a healthier lifestyle in small steps, building on successes, rather than in one giant leap.

The AOM initial goal of modifying energy balance by at least 100 kcal per day can be accomplished by taking 2000 steps more each day and/or eating 100 kcal less each day. This differs from other programmes that recommend a specific number of steps/day (i.e. 10 000) or specific dietary targets. Setting an initial goal of 10 000 steps/day may not be achievable or sustainable for many sedentary people; however, most should be able to achieve smaller increases that would improve health.

America On the Move has developed tools to aid people in making small lifestyle changes and offers these tools free to participants. The tools include online resources, interactive elements, community support, and events to support and encourage these two small behavioural changes. Tools are available for individuals, schools, worksites and health-care providers. All the tools and programmes are free and available via the web and can be accessed at <http://www.americaonthemove.org>

How AOM reaches the general population

America On the Move reaches the public through its multiple partners, sponsors and communication channels. Partners include the YMCAs of America, National Urban League, National Council of LaRaza, Public Broadcasting System and the Girl Scouts. In addition, AOM partners with a variety of manufacturers and retailers who help bring the AOM message into the community in places where people live, learn, work and play. AOM actively promotes messages to the public about the small change strategy through these channels and has generated over a billion media impressions since its launch in 2003.

The effectiveness of AOM

The AOM intervention to increase walking was effective in increasing average steps/day by at least 2000/day in worksites and church communities over a 14-week period (28). The AOM message to reduce energy intake by 100 kcal day⁻¹ has also been shown to result in significantly less energy intake (29).

The overall effectiveness of AOM in preventing excessive weight gain has been evaluated in two different studies using a family-based delivery approach to increase daily steps and decrease dietary intake to reduce weight gain in children and adults (30,31). Both studies recruited families with overweight children. In both studies, weight gain was reduced in children of families randomized to the AOM intervention as compared with those randomized to the control condition. In the first study (30), the small changes were more effective on reducing weight gain in girls and

mothers than in boys and fathers. In the second study (31), there were no sex differences in results.

AOM facilitates small changes to the environment

America On the Move also promotes small changes to the environment to help support and sustain the small behaviour changes. The AOM web site provides 100 tips for modifying the food and physical activity environments. These include:

- Providing tips for reducing intake by 100 kcal in restaurants;
- Partnering with grocery stores to suggest healthy food substitutions;
- Working with realtors to provide pedometers and neighbourhood walking maps (with step values) with new home purchases;
- Working with retail businesses to provide incentives for customers wearing pedometers.

America On the Move is working with several communities across the US to engage all sectors of the community in helping support and sustain small behaviour changes in the population.

Prevention of weight gain as an international strategy to address obesity

Given that obesity rates are still relatively low in many countries and given the difficulty of treating obesity once it is present, the AOM approach of preventing primary weight gain would seem to be a viable international strategy to help lower the prevalence of obesity. The tools developed by AOM in the US can easily be adopted and modified for use in other cultures. This is a way of providing small behaviour change goals for individuals and populations, which can help prevent increases in the prevalence of obesity while simultaneously working to facilitate small changes in the food and physical activity environments. This approach allows an opportunity for all sectors of society to be part of the solution to the problem of obesity.

It is certainly possible that systemic changes in the food supply (such as promoting healthier foods and making them more affordable) and in the systems that promote physical activity (i.e. transportation, leisure time, etc.) can be made. However, these are big changes requiring a large scale restructuring of the current state of affairs on an international level. It is not clear how long it will take to make such changes within our social/political environment. Which strategy is right (small changes or big changes) is not known. More importantly, these are not mutually exclusive approaches. A rational approach would be to work to advance both directives simultaneously – promoting small

changes that can be adopted by the population immediately while building the global framework for even greater change in the many large systems that will have to evolve in order to sustain a fundamentally different future state where healthier behaviours are the social norm. While there is an urgent need to address the current obesogenic environment, the broad social change, economic and political changes needed to reshape the current infrastructure will not occur overnight. Programmes to promote small and sustainable changes in individual behaviour and in the prevailing environment could make an immediate impact in arresting any further increase of obesity rates worldwide.

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Conflict of Interest Statement

JOH and JCP serve on the Board of Directors of the America On the Move Foundation. JCP is an employee of the Procter & Gamble Company. JOH has received consultancy fees from for PepsiCo, General Mills, Walt Disney Company, McNeil Nutritionals.

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