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## Physical activity and obesity

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The Research letter in today's *Lancet* by John Reilly and colleagues has important implications for the future weight and health of individuals within the UK. These researchers conclude that "Modern British children establish a sedentary lifestyle at an early age". With this revelation, they essentially forecast an epidemic of obesity in the UK that will probably rival that already underway in the USA. The nature of human physiology is such that it is extremely difficult, if not impossible, to maintain a healthy bodyweight with a low level of physical activity. High levels of physical activity may protect against excessive weight gain whereas low levels permit excessive weight gain.<sup>1</sup> As UK children establish a sedentary lifestyle, they almost certainly set themselves up for obesity.

The increasingly sedentary nature of UK children is not unique and is being seen in most countries around the world. The modern environment is one in which technological advances have eliminated many reasons for physical activity. Physical activity has decreased at work, at school, in transportation, and at home.<sup>2</sup> Our environment encourages inactivity, and young children are not immune. It is unlikely that we can (or want to) change the environment back to one that requires high levels of physical activity, which means that we have to teach children to use their intellect to push back against the environment. Such a change can be done by eating a little less than would otherwise be eaten and being more physically active than ordinarily. Public-health efforts need to be considered to promote small changes in physical activity and energy intake, to counter the natural tendency to succumb to the environment.

Obesity is not solely the result of low levels of physical activity but rather arises from an energy imbalance in which energy intake exceeds energy expenditure. A low level of physical activity, such as that seen by Reilly and colleagues in 3-year-olds who were followed up again at age 5, does not definitively doom someone to be obese. But it does mean that to avoid obesity, sedentary individuals must maintain a low intake of energy. As pointed out by Reilly and colleagues, the low level of

total energy expenditure in the children in their study was 200 kcal below the estimated average energy requirement for children of this age. One way for children in this population to prevent obesity would be for them to eat less than current recommendations. Human physiology did not develop to support restriction of energy intake, and it is difficult for most people to do so consistently over time.<sup>2</sup> Further, the environment in most countries, especially in developed countries, encourages rather than discourages energy intake by providing good-tasting, convenient, and inexpensive food.<sup>2</sup> Sedentary children in the UK will probably not be able to maintain energy balance and avoid obesity only by restricting energy intake. In reality, preventing obesity in these children will require both reductions in energy intake and increases in physical activity. The good news is that it may only take small changes to prevent obesity.

Reilly and colleagues' data demand action immediately if efforts are to be made to prevent or limit the obesity epidemic in the UK. Excessive gain in weight can be prevented with small changes in behaviour. The average US citizen is gaining 0.8–0.9 kg each year.<sup>2</sup> This weight gain could occur from as little as 20–50 kcal a day ingested in excess of energy expended. In fact, we suggested that weight gain in 90% of the US adult population could be prevented by reducing positive energy balance by only 100 kcal a day.<sup>3</sup> This reduction would equate to a little more walking (about 2000 additional steps) or eating a few less bites of food.<sup>3</sup> It could take a bit more change in behaviour in children, but the point is that small and achievable changes in behaviour can have a big impact on preventing weight gain. This idea is the basis of a recent national initiative in the USA called America on the Move.<sup>4</sup> This initiative inspires people to prevent abnormal weight gain by making small changes in energy balance: get an electronic step-counter (pedometer) and walk 2000 additional steps each day, and choose one behaviour each day to eliminate 100 kcal (eg, drinking water or a diet [artificial sweetener] drink instead of a sugared fizzy drink). Combining these two small changes can save 200 kcal a day, the estimated difference between current food-intake recommendations in the UK and habitual daily physical activity there.

It is time for the UK to take action to prevent the excessive weight gain that is likely to occur in its young children. Increasing physical activity must be a part of any national prevention efforts for weight gain. Changing behaviour to prevent weight gain will be easier than treating obesity once established. It is time to get serious about prevention of weight gain in the UK.

I am on the steering committee of America on the Move, which is sponsored by Masterfoods and Pepsico, and I receive grant support from McNeil Nutritionals.

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