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Warning Sloburbia! Does where you live affect your waistline and your health?

Tim Townshend and **Amelia Lake** examine the possible links between urban form, obesity and health.

The obesity issue

The prevalence of obesity in the UK has tripled over the past 20 years and continues to increase at an alarming rate. The social costs associated with this trend are high; obesity accounts for approximately 30,000 premature deaths and the total estimated cost of obesity treatment is £3.3 - 3.7 billion per year [1]. Thus far obesity prevention and treatment has focused on pharmacological, educational and behavioural interventions, with limited overall success. Moreover, no single theory has adequately explained all the factors which contribute to the current obesity epidemic. Obesity is complex; the causes are multi-factorial and include biological, psychological, behavioural and social aspects.

In the developed world, our environment supplies an unlimited amount of convenient, energy dense foods; our current lifestyles generally require relatively low levels of physical activity and promote sedentary behaviour [1,2]. Work on understanding obesogenic environments, i.e. those which discourage physical activity and encourage food intake, have largely been confined to North America and Australia, where obesity levels are high. The UK, however, is also close to these levels and is the most obese nation in Europe. We urgently need to develop a more sophisticated understanding of the issues. Policy makers, town planners, urban designers and all involved in the creation of the built environment need to comprehend the implications of the decisions we take.

Influences on the built environment

The built environment is a key factor within the obesity conundrum in two ways. Firstly in the opportunities it provides for active travel and physical activity and also in the location, proximity and availability of food and food outlets; thus broad factors of physical design, land use patterns and transportation systems are all important. There is a considerable body of literature which points to a link between urban design and active transport, i.e. walking and cycling. Research has suggested a number of factors within the built environment which appear to correlate with people's propensity to undertake walking and cycling which should have improved health outcomes. US work suggests that groups of neighbourhood characteristics will often be found together which make neighbourhoods more, or less, 'walkable' [3]. Older (pre-WW II) traditional neighbourhoods display higher residential densities; good connectivity between streets; high levels of land-use mix; good levels of pavement provision and are often perceived to be aesthetically pleasing and safe; this combination of built environment features, it is suggested, encourages walking and cycling.

In contrast, modern auto-dependant, suburban neighbourhoods lack nearly all of these qualities. The resultant tracts of single use land patterns; few local shops and services combined with housing; disconnected 'cul-de-sac' development layouts; poor levels of pavement provision and monotonous views, deter people from walking, or cycling to work, shops and services. A degraded environment with the presence of

incivilities such as graffiti and litter may also be associated with higher levels of inactivity[4]. What factors are most crucial is, however, hotly debated. A study in Atlanta, Georgia, for example, found a significant correlation between the obesity of white males and the residential density of where they lived. Obesity decreased from 23 percent to 13 percent from the least to the most dense neighbourhoods, [5] .

In the Georgia study the lowest density neighbourhoods in the study (at less than 2 dwelling units per acre) are of a type which attracts most criticism in the US and Australia, but are relatively rare in the UK. At what level densities may need to reach to have a positive impact is, however, unclear. A very large statistical study of neighbourhoods in New York correlated high density neighbourhoods, more akin to European city levels, with lower Body Mass Index. The same study also stressed the importance of multiple trip destinations, i.e. local shops and services. A study of Seattle neighbourhoods, however suggested that 'greenness' was a significant factor in encouraging people to walk. More generally too, studies have emphasised the importance of greenery and green space to people's feeling of health and well-being and some research has linked green space within neighbourhoods to reduced crime and aggression [6]. Clearly, therefore there are trade-offs between density, green space and trip destinations as a concentration of all three would be impossible to achieve; but exactly where optimum levels may lie is far from clear.

Research has, therefore, correlated elements within the built environment to activity levels and there have been some tentative links to health outcomes. There are, however, a number of key issues. Firstly as much of the work is US, or Australia based it is difficult to know how transferable the observations are to the UK, nevertheless even though densities and exact built form vary significantly we do seem to be creating many environments which seem to discourage rather than encourage active living (fig i). Whether the discouragement of walking and cycling does have a detrimental affect on health is however still disputed; many current studies are large statistically based quantitative studies which *correlate* factors rather than aiming to explore cause and effect. Existing studies also seem, if not to directly contradict each other, then at least to give highly inconsistent results. Further, while some studies have cross-correlated results to particular socio-economic and ethnic groups and children's behaviour has been a focus of others, some groups, for example adolescents, have been largely un-researched in relation to these issues.

Children and Young people.

The affect of aspects of the built environment on children's propensity to take exercise has been the subject of a number of studies, with walking/cycling to school a specific focus. Research has for example shown a direct correlation between the distance a child lives from school and the propensity to walk, or cycle to it. Other research has suggested that children living further from and therefore being driven to school, lose 'free-time' (which might be physically active) commuting and this is not made up for other ways. This work has been particularly critical of modern trends in sitting large schools sites on the edge of large low density suburban locations. Journey length to school may be only one factor however; work in Australia has suggested that micro urban design environments, such as the quality of pedestrian realm can be significant in whether parents allow their children to walk to school [6].

Another key aspect of the built environment related to children's activity patterns is the availability of play and recreational space; however this does not necessarily mean traditional parks and playgrounds. It has been argued that the streets near a

child's home are actually more important, since they are readily accessible and are more 'exciting' than specifically set aside play areas. For several decades it was thought that the suburban cul-de-sacs addressed this need and provided an ideal safe play space. Research is now challenging this assumption, however, and suggests that only very young children may benefit from this residential form. As soon as children become more adventurous i.e. wanting to explore beyond their immediate doorstep, cul-de-sac layouts with their disconnected networks may actually hinder such exploration. Moreover, the hierarchical nature of road networks, necessary for cul-de-sac designs to work often mean that traffic runs on high speed arterial roads on the edge of housing estates; these are highly dangerous for children to cycle along, or to cross. Beyond these studies little if any work has been carried out to address the affect of environmental factors on adolescents and yet this is a crucial period in which patterns for adult behaviour are often set and moreover it covers the age when most people learn to drive.

Newcastle Research

At Newcastle University a research project is underway which aims to begin to understand the dynamics and interactions between nutrition, physical activity and the built environment from adolescents' perspectives (16-18 years old). So far pilot work has been undertaken which has examined the efficacy of different methods of collecting information from this age group. To this end an American designed diet, environment and physical activity questionnaire [7] has been used along with a validated food frequency questionnaire [8]. The work has explored activity, lifestyle and food intake and choice in relation to neighbourhood environments.

Though the findings are tentative and are based on a small pilot project there is some indication that the built environment has an influence on physical activity in this age group. Common barriers to the local neighbourhood which prevented walking or cycling included perceptions of poor lighting; dangerously busy roads; levels of crime and a lack of safe locations to leave bicycles. Other characteristics that may be associated with the young people's use of pedestrian environments were also identified, and these included attractive buildings, well maintained pavements and trees lining the streets.

A number of limitations became apparent during the study, however, not least that while the group all attended the same college they lived in different post code areas, and therefore lived in different neighbourhood environments. Clearer assumptions could have been made if the young people were all from the same area, or if there were an equal number of participants from each area and this will be addressed in future work [9]. The study may also have been able to draw more concise conclusions if it focussed on the school environment, rather than trying to incorporate the home environment as well. Another key issue was that as the study used a self-reported questionnaire it did not directly measure environments, rather the young people's perceptions of their environment. Individual perceptions of the environment vary and only fair to low agreement, has been demonstrated between self-reports of neighbourhood environments and objective environmental audits [10]. However, perception is a vital factor, and therefore, future work will include a combination of both perceptions and objective measures mapped out using geographic information systems. A second round of pilot study work with groups of young people is currently underway.

Discussion

This paper has presented evidence which supports the perspective that the form and quality of built environment is a crucial factor in the creation of obesogenic environments. Evidence has been described from studies conducted in Australia, New Zealand and the UK; though the majority of the evidence has been collected in the US and is often based on large national survey databases. The cultural and physical differences between the US and UK environments, however, means that this research is not directly comparable. Crucially the UK based body of evidence on the obesogenic environments is very slim and needs to be expanded and related to varied groups of individuals and a range of environmental settings.

Tackling the current obesity epidemic will require individual behaviour change, but it is important that there are broader ecological approaches to obesity prevention which support these changes. It is hoped that the Newcastle research will begin to untangle the complex web of factors involved at least for the target group and that eventually we will be able to recommend interventions for positive action.

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Notes

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Figures



Figure 1 Too many UK housing developments are disconnected, have a poor pedestrian realm, car dominated layouts and lack local shops and services.