Health Select Committee Inquiry: The impact of physical activity and diet on health

Written evidence submitted by physical activity research groups at the MRC Epidemiology Unit and the Centre for Diet and Activity Research (CEDAR)

Submission from: Prof Nick Wareham (Centres Director), Dr Soren Brage, Dr Andy Jones, Dr David Ogilvie, Dr Esther van Sluijs, Dr James Woodcock.

Executive Summary

- Changing physical activity behaviours requires policy and interventions that act at the individual, social, community and environmental levels.
- Policies aimed at prevention and whole populations are likely to be more cost-effective and equitable than those aimed only at high risk groups.
- Increasing physical activity alone has many health benefits independent of obesity, but it is unlikely to be the best single strategy for combatting excess weight.
- Adults and children tend to overestimate how physically active they are, and we lack good nationwide data about actual levels of physical activity.
- Creating supportive environments for physical activity presents an important role for local authorities in transport and town planning.
- Active travel presents significant potential for increasing physical activity for adults and children. Good infrastructure is likely to be necessary but not sufficient to encourage more walking and cycling: sustained and substantial interventions that address physical, cultural and psychological barriers are required.
- Physical activity patterns are influenced from a very early age, in families, at school and in the wider environment. We need to look beyond traditional forms of exercise to encourage physical activity.

1. Introduction

1.1 The **MRC Epidemiology Unit** is a department at the University of Cambridge. It studies the genetic, developmental and environmental factors (including diet and physical activity) that cause obesity, type 2 diabetes and related metabolic disorders. The outcomes from these studies are then used to develop strategies for the prevention of these diseases in the general population. www.mrc-epid.cam.ac.uk

1.2 The **Centre for Diet and Activity Research (CEDAR)** is studying the factors that influence diet and physical activity behaviours, developing and shaping interventions, and helping shape public health policy and practice. It is one of five Centres of Excellence in Public Health Research funded through the UK Clinical Research Collaboration (UKCRC). It is hosted by the MRC Epidemiology Unit, and is a partnership between the University of Cambridge, the University of East Anglia and MRC Units in Cambridge. www.cedar.iph.cam.ac.uk

1.3 Health behaviours are complex and there are no silver bullets for changing unhealthy patterns of behaviour to healthier ones. Physical activity is influenced by a combination of factors related to the individual, their social relationships, community, wider society and the environment (the 'socio-ecological model').

Influences are shown to be context and behaviour specific – e.g. influences on walking to work differ from those on cycling to work or walking for leisure. Therefore, strategies that target only a single aspect are unlikely to be successful: multiple barriers often need to be removed to achieve substantive change, and interventions need to be sustained rather than short term 'projects'. Furthermore, it is increasingly recognised that much behaviour is automatic, triggered outside of conscious awareness and cued by multiple influences.[1] This explains why, for instance, simply using information to persuade people to change their health related behaviour has had – at best – modest effects.

2. Are we losing the fight and simply encouraging a 'normalisation' of obesity and is this distracting from prevention and early intervention?

2.1 A purely medically-based response to obesity, as well as being financially unsustainable, could potentially risk encouraging the normalisation of the issue. A focus on the behaviours themselves rather than their eventual manifestation in obesity is therefore important. Whilst high quality treatment services for diabetes and morbid obesity are of course necessary, these need to be complemented by preventive efforts directed at addressing diet and physical activity behaviours (which also have health benefits independent of obesity).

2.2 When choosing potential policies and initiatives, efforts that aim to shift the population distribution of physical activity are likely to be more cost-effective overall: i.e. those strategies that involve changes in infrastructure, policy and systems that have the potential to reach large sections of the general population rather than just those at highest risk. Economic and social policies not directly aimed at physical activity could also bring benefits if they tackle underlying factors such as health inequalities.

2.3 Despite increasing understanding of differences in genetic risk and the interplay between diet, data from the Europe-wide EPIC-Interact study shows that public health strategies aimed at tackling obesity at a population level through lifestyle changes are more appropriate for preventing type 2 diabetes than targeted interventions based on an individual's genetic risk.[2] Lifestyle changes also impact positively after diagnosis: the ADDITION study found that changes to healthy behaviour in the first year following diabetes diagnosis is associated with a reduced risk of cardiovascular disease over the next 5 years, and that the higher number of positive health behaviours an individual adopts, the lower the risk of cardiovascular disease.[3]

2.4 Whilst continued research on the best ways to encourage physical activity is required, current gaps in research should not be taken as an excuse for inaction. The interventions to be prioritised for piloting are those that appear promising based on existing evidence and theories. These interventions must then be properly evaluated so that best future practice and policy can be more readily identified. Local authorities, with their newly acquired responsibilities for public health and influence over aspects of the physical environment, are ideally placed to develop, implement and evaluate policy and practice in this area, supported by scientific evaluation of selected interventions in partnership with academia.

3. Recent trends in body mass index, physical activity levels, diet and conditions linked to obesity and physical inactivity, including the availability and quality of data in this area.

3.1 Recent trends for obesity and condition such as type 2 diabetes are reasonably well documented. However, trends in the underlying behaviours are much more poorly documented. Repeated cross-sectional surveys such as the National Diet and Nutrition Survey and Health survey for England provide information about behaviours. However, because this data is self-reported, its quality and reliability can be poor. Physical activity questionnaires show 40% of men and 28% of women in England achieve recommended levels. However, objective accelerometer data suggest that only 6% of men and 4% of women achieve recommended levels.[4] Both adults and children overestimate how physically active they are, and parents overestimate our active their children are.[5 6 7]

3.2 Given the imprecision of current measures, it would be advisable to complement national surveys with repeated assessment of population-level energy intake and expenditure.

3.3 Although the evidence of a direct effect of monitoring and measurement on physical activity is currently mixed[8 9], it may be that the rise in physical activity self-monitoring tools and mobile apps represents a promising opportunity for intervention and investigation.

4. Evidence of the impact of physical activity on health, including its impact independent of weight, and costs to the NHS and wider economy

4.1 There is strong evidence of the association between physical inactivity and the risk of total mortality, cardiovascular disease, diabetes, osteoporosis and some cancers. These relationships are independent of body mass index. The relationship of physical activity with obesity is more contentious and is more likely to be a two way relationship (i.e. lack of physical activity may contribute to weight gain, and weight gain may reduce individuals' physical activity.)[10]

4.2 Keys area of uncertainty for these relationships relate to the details of the 'dose response' (i.e. how much physical activity has what level of effect.) Advances in physical activity measurement have the potential to help resolve these issues, but so far these methods have only been employed in relatively small studies. The incorporation of objective physical measurement into UK Biobank (www.ukbiobank.ac.uk) has the potential to provide the foundation for future research on this topic.

4.3 Sedentary behaviour (i.e. sitting) may be independently bad for people's health, possibly more so if it is uninterrupted.[11]

4.4 Health impact modelling reveals potentially large gains from increasing physical activity in travel. When considering active travel scenarios developed by the Visions 2030 project www.visions2030.org.uk, even the most conservative scenarios produced reductions in a range of diseases, including reducing the burden of heart disease and stroke by over 7%, and dementia by 5%.[12] A modelling study has estimated that a shift now in cycling and walking to those similar to current levels in Copenhagen could result in £17 billions of expenditure

averted over 20 years.[13] Population level benefits are greatest if activity can be maintained at older ages when disease risks are highest.[14]

4.5 Longitudinal evidence on 18,000 commuters in the British Household Panel Survey also indicates that walking, cycling, or taking public transport to work is better for people's subjective wellbeing than driving.[15]

5. Impact of broader factors on physical activity: transport and planning

5.1 Increasing walking and cycling presents significant potential for increasing physical activity. The additional £214million recently announced for cycling is therefore welcome, but long term commitment is necessary, and it is still small compared to the £15 billion recently announced for road building. It is vital that these larger infrastructural changes support active travel as well as motor vehicles: for instance integrating bike lanes into new roads, improving walking routes when creating bypasses, and so on. Similarly, investment in the rail network must be accompanied by cycle provision.

5.2 The average journey to and from work in the UK takes 28 minutes each way.[16] Although distance may be a barrier to travelling actively for the entire journey, many commuters could meet recommended activity levels if they walked or cycled for at least part of their journeys.

5.3 The *iConnect* study of Sustrans-back walking and cycle routes in Cardiff, Kenilworth and Southampton showed that adults whose active travel increased over the course of a year reported about two hours more physical activity per week on average, whereas those whose active travel decreased reported about two hours less.[17] Importantly, there was no evidence of a compensatory decrease in recreational physical activity.

5.4 In Cambridgeshire, commuters who included active travel as part of their car journeys through the use of offsite car parks or park-and-ride sites reported an average of 12 minutes of walking or 17 minutes of cycling to and from work per day.[18] Emerging findings also indicate on average 20% of the journey to work for those travelling with by bus, park-and-walk or park-and-cycle, is spent in physical activity of at least moderate intensity. The current rise in public transport fares relative to the cost of motoring is, therefore, unlikely to support increases in physical activity.

5.5 Higher active travel also translates into higher overall physical activity in children. For instance, in the SPEEDY Study, 47% of children walked or cycled to school and these children where more physically active overall.[19] [20] This association of active travel is not just confined to the school journey, as increased physical activity was also found if children walked or cycled to destinations other than schools.[21] However, 30% of children living within 2km from school in the SPEEDY study were driven to school, indicating a potentially large number who could walk or cycle instead.[22]

5.6 Improving physical infrastructure for walking and cycling has clear potential to encourage physical activity if it reduces barriers to walking or cycling (such as actual and/or perceived danger from motor vehicles); or if it provides more direct, convenient or pleasant routes.[23] When changing or planning new

neighbourhoods, it is therefore important to consider distances and routes to work, school and local amenities, as well as the presence of green spaces.

5.7 Proximity to infrastructure is important, and its effects may take some time to have an impact. Two years after the routes in Cardiff, Kenilworth and Southampton were developed, people living 1km (0.6 miles) from the routes had increased their time spent walking and cycling by an average of 45 minutes per week more than those living 4km (2.5 miles) away.[24]

5.8 Car parking may also have an important influence on travel behaviour. Research in Cambridge has shown that workplace parking charges are associated with a decreased likelihood of regular car commuting[25] and are particularly strongly associated with an increased likelihood of incorporating walking or cycling into a longer car commuting journey.[26] Depending on local factors, these findings suggest an intervention strategy could involve charging for on-site workplace parking while providing free off-site parking within walking or cycling distance.

5.9 With regard to the importance of the workplace, a study of the six *Cycling Demonstration Towns* (funded 2005-2011) and 12 *Cycling City and Towns* (funded 2008-2011) showed that the towns with the biggest increase in cycling to work were those that placed greater emphasis on workplace cycling initiatives.[27]

5.10 Infrastructure alone is unlikely to overcome all barriers to physical activity: a supportive environment is likely to be 'necessary but not sufficient', and many interventions to improve the environment for walking or cycling have been too tentative to have any effect.[28] Nevertheless certain characteristics of the route to work – access to public transport, convenience of cycle routes, and pleasant walking routes – do predict change in commuter travel over 12 months.

5.11 Beyond infrastructure, to date the evidence from controlled studies of other interventions (such as education, marketing and promotion of cycling) suggests a relatively modest impact in practice.[29] Current active travel interventions are often small scale, localised and limited in their scope. Sustained and substantial interventions that address physical, cultural and psychological barriers are required.

6. The role of schools, parents, Local Authorities and government in encouraging active play, travel and sport for children and young people.

6.1 Physical activity patterns are influenced from a very early age. A study of physical activity patterns of women and their four-year-old children revealed a strong association between the two: young children are not necessarily just 'naturally active' and parents have an important role to play in the development of healthy activity habits early on in life. Unfortunately, only 53% of mothers in this study engaged in 30 minutes of moderate-to-vigorous activity at least once a week.[30]

6.2 In popular parlance physical activity is often substituted by 'exercise' and conflated with 'sport'. However, as recognised by the national physical activity guidelines, physical activity can encompass a range of activities. This may be particularly important in reframing the promotion of physical activities in schools. In the SPEEDY study 94% of adolescents wanted to increase physical

activity. However, whilst gym use and team sports were popular with around half of respondents, girls were more likely to select non-traditional forms of physical activity such as dancing. Participation during school time was less popular among girls and more popular among participants with low socioeconomic status. Overweight/obese adolescents were less likely to choose participation with friends.[31]

6.3 Physical activity declines from childhood to adolescence: accelerometer data has found that 10 minutes of daily physical activity is replaced by sedentary time every year from the age of 10. Moderate to vigorous physical activity (MVPA) declined most steeply among boys, although girls were less active at all ages. Children living in rural areas also experienced greater declines.[32] Some of this decline is likely to be a natural part of growing up, but it is likely to be amplified by the increase in the opportunities for sedentary behaviours. Rather than aiming for increases in physical activity, effective strategies for physical activity promotion in adolescents should more realistically aim to maintain earlier activity levels.

6.4 The decline of physical activity in older children is particularly pronounced at weekends when compared to weekdays, indicating the importance of the home environment at this age. However, in the SPEEDY study, parental support was associated with less of a weekend decline in physical activity.[33] Family support appears to be similarly effective across ethnicity groups[34] and for different ages and sexes.[35 36 37]

6.5 Despite this importance of family support, family-based programmes have tended to be unsuccessful because they frequently only recruit a small proportion of the families they are targeting. Moreover, session attendance can be a problem, most likely due to requirements of attendance at specific times in out-of-home locations.[38]

6.6 CEDAR researchers have developed a framework for understanding the influences of the school environment on childhood obesity, including physical activity.[39] It underlines that consideration should be given to the wider context of schools' physical and social environment when attempting to encourage sustainable behaviour changes. Nevertheless, research has identified specific characteristics of the school and surrounding environment which may be supportive of physical activity:

- Children are more active if school grounds are more supportive (playground markings, playground equipment, marked sports pitches and tracks, wildlife garden etc.)[40]
- Break-time play contributes to overall activity levels in children. Having a longer morning school break may be important: children attending schools with a break of over 15 minutes maintained their physical activity levels better over a 1-year period.[41]
- Rainfall is associated with less physical activity in primary school children: providing indoor physical activities in wet weather may help children maintain physical activity levels irrespective of the weather.[42]

6.7 Whole-school physical activity interventions have promise to be effective,[43] although the size of effect is small and their effect on overall physical activity needs to be assessed in more detail. A lack of effective engagement of actors outside of the school environment (family, non-school peers, community leaders, sports clubs etc.) is a likely explanation for this.

6.8 Provision of safe streets or natural and challenging outdoor environments for children to engage in activity is associated with more physical activity. This does not necessarily have to be formal 'playgrounds', nor does the activity need to be organised. Research using GPS data has found that children who spent more time outside the home were more active.[44] This suggests the importance of the provision of urban gardens and green spaces, and the maintenance of safe street environments as places for children to be active. It is important, therefore, to help children and their parents manage risks perceived to be associated with activity, for instance teaching physical and coping skills and courses such as Bikeability.

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