

West of England Joint Spatial Plan

Issues and Options consultation

Bristol Heath Partners' response

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Foreword

This document sets out the joint response from four Health Integration Teams within Bristol Health Partners to the West of England Joint Spatial Plan consultation on Issues and Options.

Bristol Health Partners is a partnership between the NHS, both of Bristol's universities, and Bristol City Council. The partnership exists to support efforts to improve the health of those who live in and around Bristol and to help improve the delivery of the services on which they rely, acting as a positive mechanism for change in our health and care community and city region.

We do this via a number of Health Integration Teams which act as engines of collaboration, integration and the translation of research. Each of our HITs have a specific focus, and a number are doing work relevant to the wider

determinants of health in and around Bristol – developing evidence and understanding that is particularly relevant in the context of the developing joint Spatial Plan.

The focus of this submission is not the implications of the emerging plan on delivery of health care services *per se*. This focus is rather on the potential impacts on the health and wellbeing of the population due to spatial location and development patterns. Using an extensive evidence base this response exposes the consequent potential impact on the choices that people will, or will not, be able to make in terms of a healthy lifestyle and also attempts to review the degree to which social inclusion will be fostered, or not.

This approach is based on the wider determinants of health, which is an approach which has been acknowledged and validated by the World Health Organisation for use across Europe and also in the England by Public Health England for spatial planning. We believe the Joint Spatial Plan should incorporate and reflect this health and wellbeing approach. Evidence, referred to in this response, indicates that where development supports healthy lifestyles, throughout the whole life-course and whatever the level of social deprivation, quality of life is improved and the inequalities reduced. This in turn can reduce the economic burden on the NHS and social care sectors. The approach also generates potentially considerable associated co-benefits in terms of sustainability, biodiversity, local economy, community safety and transport objectives.

We understand the current consultation is one stage in a process that runs through to 2017 in this joint form, and then will continue in the four local authorities' more detailed planning documents, and could guide development for the next 25 years or more. We strongly welcome the opportunity to take part in this process, and will aim to ensure that at each stage in the development of these plans, and in line with the vision set out in the plan, health and wellbeing of current and future populations is regarded as a material factor in determining development decisions – and shaping the places in which we all live and work.

A handwritten signature in black ink, appearing to read 'D Relph', with a long, sweeping underline that extends to the right.

David Relph
Director Bristol Health Partners

29 January 2016

Background

The development of a Joint Spatial Plan comes at an interesting tie in terms of the policy discussion from both an international and national perspective – we attempt to summarise some of this here.

The Policy Context - International

In terms of wider international work, the UK is a member state of the World Health Organisation and a signatory to Health 2020 at ministerial level. The 53 Member States of the European Region adopted Health 2020 in September 2012. It aims to support action across government and society to 'significantly improve the health and well-being of populations, reduce health inequalities, strengthen public health and ensure people-centred health systems that are universal, equitable, sustainable and of high quality'. It recognises that 'Poor health wastes potential, causes despair and drains resources across all sectors of society.' (WHO 2013 p9).

Moreover, Health 2020 encourages all member states to adopt a 'health in all policies' approach. This sees the state's responsibility for population health spreading outside the traditional confines of the Department of Health and the NHS.

Health in All Policies (HiAP) is an approach to policies that systematically takes into account the health and health-system implications of decisions, seeks synergies, and avoids harmful health impacts to improve population health and health equity. It is founded on health-related rights and obligations and has great potential to improve population health and equity.

Leppo et al. 2013 p3

Health 2020 gives a platform for innovation and partnership; indeed this sub-regional plan could be an example of Health 2020 in action.

However, incorporating health into policies across different sectors is often challenging and even when decisions are made, implementation may only be partial or unsustainable. For the objective of 'health' to have traction in the planning sector, it is worth repeating this useful definition of health, enshrined in the WHO constitution:

The World Health Organisation defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, and recognises the enjoyment of the highest attainable standard of health as one of the fundamental rights of every human being.

WHO 1948, p1

The Policy Context – National health policy development

From a national perspective the key health policy document in recent years has been the 5 Year Forward View, published by NHS England in 2015. This document talks about the health and wellbeing gap that we currently face in the UK:

We are living longer lives but we are not living healthier lives. The overwhelming majority of ill health and premature death in this country is due to diseases that could be prevented if people lived healthier lives. Many could also be detected earlier and better managed to prevent deterioration and hospitalisation.

NHS England 2015, p10

The 5 Year Forward View is the key extant piece of UK health policy – and its publication has promoted much discussion both within the NHS but also in communities of interest concerned with the challenge of population health – on understanding health in places and not simply how well hospital (for example) services are being delivered.

Consider this from the Kings Fund, a highly respected London based health think tank:

Integrated care has become a key focus of health service reform in England in recent years, as a response to fragmentation within the NHS and social care system. Yet efforts to integrate care services have rarely extended into a concern for the broader health of local populations and the impact of the wider determinants of health. This is a missed opportunity.

Kings Fund 2015, p2

The development of longer term work such as the Joint Spatial Plan gives us the opportunity to address some of these issues locally – and this submission is designed to provide the means to do that by summarising and sharing some of the current evidence base with regard to the wider determinants of health and health in places.

Health in the National Planning Policy Framework

The veracity of the approach of ‘health in all policies’ is also reflected in England by the National Planning Policy Framework (NPPF) (CLG 2012), under which the West of England - Joint Spatial Plan, and then subsidiary local plans, is being developed. In this context it is a key piece of current guidance, and accordingly it is worth emphasising – and remembering as the Joint Spatial Plan is developed - the references within it to health and its broader determinants.

The NPPF itself refers to health and healthy communities a number of times, and provides examples of simple physical design measures that support healthier lives. Usefully, the NPPF also acknowledges international obligations by re-stating Resolution 42/187 of the United Nations General Assembly that

planning must to contribute to 'ensuring a strong, healthy and just society' (NPPF Box p2).

The NPPF goes on the state that there is a need for the planning system to perform a number of roles, economic, environmental and social. A social role in;

Supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community's needs and support its health, social and cultural well-being

NPPF Para7 p2

It states that a core planning principle planning should;

Take account of and support local strategies to improve health, social and cultural wellbeing for all, and deliver sufficient community and cultural facilities and services to meet local needs.

NPPF Para 17 p6

And goes on to state that:

Transport policies have an important role to play in facilitating sustainable development but also in contributing to wider sustainability and health objectives.

NPPF Para 29 p9

In a section titled 'Promoting healthy communities', it states that 'the planning system can play an important role in facilitating social interaction and creating healthy, inclusive communities'. Further, planning policies and decisions are expected:

to promote

- *Interactions between different groups and individuals in an area*
- *Safe and accessible environments*
- *Clear and legible pedestrian routes in high quality public space to encourage the active and continual use. Including protecting and enhancing public rights of way and access.*

to deliver

- *the social, recreational and cultural facilities and services the community needs*

to provide

- *access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and well-being of communities.*

NPPF Section 8 p17

Health is also referred to in sections on environmental issues:

Planning policies and decisions should aim to: avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;

And to: 'mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;

NPPF Para 123 p29

In terms of this response from Bristol Health Partners, the NPPF talks of the 'using a proportionate evidence base' (Para158 p38) and that:

Local planning authorities should work with public health leads and health organisations to understand and take account of the health status and needs of the local population (such as for sports, recreation and places of worship), including expected future changes, and any information about relevant barriers to improving health and well-being.

NPPF Para 171 p41

Summary

The words 'healthy' and 'wellbeing' have been used frequently as objectives in the consultation document. The use of these terms has also increased markedly in the last few years when one considers the broader context of international and national health policy development. This trend is welcome, because it helps us to think about health in a broader way that gets beyond the operational delivery of services, and focusses on broader issues of health in places, and what factors actually shape this.

This submission from Bristol Health Partners, attempts to strengthen this broader approach through providing some of the evidence base which links spatial form and what has been termed 'the wider determinants of health'. We understand that the current document deals with strategic issues and not detailed urban design (e.g. seating and trees). However we feel that is vital to strengthen the evidence base and articulate the issues that connect physical form with health and wellbeing outcomes (including health equity) and so place markers in the sub-regional planning system, giving access to strategic support for healthy urban planning policy for years to come.

The evidence presented in this submission is robust, but also proportionate. By this we mean that the measures suggested can be achieved at little or no extra cost; that they add value to the development; and on the whole they are compatible with other stated objectives within this issues and options paper - a co-benefits approach.

On the whole the proposals in this draft plan state that their purpose is to protect health, support wellbeing and reduce the inequality gap. Experience shows that objectives always get watered down; though further iterations, through local interpretation and implementation, and finally through value-

engineering. The real test is to what degree this plan contains a process that will lock-in these goals; and this is not yet explicit.

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Q1: Have the most appropriate critical spatial issues been identified in addressing housing and wellbeing; the economy; the environment; and transport?

1. Housing and access to jobs are key determinants of health (Marmot 2008). The wellbeing, and inequalities in wellbeing, for current and future populations in the WoE area will be determined by the quality of housing and associated neighbourhood environments, and access to jobs. We welcome that this issues and options consultation focuses so clearly on these. However, as the document acknowledges, it is in the details of implementation that health and wellbeing benefits, or dis-benefits, lie.
2. (Para 2.1) In terms of the key facts and figures, good connectivity is a determinant of health. Health is especially supported where there are good opportunities for attractive non-car based personal mobility (this is an important topic for population health and we have provided an extensive evidence based argument in response to question 15 on transport).
3. (Para 2.1) The problematic issue of connectivity to the south is mentioned in the draft. To this should be added the weak local rail and rapid transit inter-connectivity within many parts of the West of England area. (There is a mention of local rail capacity in para 2.17, but not connectivity).
4. (Para 2.5) Housing quality is an issue for the acute health sector as injury is more common for children and young people living in poor quality housing and in the private rental sector (NICE 2010). Particularly vulnerable groups in relation to home safety are children aged under 5 and those living in temporary, rented and social housing with families on a low income.

In addition to the quality of housing, there are also specific elements in local urban form, urban design and streets patterns, at or below the scale of neighbourhood, that impact on health and wellbeing outcomes (Grant & Braubach 2010, Barton et al. 2010).

Environmental modification (together with Education, and Legislation & Enforcement) has been long recognised as one of the three essential components of an effective injury prevention strategy (Runyan 1998).

5. (Para 2.6) This paragraph addresses some of the key health issues for the West of England. However, as a health focussed paragraph, it casts these issues in terms of their 'strain on health services'. Wellbeing issues also need to be treated as concerns in their own right. Notwithstanding that, the knock-on economic effect of urban development, where health and wellbeing have not been deliberately built-in, will not only be felt in the health service sector. Such development can also create an economic burden on other sectors. For example on employers, through elevated sickness levels (Künn-Nelen 2015); on the police, through elevated levels of social incivilities through lack of 'passive surveillance' (see Horowitz et al. 2005 or

Whitley et al. 2005), and on schools, through lower educational performance (Bhattacharjee 2015).

6. (Para 2.6) This reference to wellbeing in the Joint Spatial Plan must also be seen in the context of an ageing population. We suggest that this context is highlighted in the document. This will be very significantly for health and wellbeing, and associated support services, over the life of the plan. A current key public health issue is the rising cost of health and social care of the older population. The identification of a cost-effective means of increasing quality of life, independence, mobility, good health, and social engagement of older adults has now become a priority (House of Lords 2013, Meltzer et al. 2012). Again the focus is on a liveable or healthy neighbourhood environments.

The self-reliance and independence of people as they get older, and also people experiencing early onset or full dementia at any age, is strongly influenced by the access they may have to community support and support for a healthy lifestyle - outside the formal care services. This can be facilitated by urban form that promotes interaction between neighbours, communities with strong social capital and places to gather, indoors and out and places where residents (and carers) are able to walk to shops and other local amenities. For example evidence has shown that community gardens can be very useful for people affected by dementia which, in addition to being a safe space, provide a therapeutic option to help manage some of the challenging behaviours associated with dementia (Clark et al. 2013).

7. **The future of health and social care - local neighbourhood.**

With the rise in the number of people living with dementia in the population, place-making, in the WoE spatial strategy needs to be informed by best practice guidelines. For example, the objective for convivial urban areas with a good level of density is supported in 'How can we make our cities dementia friendly', a Joseph Rowntree Foundation report (JRF 2015). This report shows that carers supporting people living with dementia need to have places to go where they can have time alone; this in turn requires places that the person they support who is living with dementia can go.

A locally commissioned project is Growing Support which follows the principles of the Natural England 'Greening Dementia' report (Clark et al. 2013). This is a social enterprise whose community volunteers tackle loneliness and the effects of inactivity for people with dementia. Although not primarily concerned with physical planning, such vital social support initiatives thrive better where place-making creates the potential for local connections and indoor and outdoor community spaces. Initiatives like this are required both to provide vulnerable people with support and to reduce the economic costs to the public purse of health and social care. Another example in this sector is that of memory cafes, there is evidence of their effectiveness in the peer support for people living with dementia and those supporting them (Hope & Pope 2014). Memory cafes are also beneficial for people with

learning difficulties who also have dementia who are often a forgotten group of people living with dementia (Kiddle et al. 2015).

Leading a physically active life has well-established health benefits. Local neighbourhoods must be planned and built to be attractive places for everyday walking. Many studies indicate that this can lead to lower levels of obesity (Durand 2011). For older adults in their late 70s and 80s increased levels of walking leads to a potential for cost savings to health services through reduced reliance on prescriptions and fewer unplanned hospital admissions (Simmonds et al. 2014). Walkable neighbourhoods are suitable for outdoor community level social care, such as organized local walking and gardening groups.

8. (Para 2.7) It has already been stated that the 12 core planning principles, in the National Planning Policy Framework (NPPF), guide the identification of the critical issues. However there are tensions and conflicts inherent in these 12 principles, and even acknowledged tensions at law amongst the overarching 3 dimensions of sustainable development set out in the NPPF (Landmark Chambers 2014).

In resolving these, with a specific West of England context, the proposed policy, such as this one about the 'Economy', will need to be able to distinguish between different forms of economically positive development: in this case between economic success that might be in synergy with the other critical issues, and economic success which might be positive on its own terms, but could unnecessarily, or unwittingly, put other critical goals at risk. For example a Bristol City Council study of jobs demonstrated that some types of jobs, in particular shift work, temporary work, part-time work and low paid work, in some circumstances can have an adverse effect on wellbeing (BCC 2012). This is especially important for already vulnerable sectors of the population, as these types of jobs would then also exacerbate health inequalities, conflicting with the stated vision of the plan.

Whilst the local authorities involved can do little to prevent low pay, this is just an example of why they must ensure robust processes are put in place to ensure synergy, and not antagonism, between the plan objectives.

9. There is an absence of the recognition of food an important health issue. Access to a variety of good quality local food is an important determinant of health, local issues include a rising incidence of obesity and in some places in Bristol even food deserts. Much can be done through spatial planning to safeguard and promote access to healthy food (WHO CC and SHINE 2014). The emphasis on local food being particularly important for those restricted, for all kinds of reasons (such as through young or old age, or with caring responsibilities) to the their neighbourhood. Local food growing on a large scale is important for food security and resilience, and on a smaller scale, embedded across urban developments, can provide loci for outdoor physical activity and social interaction.

We would like to see explicit mention in the text of the importance of identifying and protecting valuable soil resources wherever these are found, including small pockets of local fertility and the national designation of 'Best and Most Versatile Agricultural Land' (Fig 4).

10. Comments on the spatial maps. The WoE area is mainly shown in isolation to its regional connectivity – a map showing this wider context would be useful (see figure 7 for example of suggested extents for the mapped area).

Many maps show the WoE area as an unconnected island, this is not 'good' spatial planning (see for example Dühr 2004). In particular: Figure 1 – there are known regional patterns of connectivity with Cardiff and nearby South Wales, these need stronger graphic representation.

Figure 3 - this shows the WoE area in isolation, with no relationship to the surrounding and also other relevant areas of employment.

Figure 4 – indicating the main rivers would help make sense of the ecological catchments and connectivity.

Figure 6 – Rail commuting from South Wales has been omitted.

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Q2: Is our vision the most appropriate one for guiding development and growth in the West of England up to 2036?

Are there any changes you would like to see to the vision?

1. We welcome the clearly articulated and embedded goals in the vision of supporting population health and of reducing health inequalities.
2. Adjustments to the 'Proposed Vision for the West of England Joint Spatial Plan' are suggested, so that it would read:

'By 2036 the WoE will be one of Europe's fastest growing and most prosperous sub regions with the gap between disadvantaged and other communities closed and a rising quality of life for all, **at all stages of life**. The rich and diverse environmental character will be integral to health and economic prosperity. Patterns of development and transport will facilitate healthy **communities** and sustainable lifestyles **and integrate with the sub region's biodiversity and natural assets**. Existing and new communities will be well integrated, attractive and desirable places and supported by the necessary infrastructure. New development will be designed **to help achieve these goals and to** be resilient to, and reduce the impacts of climate change.'

Explanation of the proposed changes:

Insert 1: at all stages of life

For health and wellbeing outcomes we need to ensure that the whole population is covered, children and young people can sometimes be overlooked, and at the other end of life we need to capture issues concerning the ageing demographic.

Insert 2: communities

For health and wellbeing outcomes we need to ensure that there is a focus on communities and not just individuals.

Insert 3: and integrate with the sub region's biodiversity and natural assets

Contact with nature and working with ecosystem services can have benefits for health and wellbeing. Currently these rich sub regional assets are only weakly acknowledged in the vision.

Insert 4: to help achieve these goals and to

New development needs to be considered in light of all the goals. This is not made clear – the final sentence is separate to the rest and adds climate change as if it was an isolated issue. The suggested amendment includes the issue of climate change as integral, and also captures the spirit of the whole vision.

**Q3: Are the spatial objectives the most appropriate ones for guiding development and growth in the West of England up to 2036?
Are there any changes or are there other objectives you would like to see?**

(Para 2.23:1)

‘Meet the full need for market and affordable housing in a way which enables demonstration of a five year housing land supply within each Unitary Authority.’

1. Housing quality, whether market or ‘affordable’, is an issue for the acute health sector as injury is more common for children and young people living in poor quality housing and in the private rental sector (NICE 2010). Particularly vulnerable groups in relation to home safety are children aged under 5 and those living in temporary, rented and social housing with families on a low income. We understand that hard wired smoke alarms and thermostatic mixer valves are now required to be built into new build homes and have been introduced specifically to reduce the risk of fire and scald injuries (with appropriate evidence bases). What is also needed (but not supported by legislation) is that such improvements are also incorporated in any regeneration of existing social housing stock.

(Para 2.23:2)

‘Entail a pattern, location and nature of development which promote healthy lifestyles and creates a sense of community through quality design.’

2. **Fidelity to, and delivery of, the objectives over the long term.** Evidence demonstrates that patterning, location and the nature of development can have very profound and long lasting implications for the health and wellbeing of residential populations (GCPH 2013, Grant & Braubach 2010). Each of these separate spatial design elements will need careful consideration if aspirations for closing the inequality gap and for health, as set out in the vision for this plan, are to be realised (Grant & Braubach 2010). There are good examples of appraisal mechanisms that can embed powerful criteria led processes in spatial policy, whilst also being open to stakeholder concerns and future uncertainty. One process that has been used in the southwest for over 10 years to safeguard health and sustainability in spatial plans, policies and projects is Spectrum appraisal (Barton and Grant 2008). This has already been used in Bristol (Grant 2009, Hewitt et al. 2010) and South Gloucestershire (Cribbs-Patchway New Neighbourhood) and several trainings in the method have been run in Bath and North East Somerset and North Somerset with local authority planners and public health practitioners. This or another explicit mechanism is needed that can support continuity of objectives, in a relevant manner, through all further stages of development, such as local plans, design frameworks, design coding and any associated supplementary planning documents (Grant and Barton 2013). The central role of a mechanism to achieve the stated goals needs to be addressed in this current higher-level spatial plan.

3. **The health evidence base.** Both the underpinning and implementation of this plan needs to be based on a ‘proportionate

evidence base' (NPPF Para158 p38), and 'public health leads and health organisations' (NPPF Para171 p41) are asked to provide 'information about relevant barriers to improving health' (NPPF Para171 p41). Below we highlight some key elements of the evidence base relevant to the patterning, location and the nature of development.

4. **Nature of locality.** Safe and accessibility local destination opportunities, with attractive aesthetic attributes have significant associations with everyday physical activity (Humpel 2002). It has also been found that attention to certain elements in design can support the creation of a sense of community for all ages (GCPH 2013). Supporting strong communities through design is about both the final design and the process of achieving it – engaging and involving local people and prospective residents. Strong communities foster inclusion and help mitigate against individual isolation – a growing factor in health and social care costs.
5. **Process of development.** There is a need to consult people affected by dementia in redesigning neighbourhoods. As dementia progresses, complex street designs and buildings can be difficult to navigate and clear signs are needed (JRF 2015).
6. **Natural assets.** People who live in neighbourhoods with a higher density of trees on their streets reported significantly higher health perception and significantly less cardio-metabolic conditions (Kardan 2015). Kardan goes on to recommend the number of trees in a block, this could provide useful information on which to base design codes. Looking out on, and being in, the green elements of the landscape affects health, well-being and feelings of social safety (Groenewegen et al. 2006), and there is a restorative effect (from daily stress) from viewing green space (Van de Berg et al. 2015).

Much more is now known about the use of semi-natural areas, including woodlands, and their use in promoting wellbeing and also reducing health inequalities (Ward-Thompson & Aspinall 2011). With the wealth of natural assets in the plan area, it would be good to see the plan acknowledging that the best scientific knowledge will be used as a basis for design and planning.

In terms of people living with dementia, having a connection to nature is important for well-being, and needs to be considered in housing designs (Gibson et al. 2007, Chalfont 2006). Evidence suggests that social interaction and access to the outdoors and nature is important for people living with dementia and that these activities have an important role in their quality of life (Clark et al. 2013). A report from natural England suggests that there are potentially 'huge health and social care cost savings, as well as wider societal and economic savings, to be made by investing in alternatives to medication that enable people to live well early on in the disease process' (Clark et al. 2013 piii). Planning can and must ensure that nature can be accessed through everyday activity and that it can be available locally for organised activities.

7. **Streets and outdoor places for all ages.** There is an urgent need to promote physical activity from a young age, children's activity and freedom to roam is very susceptible to their own and parental perceived feelings of safety (Mullan 2003). Higher levels of activity, good for long-term wellbeing and health, will result in greater exposure to risk of injury as any activity will result in some increase in injuries. For example, new play areas for children need to be designed to be fun and exciting, and allow learning about risk, without unnecessarily increasing injury risk. Therefore all public realm, including roads and playgrounds, need to be designed using a danger reduction approach (Whitelegg & Haq 2006). It is also important that neighbourhoods support children walking to school (Audrey & Batista-Ferrer 2015), this has consequences for school size, location and street patterns and design (Manual for Streets DfT 2007).

Good planning and design can make walking highly accessible, as a daily activity, and can provide people with easy access to physical activity throughout life. Evidence shows that it is important for adults to be able to walk to work (Audrey et al 2014). This plan needs to take notice of the Bristol Walking Strategy (BCC 2011) and the Manual for Streets (DfT 2007).

At the other end of life, men will have on average seven years of life after they stop driving and women will have ten years (Foley 2002). Mobility impacts on wellbeing in a number of ways. The report from a major study (IDGO, undated) has shown that older people go out into their local neighbourhood very frequently, regardless of season, and walking is very much the predominant form of transport. The three major reasons given for going out are: socialising, getting physical exercise and fresh air, and contact with nature.

The study concludes that if an older person cannot get out and about locally, they are at risk of becoming 'a prisoner in their own home'. From 65 years onwards, people who don't find it easy or enjoyable to get outdoors can spiral into poor physical health, less social contact with others and a reduced quality of life overall. With the cost of sedentary behaviour estimated at £8.3bn per year (CMO 2010), this places a further financial burden on the NHS and Local Authorities through increased admissions to hospitals and residential care homes.

Older people need to live in an environment that makes it easy and enjoyable for them to go outdoors (IDGO 2013). Elements that add ease of local walking can include good quality pavements, seating, access to toilets and access to water. In supportive environments, older people are more likely to be physically active and satisfied with life and twice as likely to achieve the recommended levels of healthy walking. The same has been found for those who live within ten minutes' walk of a park (IDGO, undated).

It has been shown that one indicator of reduced hospital admissions, less frequent GP visits and more independence is how many times an older person old leaves the house (Sugiyama 2007), having walkable destinations and good street design support this (Newton 2010).

The main message from the research is that there is strong evidence, and evidence based tools, that will support the designing of streets and outdoor spaces for all ages (Ward-Thompson 2013). It is important to note, that this is not just an urban design and street furniture issue relevant at a more detailed iteration of spatial planning. The key elements such as: residential density (affecting footfall and viability); presence or absence, and the nature of, local amenities or destinations; and street and transport patterning; are all determined within the current sub-regional plan (Grant & Braubach 2010).

(Para 2.23:4)

‘Assist in closing the gap between disadvantaged and other communities.’

8. **Safe streets for equality.** This is also an important social inequality issue as deaths and serious injuries in children are highly socially patterned with the most disadvantaged at the greatest risk (Edwards 2006, 2008).
9. **Dementia and inclusion.** People with dementia and their carers are often an overlooked and disadvantaged community. We are likely to see a growth in the numbers of people affected. Research is at an early stage but case studies and good practice show that spatial planning can lead to better quality of life, less exclusion and reduced burden on the NHS for this group. Rurality does not necessarily add to burden, or lack of coping, for people supporting people living with dementia (O’Connell et al. 2013). We suggest that there should be explicit consultation with specialists in this field to provide spatial best practice for dementia as the plan develops.
10. **Health equity and the role of natural areas and parks.** In Scotland planned access to woodland in and around social housing has proved valuable in supporting health equality (Ward-Thompson 2014). Access to parks and natural areas *per se*, can help reduce health inequalities (Mitchell & Popham 2008, Ward-Thompson & Aspinall 2011).

(Para 2.23:5)

‘Ensure that new development does not exacerbate existing pressures on infrastructure and that the necessary infrastructure is provided.’

11. For the sake of existing communities and sustainable development, add also the positive statement: ‘Enact mechanisms to strongly guide new development, be it housing, leisure, retail or employment, to locations that support the viability of existing infrastructure, amenity and services and locations that will reduce inequalities between, and within, communities.’

(Para 2.23-6)

‘Focus new housing and employment which facilitate public transport and active travel methods and limit substantial new housing and employment in locations which would exacerbate unsustainable travel patterns.’

12. This is poorly worded currently. Do you mean: 'Focus new housing and employment into locations which facilitate public transport and active travel methods and limit substantial new housing and employment in locations which would exacerbate unsustainable travel patterns.'

(Para 2.23-7)

'Maintain or enhance the environmental quality and the attractive character and identity of the WoE's cities, towns, villages, and countryside and embeds the services provided by the environment into our patterns for sustainable growth.'

13. Change last phrase to read: 'and embeds the services provided by the environment and nature to support the goals of wellbeing and economic prosperity.'

There is plenty of evidence, some of which is cited elsewhere in this response, that shows a positive impact on wellbeing from good quality natural environments.

(Para 2.23:8)

'Respond to the challenges of climate change and minimise flood risk.'

14. Unlike many of the spatial objectives, climate change and flood risk are referred to here in isolation. However it is important to make explicit, particularly in light of the long-time horizon for this plan, that both climate change and flood risk present a challenge to the goals of health and closing the disadvantage gap. Climate change poses a number of challenges to health (HPA 2012). For the UK headline risks include 'the impact of heat waves and overheating of buildings, increased risks of air pollution and its associated health effects, and the increasing likelihood of flooding events, alongside impacts on service disruptions and communities. The effects are expected to be unequally distributed, affecting deprived people and groups the most.' (NHS & PHE 2015, p6)

For the wellbeing outcomes, success can only be through robust implementation. Yet no defined or evidence-based process is made explicit in this document. There are toolkits that can be used to calculate costs and savings of adaptation and mitigation at sub-national level (WHO 2013). At the opposite end of the scale, other toolkits show how good urban design and planning can reduce heat island effects and achieve better outdoor thermal comfort (CABE 2007).

15. Co-benefits between wellbeing, the economy and liveable places needs to feature strongly in the mitigation and adaptation to climate change (Younger et al. 2008). For example, in terms of mitigation, studies show that good urban tree cover and/or shelterbelts can reduce residential heat loss due to winter winds by around 5% (PSA 1998), such measures have co-benefits for health in serving to reduce potential of fuel poverty and creating more walkable urban environments.

(Para 2.23:9)

‘Have place making at its heart with high quality design that positively responds to local context and heritage assets.’

16. Place making is not just an aesthetic endeavour. In terms of the wellbeing of people with dementia and mild-dementia; getting out and about is important for physical activity, independence and reducing social isolation (Chan 2012). Landmarks are an important aid to orientation and navigation and People living with dementia are likely to remember landmarks even when cognition is in decline (Kessels 2011). In addition, technology can be used alongside landmarks to help navigation (de Castro 2013 and Palmer & Handcock 2015)

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Q4: Are we planning for the right number of homes?

Is there anything else we should take into consideration regarding the number of homes?

1. (Paras 3.1-3.3) For specialists less familiar with housing market assessments there is need for more clarity on the manner in which the JSP relates to the four unitary authorities. What is the impact on the JSP of having a different baseline and process for Bath and North East Somerset? How are any adverse impacts to be mitigated? There is some confusion with the key on Figure 8. Is the area labelled as 'HMA Area' consistent with the text, or should this be 'Wider Bristol HMA'? Please mark the 'Wider Bristol HMA' on the figure if it has a geographic footprint.

Q5: What needs to happen to ensure the homes we need are built by 2036?

1. (Para 3.8) In terms of increasing the supply of homes, there needs to be a stimulation of a wide range of supply routes for homes.
2. The plan needs to encompass the potential for homes to be created from conversion of existing built stock that is either derelict, under-used or can be converted from others uses. We suggest that further work may be required to look at the distribution of un-occupied or under occupied properties within the WoE and whether there are measures that might help release these into the market.
3. The 'homes we need' must not be considered solely in terms of number, but also in terms of the other stated objectives. A type of supply, which is being seen as increasingly important, is the nexus of 'self-develop', 'self-build' and community interest development companies. This agenda is not just about numbers, but also about quality. Some evidence shows that this type of development can lead to strong and cohesive communities with higher levels of wellbeing and greater levels of community safety. On visits to study neighbourhoods procured in this way in Netherlands and Germany, Directors of Public Health and City Planners, including some from Bristol, found that they contained many spatial elements that support healthy lifestyles and strong communities (Grant 2008, 2009; Burgess 2012). These types of development and the financial land transfer structure underpinning them should be supported, especially in situations where the land is in local authority ownership.
4. We are not clear of the degree to which the Joint Strategic Needs Analysis, or other health trend data, helps to determine future housing need. For example there will be specific assisted housing needs required for those with dementia (Hyde et al. 2007), evidence also points the needs for situating such homes (Gibson 2007, Chalfont 2006).

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Q6: What needs to happen to ensure enough of the homes built are affordable?

1. (Para 3.11) This is largely a question of finance, and although we don't have a financial solution ready; nationally there are several research teams looking at the implications on the future public purse of not supplying housing or neighbourhoods that adequately support healthy lifestyles for residents.
2. The definition of 'affordable' housing is contested and open to political interpretation. In part what is being referred to is the undersupply of housing accessible to those on lower incomes, at the margins of society, or with caring responsibilities. This should be made clearer in the text. If neighbourhoods do not support healthy lifestyles, especially with affordable homes, this will inevitably give rise to a financial burden for health and social care budgets at some stage. This also widens the inequality gap, as the populations that may require more affordable accommodation are also often the group that won't have the means to afford to go to private gyms or take respite through holidays and short-breaks. In terms of wellbeing, the provision of homes and quality of neighbourhoods is more acute for this group.
3. We would suggest that the WoE authorities commission a study that could support the case for a greater subsidy for affordable housing and neighbourhoods planned with health in mind, to save costs on the public purse later. BHP may be an appropriate partner for such research.

With additional factors of an ageing population, and the potential for large scale inadequate pension provision, there are several concerns here for future wellbeing that require attention.

Q7

Have we identified the right employment issues?

1. (Paras 3.13-16) This section on employment seems to be driven by the assessment tools available and not by the vision statement 'By 2036 the WoE will be one of Europe's fastest growing and most prosperous sub regions with the gap between disadvantaged and other communities closed and a rising quality of life for all'.

Not all types of rapid growth (assumed to mean economic growth) are compatible with wellbeing, some jobs may damage the health of people already vulnerable (BCC 2012). This is not addressed in the document.

The employment issues must be explicitly driven by higher-level goals which are for greater sub-regional and local resilience and employment that supports wellbeing, in particular for disadvantaged groups.

2. A Bristol City Council study of jobs demonstrated that some types of jobs, in particular shift work, temporary work, part-time work and low paid work, in some circumstances can have an adverse effect on wellbeing (BCC 2012). This is especially important for already vulnerable sectors of the population as these types of jobs would then also exacerbate health inequalities, conflicting with the stated vision of the plan.

Whilst the local authorities involved can do little to prevent low pay, this is just an example of why they must ensure robust processes are put in place to ensure synergy, and not antagonism, between the plan objectives.

3. Early onset dementia provides another example of a growing employment issue that may not have been addressed. Many people with early onset dementia have to stop work earlier than their planned retirement age (Harris & Keady 2004). This can have a negative impact on wellbeing for the person living with dementia as they have no longer have meaning occupation. This also impacts on individuals supporting them (van Vliet et al. 2010).
4. After housing, appropriate employment is one of the main determinants of health. A resilient approach might look at issues such as variety of types of gainful employment at a local level and jobs that best supports the local economy (Ward and Lewis 2002). Spatially this could translate into ensuring physical provision is flexible and local, that it is available in a variety of sizes with a variety of tenures, and that it responds to local needs and is insulated to some degree from global forces.

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Q8: Where should new employment land be located?

1. (Paras 3.13-16) The vision statement makes only implicit reference to employment. It may be inferred that that vision statement: 'Existing and new communities will be well-integrated, attractive and desirable places and supported by the necessary infrastructure' refers partly to integration of employment and residential areas.

Para 3.14 stated that the Economic Development Needs Assessment (EDNA) will provide an assessment of the needs for office, industrial and warehouse employment floor space, and a different study will identify the employment floor space requirements of retail or other service sectors. This makes a split between embedded neighbourhood jobs, often part-time or very local, and jobs that may require more specific skills sets and/or require people to commute. In combining these two kinds of studies, it will be important to retain the ability to use this joint spatial plan to support a third sector of independents, start-ups, home working, community sector and small businesses. These sectors can often populate, animate and make more viable local urban form such as mixed-use village, town, and district centres and also provide much needed footfall and support for much needed local amenities and services. The risk is that the EDNA may be undertaken in a way that results in a zoning plan and separation of employment from residential use, in situations where this is unnecessary and counterproductive to the overarching vision and objectives.

2. Mixed land use provides multiple destinations within close proximity. This has been found to be conducive to walking and cycling (TRB, 2005) with reasonable consistent associations for physical activity levels (Bauman and Bull, 2007). Conversely where urban development is unplanned or planned as segregated single use zones, often spreading out into areas adjoining the edge of a city, car dependency is likely to be increased (Lavin et al. 2006).
3. The integration of high levels of employment and jobs within residential areas and using mixed-use development, can reduce isolation and support community interaction and reduce commuting levels. In Europe, almost 80% of commuters use public transportation or a car to go to work, and the figures in Bristol are little different. Both of these commuting modes are strongly related to several negative health outcomes that increase as the daily time spent commuting lengthens (Künn-Nelen 2015). However, it has been found that commuting time has a more negative effect on health among car drivers than among commuters using public transportation. For car drivers, a study found that a longer commuting time was related to lower health satisfaction, lower health status, and a higher BMI with more frequent visits to a general practitioner (Künn-Nelen 2015).

For commuters using public transportation, the same study found no significant relation between commuting time and these health measures. In terms of health inequalities, women face more and stronger negative effects of longer commuting times. Whereas men who commute longer have a lower self-perceived health status, women

report lower health satisfaction, a lower probability of regular exercise, and a higher BMI; call in sick more often; and visit the general practitioner more often than men (Künn-Nelen 2015).

4. Long commuting times not only negatively affect different types of health outcomes but also have negative consequences on life satisfaction, stress, and family life as well (Stutzer and Frey 2008; Koslowsky et al. 1995 cited in Künn-Nelen 2015)

References for Question 8

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Q9

Is our priority of building more homes in Bristol and our main towns appropriate and how can this approach be achieved?

1. (Paras 4.1- 4.5) A priority must be to achieve this without negative and unintended consequences for wellbeing. Fortunately, evidence indicates that many of the elements associated with ensuring a good density of development provide good local serviced and walkable/cycleable places are also associated with active lifestyles and stronger social capital (NICE 2008, IDGO undated, Barton et al 2010). A 'health lens' will be required to ensure inclusion of the most vulnerable. For example everyday tasks such a grocery shopping can be difficult for people living with dementia and people with mild cognitive impairment (Gure et al. 2013), having supportive environments can help people remain independent for longer (JRF 2015). There should be explicit reference to the use of a mechanism to ensure a health appraisal of the developing spatial policy and all derived frameworks.
2. It can be achieved successfully, and within the vision, if the potential of urban areas to support health, wellbeing and inclusion for a wide range of people is maximised. Evidence now supports the otherwise arbitrary use of a number of spatial elements, listed below, allowing a higher degree of specificity for including them in plans in accordance with the NPPF.

Evidence shows the following can all be considered as contributing to wellbeing or more inclusive communities:

- Allotments and community orchards (Van de Berg et al 2010).
- Street trees (Kardan 2015).
- Well maintained green spaces (GCPH 2013, Van de Berg et al 2015)
- Safe and sociable play areas (GCPH 2013).
- Well-lit and pedestrian-friendly footpaths (GCPH 2013).
- Socially enhancing street patterns (GCPH 2013).

References for Question 9

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Q10: Have all the reasonable strategic locations been identified?

Are there any others we should consider?

Q11: Do you have comments on the suitability of any of the strategic locations?

Q12: In your opinion, do some strategic locations have advantages or disadvantages in terms of addressing the critical issues identified in chapter 2

Q13: Which spatial scenario (or mix of scenarios) is likely to best deliver the plan's objectives?

Q14: If a new settlement is a solution, how big should it be and where would you suggest it could go?

1. Taking these questions together; the basis of building health into future development at the sub-regional scale is getting the spatial patterning and resultant transport modes right (Grant & Braubach 2010). Health, wellbeing and closing the inequality gap are fundamental to all the other objectives of this plan including economic prosperity and environmental sustainability. There is a wealth of knowledge in this field (Barton 2009) and also much evidence about the risks and challenges to health if spatial planning is left to market forces or just follows a laissez-faire pattern determined by land ownership, prevailing house building industry and the arbitrary administrative boundaries in this sub-region (Grant and Braubach 2010).
2. Q10 to Q15 raise a complex set of interrelated planning issues. There is no one-size-fits-all and a well-planned development at a strategic scale can be rendered useless in execution at a more detailed scale of design, and vice-versa (Barton et al. 2011).
3. Success for wellbeing, and closing the inequality gap, will be dependant upon a methodical process being put in place to ensure that the knowledge and evidence of spatial determinants of health can be used to inform rational decision-making. Such a process is not yet in place.

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Q15: What transport improvements or measures would be required to support the scenarios?

4. The current summary inviting comments is almost bereft of mentioning the health benefits associated with sustainable transport and health and wellbeing generally.
5. Active travel is a key means through which populations can routinely achieve at least the minimum recommended levels of physical activity in order to protect against sedentary lifestyle diseases (for example, Audrey et al 2014). The Chief Medical Officers of the UK note that for most people, the easiest and most acceptable forms of physical activity are those that can be built into everyday life (DOH 2011). Examples include walking or cycling instead of travelling by car, and using stairs instead of lifts. Regular physical activity is also a key contributor to energy balance, helping to prevent obesity and excess weight (PHE 2014). Transport systems and the wider built environment have a crucial part to play by either promoting or hindering people to achieve these physical activity targets.

General comments

6. Physical inactivity costs the NHS between £1-1.9B a year and overall it costs the UK an estimated £7.4bn a year (Scarborough et al. 2011, UnitDoCMaSS 2002). However, this figure does not encompass other data such as that relating to air pollution - half of the UK's £10bn cost per annum of air pollution derives from road transport (EEA 2014). The overall costs to society from road transport are substantial. The Cabinet Office has estimated that excess delays, accidents, poor air quality, physical inactivity, greenhouse gas emissions and some of the impacts of noise resulting from road transport cost English urban areas some £38-49 billion (Cabinet Office 2009).
 - Physical inactivity directly contributes to one in six deaths in the UK and costs £7.4 billion a year to business and wider society
 - The transport system as it currently operates is a major factor in the decline in physical activity rates.
 - There are many opportunities to change this for the better while maintaining access needs.
 - Health promoting transport systems are pro-business and support economic prosperity. They enable transport systems to work optimally with less congestion, collisions, pollution, and with a healthier workforce.
 - Short car trips (under 5 miles) are a prime area for switching to active travel modes and to public transport
7. Physical activity saves money by significantly easing the burden of chronic disease on the health and social care services, and by reducing absenteeism (CMO 2011). A feasible reduction in prevalence of physical inactivity can lead to major cost savings, with 37% of the savings arising in the health sector. By order of magnitude, the largest savings would benefit:
 - individuals
 - the health sector

- business
 - government (CBI 2013).
8. Collaboration between transport and other planners and public health staff can improve health, the economy, and the environment. There is, for example, a significant positive relationship between physical activity, improved cognitive performance and academic achievement. There is convincing evidence that physical activity and fitness levels in school children is associated with better academic scores and improved classroom behaviour (Fedewa & Ahn 2007, Trudeau & Shephard 2010, Van Dijk et al. 2014).

A review conducted in Bristol included more than 20 scientific papers looking at the link between physical activity and academic attainment over the past 14 years (Bhattacharjee 2015). This concluded that:

- There is convincing evidence that physical activity and fitness levels in school children is associated with better academic scores and improved classroom behaviour.
- Active commuting to school can lead to the above benefits.

Recommendations included to:

- Make school travel plans an integral part of school policy to encourage sustainable modes of transport, and highlight the fact that the LEA have a statutory duty to contribute to healthy travel to school initiatives.
 - Enhance road safety messages, including the 20mph speed limit, for the local catchment area. Make parents aware that driving their children to school makes the environment more detrimental for walkers and cyclists.
9. More broadly, from a public health perspective, use of the transport system to meet basic needs should not place undue burden on people in terms of their monetary and time budgets, their physical and mental capabilities, and anxiety levels. Any negative environmental or societal impacts of such a system should be minimal, and should not be unfairly distributed to those worst off.

In terms of risk of harm there is no evidence that building additional road capacity is beneficial to health in developed economies but rather that it induces additional motor traffic journeys (SACTRA 1994, Egan et al 2003). Regional connectivity can be improved by rail, including increasing freight capacity.

10. **Economics and value for money:** Research suggests that a switch to increased active travel even just for previous short motor vehicle trips could save £17bn in NHS costs over a 20 year period. The largest cost savings would come through reductions in the expected number of cases of type 2 diabetes (£9bn) (Jarrett 2012). Investment in infrastructure or behaviour change programmes which enable increased cycling and walking is likely to give low cost, high-value options benefiting individual health, the NHS, the transport system as a whole, and the economy through more efficient use of our transport networks (DfT 2014).

- ▶ There is unequivocal economic justification for investments to facilitate cycling and walking says the Department for Transport (DfT 2014).
- ▶ The economic benefits of active travel are highly significant, with Benefit to Cost Ratios averaging over 5:1. The Department for Transport classifies schemes returning over £4 for every £1 invested as 'very high' value for money (Davis 2014).
- ▶ Next to providing considerable health benefits, walking and cycling also play an important part as 'co-benefits' in reducing carbon dioxide emissions, conservation of land, air pollution (which kills at least 29,000 people a year in the UK)(COMEAP 2015), noise as well as traffic congestion – which contributes to economic prosperity
- ▶ There is a major misconception about which mode users spend most money on local high streets. Car users clearly spend most at out of town locations which almost invariably designed around car use. This often results in them spending less in local centres. Indeed, research has found that as motorised traffic flow increases so does the proportion of vacant shops along that particular street (LCET 1993).
- ▶ Repeated research across Europe from Graz, Austria, to London Boroughs and the Gloucester Road suburban high street in Bristol finds that car users often spend less on their local high streets than bus users, pedestrian and cycle users. Surveys by traders have found this to be the case and traders have since become strong supporters of improvements for mode users other than cars (NHFOA 2011).
- ▶ Key ingredients for economically viable local centre include: reducing speeds and traffic danger; widening footpaths, adding cycle lanes; improving public transport; "greening" the street (NHFOA 2011).

11. **Travel demand management:** Motor vehicle parking is a key part of demand management. The most progressive cities in Europe are ring-fencing or earmarking parking revenues to support public transport services and/or bike sharing (ITPD 2011). Vehicle parking control more generally is one of the most effective ways to help boost walking, cycling and public transport use. Supportive transport environments appear to predict uptake of walking and cycling (Panter et al 2013a). Car parking availability appears to be strongly associated with travel behaviour (Wilson & Shoup 1990). Robust UK research suggests that those with work place motor vehicle parking are 20 times less likely to use active travel (Panter et al 2013b). Consequently, it is imperative that, in order for the sustainable travel modes to flourish, there must be more restraint mechanisms in place of private motor transport. This includes road space reallocation in order that more people can feel able to walk and cycle – both adults and children – which then can engender a culture of active travel across generations. Travel demand management is critical for the two cities and the towns in the West of England. Restraint will also help maintain the attractiveness of urban centres and inward investment.

12. **A Safe Traffic System: 20mph for residential streets and local high streets:** Road safety (i.e. freedom from fear of harm or injury on the road) should not be subjugated to mobility. No one should die or have to live with life-changing injuries as the result of meeting people's access needs. What is required is a safe systems approach to road safety in which the kinetic energy in the transport system is controlled so that death and life changing injury are eliminated. A Safe Systems approach to Road safety has now been adopted by the Department of Transport (DfT 2016). Interventions addressing a large number of people who are at a small risk may be more effective in reducing injury and illness than interventions addressing small numbers at high risk. This is an important consideration in areas of public policy such as road safety given finite resources. Of particular relevance to both transport planning and public health are injuries due to traffic collisions. The prevention paradox states that the majority of cases of injury and illness, such as from traffic collisions, do not occur in individuals at high risk. Thus, "a large number of people exposed to a small risk may generate many more cases than a small number exposed to a high risk" (Rose 1992). Interventions which are, therefore, targeted across whole populations are likely to be more beneficial in terms of harm and injury reduction. The city-wide implementation of 20mph is a prime example of small reductions in each drivers' speed having a potentially large impact on collisions and casualties (Cairns 2006). 20mph contributes also to releasing the suppressed demand for walking and cycling.
13. Safe routes to schools programmes need funds to enable children to travel safely on the school journey using active travel modes. Research has demonstrated the safety benefits resulting from interventions. For example, in the US, measures consisting primarily of pavement improvements (19%), traffic calming (14%), pedestrian /bicycle access (14%), and education (14%) at over a 10th of all US primary and elementary schools were implemented between 2005-10. During the study period, annual pedestrian injury rates in intervention areas in New York alone decreased 33% in school-aged children but remained fairly stable in other age groups (DiMaggio & Li 2013).
14. **Strengthen and enhance public transport corridors:** An increase in public transport provision and use, and a corresponding reduction in car use, has the potential to contribute to improving population health, and environmental and transport objectives. A population shift from using private motor vehicles towards more public transport use could contribute to improved health through enhanced wellbeing and reduced disease risk including cardiovascular disease, diabetes and some cancers. This is not least because there is a body of evidence which shows that for many public transport users significant physical activity time is also part of the journey. Some public transport users are reported to achieve the minimum of 30 minutes of physical activity daily solely by walking to and from transport stops (Wener & Evan 2007, Besser & Dannenberg 2005). Such studies also report that people of lower socioeconomic status obtain the greatest amount of physical activity by walking to and from public transport stops and so improved public transport generally could help to reduce health inequalities.

Greater attention needs to be given to older people (aged 60+) as they commonly experience transport disadvantage, including substantial problems with bus usability, which limits their participation in society and results in poorer health outcomes. Building and enhancing capacity and corridors alone is insufficient to improve the access and health and wellbeing of this group. Aside from infrastructure initial steps to an age-friendly bus system include ensuring that all buses have accessible low-floor entrances and exits, ensuring that bus drivers are friendly and helpful, and providing frequent bus services that operate during mornings, evenings and weekends. The barriers and facilitators to bus use for older people are varied, including aspects of the vehicle (e.g., entry and exit, handles and railings, signage, width of the aisle), scheduling, routes, connections, pedestrian and bus stop infrastructure, bus driver helpfulness and friendliness, information environments, and prior knowledge. Creating an age-friendly bus system involves overcoming these barriers and maximising facilitators, beginning with those that have the greatest impact on bus usability (Broome 2010).

15. **MetroWest ++** : Expansion of the sub-regional rail network could improve accessibility, including to jobs at the least environmental cost. It could also help enhance bike-rail integration helping more people to find cycling convenient. Bike-rail integration can make a contribution to reducing both carbon emissions and car dependence, but a lack of integration within the rail industry and other agencies is limiting the delivery of policies to enhance the opportunities (Sherwin et al. 2013). Likewise, improved rail travel opportunities could enable more people to improve their health by increasing their levels of routine physical activity
16. **Walking and cycling superhighways:** There is a need to ensure that the walking and cycling infrastructure is safe and attractive to all. At present it is not because of a range of physical and psychological barriers. There is increasing evidence of the link between adult obesity levels and travel behaviour, one indicator of which is that countries with the highest levels of active travel generally have the lowest obesity rates (Bassett et al. 2008). In planning infrastructure and behaviour change measures it is important to recognise that walking and cycling do have different requirements and should be treated separately.
17. **Regarding cycling:** Substantial increases in bicycling require an integrated package of many different, complementary interventions. Methodologically robust studies have shown that a variety of approaches are associated with increases in cycling, such as:
 - an intensive intervention with individuals,
 - individualised marketing to households,
 - improving infrastructure for cycling, and
 - multifaceted town level or city level programmes (Yang 2010)

Spatial factors positively associated with cycling include the presence of dedicated cycle routes or paths, separation of cycling from other traffic, high population density, short trip distance, proximity of a cycle

path or green space and (for children) projects promoting 'safe routes to school' (Fraser & Lock 2010). Better infrastructure for older people to feel confident to cycle is also important. This includes provision of a leading green phase and advanced holding lines for cyclists, and provision of conspicuous, well-defined cycle paths throughout intersections (Oxley & Whelan 2008).

Segmentation work suggests that 20% of car drivers would like to reduce their car use. A proportion of new cyclists are likely to come from this segment. Research specifically seeking to identify new cyclists cites young people, especially men, with a significant minority finding cycling particularly appealing (RAC Foundation 2005, Anable 2005). A clear message emerges that individual interventions are most effective as a part of a more comprehensive effort including traffic restraint (Pucher 2010).

18. **Regarding walking:** There is general agreement that the higher the pedestrian environment quality the farther, within reason, people are willing to walk (accounting for weather)(Chaug-Ing & Yau-Ching 2014). Walking to work can make a substantive contribution to daily physical activity, contributing to reducing preventable deaths, and improving health in the workplace. A Bristol based study in 2013 using accelerometry and GPS monitoring showed that the journey to and from work was responsible for the majority of the difference in weekday physical activity between those who walked to work and those who travelled by car (Audrey et al. 2014).

However, poor quality and width of paving, pavement clutter, pavement parking, poor lighting and a range of other physical barriers can deter walking. This is increasingly a problem for older people. When asked, older adults have suggested that motor traffic control measures are one of the most important environment issues to address (Kerr et al. 2012). There is a notable concentration on the details of pavement quality and maintenance, slopes and curbs, and temporary obstacles on pavements which are important determinants of walking among older people (Annear et al. 2014, Stav 2014). In addition to the prerequisites of pavement quality and other environmental facilitators of walking, measures to reduce motor vehicle speeds in areas of high pedestrian activity (e.g., reduced speed limits and provision of traffic-calming measures) are important. They also note that provision of infrastructure that gives higher priority to pedestrians in critical locations (e.g. provision of vehicle-free or vehicle restricted zones with traffic-calming measures, grade separation of crossings and segregation of bicycles from motor vehicles and pedestrians.

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