Hampshire Water Transfer and Water Recycling Project

Environmental Statement – Appendix 17.1 Health evidence review

VOLUME NUMBER: 6

PLANNING INSPECTORATE SCHEME NUMBER: WA010002

APPLICATION DOCUMENT REFERENCE: 6.2

APFP REGULATION: 5(2)(a)

May 2026

Version 0

from Southern Water

Contents

1 Introduction

1.1.1 This appendix summarises a literature review of publicly available evidence relating to the wider social and environmental health determinants considered in the health assessment of the Hampshire Water Transfer and Water Recycling Project (hereafter referred to as the 'Proposed Development'). The purpose is to provide an overview of evidence for the potential health outcomes associated with impacts on health determinants assessed in the Environmental Statement (ES) Chapter 17 Socio-economics, tourism and health, Volume I (Document reference 6.1, DCO Volume 6).

1.1.2 The review is mainly focused on secondary sources (such as systematic reviews) and grey literature (such as government reports and policy statements) as these reflect a scientific consensus. Primary literature sources are referenced where secondary literature is not available. The evidence has been used to inform the qualitative assessment of likely significant effects on population health as a result of impacts on health determinants.

1.1.3 The strength of evidence for health outcomes associated with health determinants has been evaluated and classified as follows:

1. Strong: secondary evidence based on a wide range of peer-reviewed research studies showing similar associations. The association is widely accepted by the public health community and there is consensus on the specific causal factors, the mechanism of effect and the strength of association.
2. Moderate: a range of peer-reviewed research studies showing similar associations, with limited secondary evidence. The general association is widely accepted by the public health community, though there may be debate about the specific causal factors, the mechanism of effect and/or the strength of association.
3. Weak: a few peer-reviewed/non-peer reviewed research studies to suggest an association, or studies showing conflicting findings.

1.1.4 Weak evidence does not necessarily indicate an absence of association between a health determinant and a health outcome but suggests that there is less certainty in the assessment of the likely effect. While different levels of evidence within the review are useful for the purpose of comparison, lower levels of evidence may still be valid and reliable. The strength of evidence should not be considered as indicating the importance of the health effect.

2 Access to health and social care and other social infrastructure

2.1.1 Access to public services and social infrastructure such as health, education and community facilities has a direct positive effect on human health [1].

2.1.2 Evidence [2] indicates that the accessibility of local shops, community services and healthcare facilities may be affected by:

1. Effects on the capacity of existing services.
2. Physical accessibility (i.e. distances travelled and transport connections).
3. Social and/or cultural access (i.e. communication issues).
4. Separation imposed by a new piece of physical infrastructure.

2.1.3 Research has suggested that "*access to local shops, post offices, places of entertainment and community activity all contribute to well-being*" [3]. It has been estimated that 5% of adults in Great Britain reported feeling a sense of isolation due to difficulties accessing local shops and services [4]. The same research also reported that over a fifth of adults reported that they knew someone who felt a sense of isolation due to difficulties accessing local shops and services.

2.1.4 Access to healthcare services is affected by the accessibility of transport modes, availability of financial support for those on low incomes and the location of healthcare services [4]. Groups impacted by disability and of certain ages can also experience even greater barriers to health and social care services [5]. Access to healthcare is important for communities as healthcare offers information, screening, prevention and treatments. Restricted access to healthcare prevents patients gaining necessary treatments and information.

2.1.5 Research published by the National Library of Medicine's 2021 [6] finds that population growth combined with an ageing demographic will lead to a smaller working-age population and a sharp increase in individuals with complex, long-term health conditions. This will place significant strain on healthcare services, both in terms of workforce capacity and financial sustainability.

2.1.6 Based on the criteria set out in paragraph 1.1.3, the evidence linking access to health and social care and other social infrastructure to health and well-being is strong.

3 Access to green space

3.1.1 Numerous studies have found links between health and access to green space. A systematic review of observational evidence has shown an association between long-term exposure to green space and cognition (intellect and cognisance) over the life course [7]. The association is seen cross-sectionally in both adults and children.

3.1.2 A review of the literature examining the association between access to green space and the mental well-being of children concluded that access to green spaces promoted attention and memory, fostered supportive social groups and self-discipline and improved symptoms of Attention Deficit Hyperactivity Disorder (ADHD) [8].

3.1.3 A review by O'Brien et al. (2010) for the Forestry Commission [9] found that the proximity, size and amount of green space available to people in urban environments influenced physical and mental health outcomes. The review identified the key health benefits of green space as:

1. Long and short-term physical benefits associated with obesity, life expectancy, heart rate and blood pressure.
2. Attention and cognitive benefits associated with restoration, mood and self-esteem.
3. Physical activity benefits associated with the use of green space.
4. Self-reported benefits in terms of health and life satisfaction.
5. Community cohesion benefits through social contact fostered by green space.

3.1.4 The review suggests various mechanisms for the beneficial effects of green space including "*providing a space that promotes social interaction and inclusion, reducing social annoyances and crime*" and "*reducing stress and restoring cognitive function and capacity to function with the demands of life*".

3.1.5 An evidence review by Natural England [10] showed that access to natural environments promotes physical activity including walking, gardening and children's play. The review shows evidence that people with poorer health tend to benefit more from physical activity in natural environments. In addition, a systematic review of physical activity and green spaces concluded that, compared with indoor activities, physical activity in natural environments is associated with greater feelings of revitalisation, increased energy and positive engagement, and decreases in tension, confusion, anger and depression [11].

3.1.6 Research conducted by Maas et al. in 2006 [12] has suggested that there is a positive association between the proportion of green space in a residential area and the perceived general health of residents, and that this relationship is strongest for lower socio-economic groups.

3.1.7 A literature review by Croucher et al. in 2007 for Greenspace Scotland [13] found a positive relationship between green space and general health and also identified that "*the attractiveness or quality of greenspace is an important determination of green space use*". The review also identified links to mental health, stating that "*studies consistently show a relationship between levels of stress and access to urban green spaces*" and identified "*activity and exercise, natural daylight,*

stimulation of the senses and aesthetic experience" as potential factors in reducing stress. Similarly, Wood et al (2017) found that there was a positive relationship between access to green spaces and mental well-being, including in places with a nature focus and spaces designed for recreational and sporting activity [14].

3.1.8 A systematic review of the impact of green space on biodiversity and health found that, while reported effects of green space were overwhelmingly positive, 22% of the papers examined identified either no effect or negative effects [15].

3.1.9 A UK study by Houlden et al. [16] in 2019 was undertaken to test whether the amount of green space within a radius of individuals' homes was associated with mental well-being, testing the UK government guideline that green space should be available within 300m of homes. Findings showed that an increase in one hectare of greenspace within 300m of residents was associated with a statistically significant increase in life satisfaction, worth and happiness.

3.1.10 Research into the effects of the visual and aesthetic environment on well-being is mainly focused on the psychological effects of 'natural' versus 'man-made' or urban views. In general, evidence shows a preference for views of natural over man-made scenes. These links are often tied in with other, related issues such as opportunities for exercise and contact with nature.

3.1.11 Access to recreational facilities is also a determinant of health. According to research "*leisure activities can have a positive effect on people's physical, social, emotional and cognitive health through prevention, coping (adjustment, remediation, diversion), and transcendence*" [17].

3.1.12 Based on the criteria set out in paragraph 1.1.3, the evidence linking access to green space to health and well-being is moderate to strong.

4 Recreation and physical activity

4.1.1 There is a large body of evidence linking physical activity with improved physical and mental health. The World Health Organization (WHO) [18] defines physical activity as "*any bodily movement produced by skeletal muscles that requires energy expenditure' and states that 'physical activity has significant health benefits and contributes to prevent non-communicable diseases*".

4.1.2 These benefits are identified as reduced risk of hypertension, coronary heart disease, stroke, diabetes, breast and colon cancer, depression and the risk of falls, improved bone and functional health, and weight control. The WHO also states that "*beyond exercise, any other physical activity that is done during leisure time, for transport to get to and from places, or as part of a person's work, has a health benefit. Further, both moderate- and vigorous-intensity physical activity improve health*".

4.1.3 The positive effects of physical activity on physical health were summarised in a recent Department of Health report [19] which suggests that "*Regular physical activity can reduce the risk of many chronic conditions including coronary heart disease, stroke, type 2 diabetes, cancer, obesity, mental health problems and musculoskeletal conditions. Even relatively small increases in physical activity are associated with some protection against chronic diseases and an improved quality of life."*

4.1.4 It has been shown that "*physical activity improves health throughout the life course – from childhood through to older age*" [3]. The health benefits of physical exercise occur across virtually the full range of diseases, and when this is combined with the prevalence of inactivity among the public, it "*makes physical activity one of the main contemporary public health issues*".

4.1.5 A 2013 literature review focused on the health benefits of active travel determined that, although there is no clear evidence in the effectiveness of active travel in reducing obesity, there has been a rise in the prevalence of obesity which has occurred in parallel with a decline in active travel in the past 30-40 years [20]. Data from a report by the National Obesity Observatory in 2011 suggests a number of factors impact active travel including access to fitness facilities, distance to destinations, land use, urban walkability scores, safety, availability of equipment and the provision of footpaths.

4.1.6 A study undertaken in 2017 by the University of the West of England [21], examined the impacts of commuting on the well-being of over 26,000 employed people in England between 2009-2010 and 2014-2015 as part of 'The Commuting and Wellbeing Study'. The study found that for every extra minute of commute time, job satisfaction and leisure time reduced, and stress was increased.

4.1.7 Vernon et al. in 2014 [22] suggest that road safety interventions can also help to encourage physical activity by creating a safer physical road environment and reducing the level of danger posed to vulnerable road users. Vernon et al also noted that that "*road safety has a much wider impact on health than just preventing injuries. This is because some forms of travel (i.e. walking and cycling), and the provision for them, bring more health benefits for individuals and society than others. However, the way that people travel is influenced by concerns about actual*

or perceived safety; effective intervention to reduce road danger can encourage more people to travel by these active, health-promoting modes".

4.1.8 More recent research [23] found that people living in walkable neighbourhoods tend to be more physically active and less likely to be obese.

4.1.9 Based on the criteria set out in paragraph 1.1.3, the evidence linking recreation and physical activity to health and well-being is strong.

5 Noise environment

5.1.1 According to the WHO [24], "*excessive noise seriously harms human health and interferes with people's daily activities at school, at work, at home and during leisure time. It can disturb sleep, cause cardiovascular and psychophysiological effects, reduce performance and provoke annoyance responses and changes in social behaviour*".

5.1.2 A literature review by van Kamp and Davies in 2013 [25] looked at 62 papers published from April 2006 to April 2011, which included the impact of environmental noise on the health of vulnerable people, including primary school children, young adolescents, preschool children, the elderly, and children with autism, asthma and attention deficit hyperactivity disorder. This found that, while vulnerable groups of people may be more at risk from exposure to environmental noise than healthy adults, there is comparatively little research focusing on the adverse health effects of noise on vulnerable people.

5.1.3 A European Commission publication in 2015 [26] cited evidence that "*living in a quiet area has a positive impact on health. A study assessed quality of life for people living in quiet and noisy locations and found that those who lived in quiet locations – particularly in rural areas – had a better quality of life*".

5.1.4 The 2018 WHO guidelines on Environmental Noise for the European Region [27] undertook a series of systematic reviews synthesising exposure and associated impacts on health in order to develop a set of guidelines on how to protect human health. Recommendations were formulated based on the strength of evidence from various noise sources which are road traffic noise, railway noise, aircraft noise, wind turbine noise and leisure noise. The systematic reviews concluded that there was evidence for an association of railway noise and road traffic noise on cardiovascular disease, sleep disturbance, annoyance, and cognitive impairment, with suggestive but weaker evidence (often due to lack of studies) for effects on mental health and birth weight.

5.1.5 Based on the evidence reviews, the 2018 WHO guidelines set a recommended level for railway noise exposure to protect health of 54dB L_{den} and 44dB L_{night}; for road noise the recommended levels are 53dB L_{den} and 45dB L_{night}. However, the WHO states that recommended levels are not Lowest Observed Adverse Effect Level values and there is currently no policy requirement to implement these values in the UK.

5.1.6 Based on the criteria set out in paragraph 1.1.3, the evidence linking noise environment to health and well-being is moderate to strong.

6 Air quality

6.1.1 The WHO recognises outdoor air pollution as a major environmental health problem for all countries, including high-income countries [28]. There is a wealth of evidence showing the association of nitrogen dioxide and particulate matter on poor health outcomes. Epidemiological studies have shown that long-term exposure to air pollution (over years or a lifetime) reduces life expectancy, due to cardiovascular and respiratory diseases and lung cancer. Short-term exposure (over hours or days) to increased levels of air pollution can also have a range of health effects, including effects on lung function, asthma, as well as increases in respiratory and cardiovascular hospital admissions, and mortality [29]. Additionally, outdoor air pollution can influence productivity and contribute to social costs such as increasing days off work and school due to restricted health [30].

6.1.2 A Public Health England review [31] of interventions to improve outdoor air quality and public health found clear evidence that air pollution is the largest environmental risk to the health of the public in the UK. The review found that:

1. It is estimated that between 28,000 and 36,000 deaths each year are attributed to human-made air pollution.
2. There is a close association with cardiovascular and respiratory disease, including lung cancer.
3. There is emerging evidence that other organs may also be affected, with possible effects on dementia, low birth weight and diabetes.
4. It concluded that the most impactful interventions would be those that reduce emissions of air pollution at source.

6.1.3 Evidence on the links between road traffic emissions and health is well established, based on numerous research studies. A WHO report in 2000 suggested that about 36,000–129,000 adult deaths a year are brought forward due to long-term exposure to air pollution generated by traffic in European cities. The main health damaging pollutants released as emissions from road traffic are Particulate Matter (PM_{10} – particulate matter up to 10 micrometres in size) and nitrogen dioxide (NO_2).

6.1.4 Particulate Matter, which is an important pollutant with regard to health effects, comprises atmospheric particles that are less than 10µm in diameter. Road transport is a major source of PM_{10}, which is emitted from the combustion of vehicle fuels. There is growing evidence that smaller respirable particulate matter may be more relevant to health than larger particles. Recent studies have found that ultra-fine particles (less than 0.1µm) have been associated with stronger effects on the lung function and symptoms in asthmatics than either PM_{10} or $PM_{2.5}$ [32].

6.1.5 According to the Lancet Commission on pollution and health [33] children are at high risk of pollution related disease and even extremely low-dose exposures to pollutants during windows of vulnerability in utero and in early infancy can result in disease, disability, and death in childhood and across their lifespan. Research has shown that exposure to Particulate Matter (PM) affects children's lung development, including reversible deficits in lung function as well as chronically reduced lung growth rate and a deficit in long-term lung function.

6.1.6 Whilst there is no clear evidence of a safe level of exposure below which there is no risk of adverse health effects, there is sufficient evidence available to

demonstrate that the adverse effects of air pollution on health outcomes is widely accepted. There is consensus that lowering levels of NO_2 and particulate matter will bring additional health benefits. Therefore, the evidence is judged to be strong.

6.1.7 Department of Environment, Food and Rural Affairs commissioned a study in 2006 to review the research evidence on links between air quality and social deprivation in the UK [34]. The analysis for England showed that there is a tendency for higher relative mean annual concentrations of NO_2 and PM_{10} in the most deprived areas of the country. This distribution can largely be explained by the high urban concentrations driven by road transport sources, and the higher proportion of deprived communities in urban areas. If exceedances of National Air Quality Standards are considered, the correlation between poor air quality and deprivation is stronger, showing that when the most polluted areas are considered, the greatest burden is on the most deprived communities, and very little on the least deprived.

6.1.8 Based on the criteria set out in paragraph 1.1.3, the evidence linking air quality to health and well-being is strong.

7 Access to work and training

7.1.1 There is a large body of evidence linking employment and income levels with health. The WHO identifies a list of health determinants [35] that combine to affect the health of individuals and communities. Included in this list is: "*income and social status - higher income and social status are linked to better health. The greater the gap between the richest and poorest people, the greater the differences in health*".

7.1.2 The Marmot Review, published in 2010 [36], was commissioned by the Department of Health to investigate health inequalities in England and focused on correlations between health and well-being and the socio-economic status of communities. The report identified six evidence-based policy objectives to reduce health inequalities, one of which was to create fair employment and good work for all. The Review stated that "*being in good employment is protective of health. Conversely, unemployment contributes to poor health*". This study also identifies links between educational attainment and physical and mental health.

7.1.3 Much of the literature relating to unemployment and health outcomes is focused on the increased likelihood of poor health in low income groups, often referred to as the social gradient in health. For example, a large-scale study by Wapner in 2015 [37] showed that disadvantaged adolescents reported lower levels of physical activity and higher levels of bodily aches and pains, sleeplessness and emotional difficulties, such as nervousness and irritability, than more advantaged teenagers. In addition, a Spanish study undertaken in 2015 [38] found that the impact of unemployment, particularly long-term unemployment, had a negative impact on self-reported health and mental health.

7.1.4 A study by Clark and Lepinteur in 2019 [39] explored the causes and consequences of early-adult unemployment. Findings showed that past unemployment can negatively impact on life satisfaction later in life. A Policy Brief for the LEAD Centre presented evidence to suggest a positive correlation between employment and health for working age people with disabilities [40].

7.1.5 A review of longitudinal study literature by Reche et al. in 2019 [41] suggested that the direct association between income and self-rated health is small. Most studies of this topic have used cross-sectional data and only considered self-rated health as the decisive factor. Moreover, the study was unable to find a statistically significant link between income and morbidity.

7.1.6 A wide range of mechanisms for the health benefits of employment, as well as the negative effects of unemployment, have been suggested. For example, a study by Olesen et al. in 2013 [42] cites numerous references indicating that the health benefits of employment "*are believed to reflect a combination of material (e.g. income and the resulting access to resources) and psychological outcomes, such as social role and status, access to social networks and support, and a sense of purpose/achievement*" and that "*in contrast, excluded individuals experience a set of multiple, and often entrenched, disadvantages including limited social support and networks, inadequate financial resources, and poor employment and health*". A literature review by Kim et al. in 2015 [43] identified higher incidence of poor self-rated health, mental illness, physical complaints such as coronary heart disease, and higher all-cause mortality in unemployed people compared with those in employment.

7.1.7 There is a large body of evidence linking education, employment and income levels with health. The WHO identifies a list of health determinants [35] that combine to affect the health of individuals and communities. Included in this list is: "*education – low education levels are linked with poor health, more stress and lower self-confidence*'.

7.1.8 The majority of evidence linking education with health outcomes looks at educational attainment in the context of broader socio-demographic status. An evidence review by the Joseph Rowntree Foundation [44] states that improved qualifications can lead to better wages and employment, providing greater access to the health benefits associated with good and secure employment. A University of London report by Feinstein et al. in 2008 [45] on the social and personal benefits of learning states that "*people with better qualifications are more likely to have healthy lifestyles, to be fitter and slimmer – and such health advantages can be transferred to the next generation at the earliest age*".

7.1.9 An evidence review by the Economic and Social Research Council [46] suggests that the level of education a person has correlates with positive life outcomes including health and well-being.

7.1.10 Based on the criteria set out in paragraph 1.1.3, the evidence linking access to work and training to health and well-being is strong.

8 Community safety

8.1.1 There is a large body of evidence linking community safety with health outcomes. The Health Foundation 2024 [47] highlights that living in areas with high levels of crime can affect people's health negatively. In addition to the direct health effects of being the victim of violent crime, fear of crime can also have an indirect detrimental impact on health. Research shows that fear of crime results in people exercising less, as well as reducing how often people socialise, resulting in poorer mental and physical health.

8.1.2 BioMed Central (BMC) Public Health's 2019 [48] cross-sectional study on the association between criminality in neighbourhoods and self-reported health finds that living in unsafe neighbourhoods has repeatedly been shown to be associated with poor mental and physical health and lower well-being of the residents. Crime, but also fear of crime and general feelings of safety have been associated with worse self-perceived health, higher levels of stress, more depressive symptoms and worse mental health, increased risk of coronary heart disease, less physical activity and even adverse birth outcomes.

8.1.3 The Health Foundation 2024 [47] also shows that people living in high crime areas are more likely to be in poor health, as crime rates are higher in more deprived areas, and deprivation is itself strongly associated with poor health. Men's life expectancy in neighbourhoods with the lowest crime rates is 82.3, compared with 76.5 in neighbourhoods with the highest, while women's life expectancy in neighbourhoods with the lowest crime is 85.6, compared with 81.5 in neighbourhoods with the highest.

8.1.4 The US Office of Disease Prevention and Health Promotion (ODPHP) [49] literature review on crime and violence as a social determinant of health finds that children can be exposed to violence such as bullying or cyberbullying, abuse, or witnessing violence in a variety of settings, including at home or school, online, or in their neighbourhoods. Children and adolescents exposed to violence are at risk for poor long-term behavioural and mental health outcomes, such as depression, anxiety, and post-traumatic stress disorder, regardless of whether they are victims, direct witnesses, or hear about the crime. Research has also shown an association between exposure to violence in childhood and an increased likelihood of experiencing intimate partner violence as an adult.

8.1.5 The ODPHP review [49] also finds that women exposed to intimate partner violence have an increased risk of physical health issues such as injuries and mental disorders such as disordered eating, depression, and suicidal ideation. It also finds that evidence shows that older adults who experience elder abuse are more likely to experience increased stress and depression or develop fear and anxiety than those who do not experience elder abuse.

8.1.6 Based on the criteria set out in paragraph 1.1.3, the evidence linking community safety to health and well-being is moderate.

9 Social cohesion

9.1.1 A 2014 Office for National Statistics (ONS) paper, Measuring Social Capital [50], provides the following definition of social capital: "*In general terms, social capital represents social connections and all the benefits they generate. The benefits for people having these social connections can occur either at an individual level (for example, through family support) or at a wider collective level (e.g. through volunteering). Social capital is also associated with values such as tolerance, solidarity or trust. These are beneficial to society and are important for people to be able to cooperate*." Social capital is, in this context, synonymous with social cohesion.

9.1.2 The ONS has looked at social capital as part of its Measuring National Well-being programme. This programme identifies four aspects of social capital, based on work undertaken by Scrivens et al. in 2013 for the Organisation for Economic Co-operation and Development [51]. These aspects are:

1. Personal relationships
2. Social network support
3. Civic engagement and trust
4. Cooperative norms

9.1.3 The 2014 ONS paper includes a review of academic studies on social capital and its effects on health. The evidence suggests that social capital makes a positive contribution to a range of well-being aspects such as personal well-being, health and crime rates, and that these benefits occur at individual, community, regional and national level. In the same paper, the ONS cites evidence to suggest that:

"people with a good range and frequency of social contact report higher levels of life satisfaction and happiness, but also better mental health. However, people with poorer health, particularly mental health, have been reported to have significantly smaller social networks. Personal relationships are important for individual well-being but can also have positive outcomes for firms and organisations, and at a community level". The evidence also suggests that "more socially isolated people are more at risk of risky behaviours such as smoking, drinking, physical inactivity and poor diet".

9.1.4 Social capital can also be defined as benefits that emerge from social networks, where individuals have good access to information, services and support [52]. The same study suggests that cultural and socio-economic aspects can act as a barrier to social capital. For example, some types of social capital may only be beneficial to those who have access to them through sufficient economic capital, such as expensive sports clubs.

9.1.5 A systematic review of systematic reviews [53] on social capital and multiple health outcomes carried out in 2019 showed that there is good evidence to suggest a positive correlation between social capital and mental and physical health, and that social capital contributes to lower mortality. On the other hand, the review also found numerous non-significant or negative relationships between social capital and health. The review also analysed social capital interventions and found that their efficacy remained unclear. The analysis showed that it is difficult to assess whether an increase in health outcome is due to an increase in social capital, which

limits the ability to understand whether and how social capital interventions can improve health.

9.1.6 A study by Nieminen et al. in 2013 published in BMC Public Health [54] identified associations between health behaviours and social capital. For example, in Sweden lower trust in communities and families led to increased alcohol consumption; in England strong social support networks were associated with increased healthy eating; and in Finland those with higher social participation and networks exhibited healthier behaviours. A study by McPherson et al. in 2014 published in BMC Psychology [55] found that "*social capital can affect the norms and attitudes that influence health behaviours. It can be generated at a family and community level and can influence mental health and behaviour from a young age*".

9.1.7 Based on the criteria set out in paragraph 1.1.3, the evidence linking social cohesion to health and well-being is moderate.

References

[1] London Healthy Urban Development Unit, *HUDU Planning for Health. Rapid Health Impact Assessment Tool,* 2013.

[2] R. Quigley and L. Thornley, *Literature Review on Community Cohesion and Community Severance: Definitions and Indicators for Transport Planning and Monitoring, Report to New Zealand Transport Agency.,* Quigley and Watts Ltd, 2011.

[3] T. Harding, *A Life Worth Living: the Independence and Inclusion of Older People, London: Help the Aged,* 1997.

[4] A. Self, J. Thomas, C. Randall and Office for National Statistics, *Measuring National Well-being - Where we Live – 2012.,* Office for National Statistics, 2012.

[5] Hamer, L, Improving patient access to health services: a national review and case studies of current approaches, Health Development Agency, 2004.

[6] M. McKee, K. Dunnell, M. Anderson, C. Brayne, A. Charlesworth, C. Johnston-Webber, M. Knapp, N. J. Newton, D. Taylor and G. R. Watt, "The changing health needs of the UK population," *National Library of Medicine,* 2021.

[7] C. Keijezer, M. Gascon, M. J. Nieuwenhuijsen and P. Dadvand, "Long-term Green Space Exposure and Cognition Across the Life Course: A Systematic Review.," *Current Environmental Health Reports,* vol. Vol 3(4):, no. 468-477, 2016.

[8] R. McCormick, "Does Access to Green Space Impact the Mental Well-being of Children," *A Systematic Review,* vol. 37, pp. 3 - 7, 2017.

[9] L. O'Brien, K. Williams and A. Stewart , "Urban health and health inequalities and the role of urban forestry in Britain: A review,," *The Research Agency of the FOrest Commission,* 2010.

[10] Natural England, "Access to Evidence Information Note EIN019," *Links between natural environments and physical activity: evidence briefing,* 2016.

[11] J. Thompson Coon, K. Boddy, K. Stein, R. Whear, J. Barton and M. H. Depledge, "Does participating in physical activity in outdoor natural environments have a greater effect on physical and mental wellbeing than physical activity indoors?," *A Systematic Review. Environmental Science & Technology 45: 1761,* 2011.

[12] J. Maas, R. Verheij, P. Groenewegen, S. De Vries and P. Spreeuwenberg , "Green space, urbanity and health: how strong is the relation?," *Journal of epidemiology and community health,* 2006.

[13] K. Croucher, L. Myers and J. Bretherton, *The links between greenspace and health: a critical literature review,* Greenspace Scotland, 2007.

[14] L. Wood, P. Hooper, S. Foster and Bull F, "Pubilc green spaces and positive mental health - investigating the relationship between access, quantity and types of parks and mental wellbeing," *Health and Place,* vol. 48, pp. 63-71, 2017.

[15] L. Hakkan, E. J. Files, P. Weinstein and A. Woodward , "The impactof green space and biodiverstiy on health," *Frontiers in Ecology and the Environment,* vol. 17, no. 7, pp. 383-390, 2019.

[16] V. Houlden, J. P. De Albuquerque, S. A. Jarvis and S. Weich, "A spatial analysis of proximate greenspace and mental wellbeing in London," *applied Geography,* vol. 109, 2019.

[17] L. L. Caldwell, "Leisure and health: why is leisure therapeutic?," *British Journal of Guidance and Counselling,* vol. 33, no. 1, 2005.

[18] World Health Organisation, "Physical Activity," 5 October 2022. [Online]. Available: https://www.who.int/en/news-room/fact-sheets/detail/physical-activity. [Accessed 15 February 2024].

[19] Chief Medical Officers, "Physical activity guidelines: UK Chief Medical Officers' Report," 7 September 2019. [Online]. Available: https://www.gov.uk/government/publications/physical-activity-guidelines-uk-chief-medical-officers-report. [Accessed 15 February 2024].

[20] L. E. Saunders, J. M. Green, M. P. Petticrew, R. Steinbach and H. Roberts, "What are the health benefits of active travel? A systematic review of trials and cohort study," *PLoS One,* vol. 8, no. 8, 2013.

[21] K. Chatterjee, B. Clark, A. Martin and A. Davis, "The commuting and wellbeing study: understanding the impact of commuting on people's lives," University of the West of England, Bristol, 2017.

[22] Royal Society for the Prevention of Accidents, “Road Safety and Public Health,” March 2014. [Online]. Available: https://www.rospa.com/rospaweb/docs/advice-services/road-safety/practitioners/rospa-road-safety-and-public-health.pdf. [Accessed 15 February 2014].

[23] G. L. Booth, M. J. Creatore and J. Luo, “Neighbourhood walkability and the incidence of diabetes: an inverse probability of treatment weighting analysis,” *Journal of Epidemiology Community Health,* vol. 73, no. 4, pp. 287-294, 2019.

[24] World Health Organisation, “Noise,” 2017. [Online]. Available: https://www.who.int/europe/news-room/fact-sheets/item/noise. [Accessed 15 February 2024].

[25] I. van Kamp and H. Davies, “Noise and health in vulnerable groups: a review,” *Noise Health,* vol. 15, no. 64, pp. 153-9, 2013.

[26] European Commission, *Noise impacts on health,* Bristol: University of the West of England, 2015.

[27] World Health Organisation, *Environmental Noise Guidanelines for the Europena Region,* Regional Office for Europe: WHO, 2018.

[28] World Health Organisation, “Ambient (outdoor) air pollution,” 19 December 2022. [Online]. Available: https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health. [Accessed 15 February 2024].

[29] Public Health England, “Guidance: Health matters: air pollution,” 14 November 2018. [Online]. Available: https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution. [Accessed 15 February 2024].

[30] H. Cowie, J. Crawford, A. Davis, S. Steinle, S. Reis, K. Dixon, G. Morris and F. Hurley, “Air quality, health, wellbing and behaviour,” August 2015. [Online]. Available: www.environment.gov.scot/media/1133/iom-seweb-aq-health-behaviour-review.pdf. [Accessed 15 February 2024].

[31] Public Health England, “Review of interventions to improve outdoor air quality and public health,” 2020. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/937341/Principal_interventions_for_local_authorities-air_quality_public_health.pdf. [Accessed 15 February 2024].

[32] World Health Organisation, “Transport, environment and health,” WHO, Copenhagen, 2000.

[33] P. Landrigan, “The Lancet Commission on pollution and health,” *The Lancet,* vol. 391, pp. 462-512, 2018.

[34] Department for Environment, Food and Rural Affairs, *Air quality and social deprivation in the UK: an environmental inequalities analysis - final report to Department for Environment, Food and Rural Affairs,* Defra, 2006.

[35] World Health Organisation, “Determinants of health,” 3 February 2017. [Online]. Available: https://www.who.int/news-room/questions-and-answers/item/determinants-of-health. [Accessed 15 February 2024].

[36] M. Marmot, J. Allen, P. Goldblatt, T. Boyce, D. McNeish, M. Grady and I. Geddes, *The Marmot Review: Fair society, healthy lives: Strategic review of health inequalities in England,* 2010.

[37] J. Wapner, “Money is driving a wedge in teen health,” *Scientific America,* no. May issue, 2015.

[38] B. G. Lopez-Valcarcel and R. M. Urbanos-Garrido, “The influence of economic crisis on the association between unemployment and health: an empirical analysis for Spain.,” *The European Journal of Health Economics,* vol. 16, no. 2, pp. 175-184, 2015.

[39] A. E. Clark and A. Lepinteur, “The causes and consequences of early adult unemployment: evidence from cohort data,” *IZN Discussion papers,* vol. 12430, 2019.

[40] N. Goodman, “The impact of employment on the health status and health care costs of working-age people with disabilities,” LEAD Centre- Policy brief, 2015.

[41] E. Reche , H. H. Konig and A. Hajek, “Income, self-rated health and morbidity: A systematic revi of longitudinal studies.,” *International Journal of Environmental Research and Public Health,* vol. 16, no. 2884, 2019.

[42] S. Olesen, P. Butterworth, L. Leach, M. Kelaher and J. Pikis, “Mental health affects future employment - as job loss affects mental health: findings from a longitidinal study,” *BMC Public Health,* vol. 144, 2013.

[43] T. Kim and O. Knesbeck, “Is an insecure job better for health than no job at all? A systematic review of studies investigating the health-related risks of both job insecurity and unemployment.,” *BMC Public Health,* 2015.

[44] Joseph Rowntree Foundation, *Reducing poverty in the UK: A colelction of evidence reviews,* Joseph Rowntree foundation, 2014.

[45] J. Vorhaus, K. Duckworth, D. Budge and L. Feinstein, *The social and personal benefits of learning: A summary of key research findings,* Research Gate, 2008.

[46] Economic and Social Research Council, *Evidence briefing: The wellbeing effect of education,* ESRC, 2014.

[47] The Health Foundation, “Relationship between neighbourhood crime and health,” 2024. [Online]. Available: https://www.health.org.uk/evidence-hub/our-surroundings/safety/relationship-between-neighbourhood-crime-and-health.

[48] BioMed Central Public Health, “Assessing the role of criminality in neighbourhood safety feelings and self-reported health: results from a cross-sectional study in a Dutch municipality,” 2019. [Online]. Available: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-019-7197-z#:~:text=Crime%2C%20but%20also%20fear%20of%20crime%20and%20general,%5B8%5D%20and%20even%20adverse%20birth%20outcomes.%20%5B9%5D%20.

[49] US Office of Disease Prevention and Health Promotion (ODPHP), “Crime and Violence,” [Online]. Available: https://odphp.health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/crime-and-violence#:~:text=Decades%20of%20research%20has%20established%20a%20connection%20between,experiencing%20intimate%20partner%20violence%20as%20an%.

[50] Office for National Statistics, *Measuring Social Capital,* ONS, 2014.

[51] K. Scrivens and C. Smith, “Four interpretations of social capital: an agenda for measurement,” *OECD Statistics Working Papers,* vol. 06, 2013.

[52] E. Uphoff, . K. Pickett, B. Cabieses, N. Small and J. Wright, “A systematic review of the relationships between social capital and socioecnomic ineqaulities in health; a contribution to understanding the psychosocial pathway of health inequalities,” *International Journal for Equity in Health,* vol. Article 54, 2013.

[53] A. Ehsan, H. S. Klaas, A. Bastianen and D. Spini, “Social capital and health: A systematic review of systematic reviews.,” *SSM Population Health,* 2019.

[54] T. Nieminen, R. Prattala, T. Martelin, T. Harkanen, M. Hyyppa, E. Alanen and S. Koskinen, “Social capital, health behaviours and health: a population based associational study,” *BMC Public Health,* 2013.

[55] K. McPhIerson, S. Kerr, E. McGee, A. Morgan, F. Cheater, J. McLean and J. Egan, “The association between social capital and mental health and behavioural problems in children and adolescents: an integrative systematic review,” *BMC Psychology,* 2014.


WATER
for LIFE®
from
Southern
Water®