Proposed methodology for considering effects of roads on Physical health, stress and anxiety

Definition

This sub-topic considers the potential role of a road or project in contributing to physical health, stress and anxiety trends within the local community.

The health characteristics of a population are strongly correlated with the quality of the surrounding environment. Where local environmental quality is high and pollution is scarce, positive health outcomes are more achievable than in areas of deteriorating environmental quality (notwithstanding other influences, such as socio-economic status of the population).

For the purposes of this guidance, physical health, stress and anxiety impacts have been defined in terms of three factors. Table 4.1 defines these factors and their likely relation to road scheme design and delivery.

Table 4.1: Components and factors of Physical Health, Stress & Anxiety related to roads

Component	Factor	Example impact of road design/delivery
Physical health, stress & anxiety	Air quality and health	Increases in vehicle emissions close to a community due to a new project or improvement may impact negatively on the respiratory health of local people. Children and elderly people may be particularly affected, in addition to individuals with existing respiratory conditions.
	Noise levels and health	Increases in ambient noise levels in a community due to a road development or expansion may disrupt sleep patterns, which can affect physical health, stress and anxiety, and lead to negative impacts on child development.
	Access to facilities for physical activity (e.g. footpaths, cycleways, green spaces).	Severance of a community from its recreation facilities or displacement of facilities due to a road development may impact negatively on the frequency with which people participate in physical activity, with consequences for health conditions such as heart disease and obesity[i]. Increased traffic flows along a road or removal of footpaths, cycleways and bridleways can deter individuals from participating in physical forms of travel, contributing to reduced levels of fitness and having consequences for health.

A review of physical health, stress and anxiety impacts arising from a proposed road scheme should consider the degree to which each factor contributes to the health of the local community, and the extent to which the proposed scheme may alter the baseline conditions associated with each factor.

Determine baseline characteristics

Data concerning baseline health characteristics should be obtained and incorporated within a community profile (See main guidance). Data for each factor can be sourced as follows.

Factor 1: Air Quality and Health

This factor considers the baseline air quality in the local community surrounding the road, taking into account the possible relationship between air quality, the prevalence of health conditions such as respiratory disease and heart disease[ii], and the location of vulnerable groups.

A review of air quality in relation to health should utilise information from sources such as:

Data	Source	Purpose
Baseline air quality levels	DMRB air quality assessment (DMRB Vol. 11, Section 3, Part 1) Generic air quality maps (e.g. for Air Quality Management Areas, etc.)[iii]	To map baseline air quality in the local community and identify risk areas in relation to known health thresholds[iv].
Baseline incidence of respiratory health conditions	Community health statistics available from the Office for National Statistics' neighbourhood database[v], from local authorities, NHS trusts, and/or the Association of Public Health Observatories[vi].	To map baseline health incidence in the local community, in relation to existing air quality levels.
Location of existing arterial roads and other key sources of air pollution	Local geographical information available from Ordnance Survey mapping[vii]. Field observation may contribute to practical understanding of these geographical features.	To map likely air pollution sources in relation to baseline air quality and incidence of health conditions
Location of community groups vulnerable to respiratory disease (e.g. children, the elderly, etc.)	Local demographic data available from recent national census database[viii]. Field observation may contribute to practical understanding of these settlement patterns.	To map the distributional impacts of air quality on the health of different community groups, and highlight groups at particular risk of related health conditions.

Through the use of air quality modelling undertaken as part of the DMRB air quality assessment or through Defra air quality mapping, and consultation with air quality specialists, an informed view should be taken regarding the likely health impacts of changes to air quality due to the road scheme proposals in light of threshold levels advised by specialist agencies.

Factor 2: Noise Levels and Health

This factor considers the ambient noise levels throughout the study area, taking into account the possible relationship between noise and the prevalence of health conditions such as heightened stress levels, high blood pressure, cardiovascular disease, hearing impairment, sleep disturbance and child mental health[ix]. An awareness of the location of vulnerable groups, especially children and elderly people, should be established.

A review of noise levels in relation to health should utilise information from sources such as:

Data	Source	Purpose
Baseline ambient noise levels	DMRB noise assessment (DMRB Vol. 11, Section 3, Part 7) Generic noise maps available for local areas via Defra[x].	To map baseline noise levels in the local community and identify risk areas in relation to known health thresholds[xi].
Baseline incidence of noise related health conditions (incl. heightened stress, high blood pressure, cardiovascular disease, hearing impairment, sleep disturbance, child mental health)	Community health statistics available from the Office for National Statistics' neighbourhood database[xii], from local authorities, NHS trusts, and the Association of Public Health Observatories[xiii].	To map baseline health incidence in the local community, in relation to existing noise levels.
Location of existing arterial roads and other key sources of noise	Local geographical information available from Ordnance Survey mapping[xiv]. Field observation may contribute to practical understanding of these geographical features.	To map likely noise sources in relation to baseline noise levels and incidence of health conditions
Location of community groups vulnerable to noise related disease (e.g. children, the elderly, etc.)	Local demographic data available from recent national census database[xv]. Field observation may contribute to practical understanding of these settlement patterns.	To map the distributional impacts of noise on the health of different community groups, and highlight groups at particular risk of related health conditions.

Through the use of noise modelling undertaken as part of the DMRB noise assessment or Defra noise mapping, and through consultation with noise specialists, an informed view should be taken regarding the likely health impacts of changes to ambient noise levels due to the road scheme proposals, in light of threshold levels advised by specialist agencies.

Factor 3: Access to Facilities for Physical Activity

This factor considers accessibility to facilities for physical or recreational activity in the community surrounding the road (including sport centres, parks, footpaths, cycle paths, bridleways, etc.), taking into account the possible relationship between physical activity and the prevalence of health conditions such as obesity, diabetes, certain cancers, high blood pressure, cardiovascular disease, stress and anxiety[xvi]. An awareness of the location of vulnerable groups, especially children, should be established.

A review of accessibility to facilities for physical activity in relation to a proposed road scheme should utilise information from sources such as:

Data	Source	Purpose
Location of existing sport and recreational facilities (incl. green space, footpaths, cycleways, leisure centres, etc.)	Local geographical information available from Ordnance Survey mapping[xvii]. Field observation may contribute to practical understanding of these geographical features and the frequency of their use.	To map sport and recreation facilities in the local area and develop an understanding of baseline accessibility, including opportunities to enhance access and desirability, as well as mitigate negative impacts on accessibility.
Location of access routes to reach sport and recreational facilities (e.g. sport centres, swimming pools, parks, etc.).	Local geographical information available from Ordnance Survey mapping[xviii]. Field observation may contribute to practical understanding of these geographical features and the frequency of their use.	To map likely access routes to sport and recreational facilities in the local area and develop an understanding of baseline accessibility, including opportunities to enhance access and desirability, as well as mitigate negative impacts on accessibility.
Location of existing routes providing high quality opportunities for non-motorised travel, which are therefore physical activity opportunities in their own right.	Local geographical information available from Ordnance Survey or local street maps. Field observation may contribute to practical understanding of these features and the frequency of their use. .	To map opportunities in the local area for active travel, e.g. walking, running, cycling, horse riding, etc., and understand how these opportunities may be damaged or enhanced as a results of the project proposals.
Baseline incidence of health conditions related to physical activity (incl. obesity, diabetes, cancers, high blood pressure, cardiovascular disease, stress, anxiety)	Community health statistics available from the Office for National Statistics' neighbourhood database[xix], from local authorities, NHS trusts, and the Association of Public Health Observatories[xx].	To map baseline health incidence in the local community in relation to existing sport and leisure facilities.
Location of community groups vulnerable to health conditions related to physical activity (e.g. children, deprived communities, etc.)	Local demographic data available from recent national census database[xxi]. Field observation may contribute to practical understanding of these settlement patterns.	To map the distributional impacts of access to sport and recreational facilities on the health of different community groups, and highlight groups at particular risk of related health conditions.

By mapping facilities for and accessibility to physical activity alongside incidence of activity-related health conditions, an informed view should be taken regarding the likely health impacts of changes in access arrangements due to road scheme proposals.

Data collection and review

Much of the data used to establish the baseline and projections for Physical Health, Stress and Anxiety will be compiled as part of the assessments undertaken for environmental impact assessments. The tables above highlight where the data may be gathered in the event of environmental assessments being completed, and also alternative sources of more generic information in the event that the related assessment was scoped out. The latter situation should rarely occur. For instance, if an environmental assessment is scoped out (e.g. Air Quality), it is logical to assume that no related significant effects on health are likely to arise.

All relevant data should be collected from the sources identified above, to be incorporated into the community profile described in then main guidance. This will provide valuable information to contextualise the proposed road scheme within the local health environment.

Data collection will mainly consist of a desk-based information gathering and mapping exercise. This should be supplemented by engagement with relevant technical specialists, who will have essential expertise to contribute both to the data collection, interpretation and review process. Air quality and noise specialists will be of particular importance. External stakeholders involved in community and public health may also be engaged to support data interpretation and review.

Disproportionate impacts

This review is also concerned with the distribution of impacts arising from a road between different groups within the community (e.g. elderly, ethnic minorities, less privileged communities, etc.). As a result, when developing an understanding of the baseline characteristics, the review should also note the identity and location of social groups within the study area. National census[xxii] or local authority data may be used to define the distribution of community groups.

In the context of physical health, stress and anxiety, the review of baseline data should identify whether any health implications of the road or project are likely to present undue risks to a particular group of the community. For example, certain groups may be more vulnerable to certain health impacts and may be disproportionately affected by changes in baseline environmental conditions. Care should be taken to ensure that the needs of different groups are prioritised effectively, and that no group is exposed to inequalities in the standard of living conditions.

A robust approach to assessing the distributional impacts of road scheme proposals for community groups may be adopted through the implementation of an Equality Impact Assessment (EqIA).

[i] The World Health Organisation estimates that, worldwide, 1.9million deaths annually are attributable to physical inactivity.

[ii] A 2009 study by European and American scientists has demonstrated a link between air pollutants from exhaust pipes and increased chances of heart attack or stroke in communities living near major roads, as well as reduced lung development in young people aged 10-18 years. Further information available at http://www.edie.net/news/news_story.asp?src=nl&id=17666 (08.04.10) and from The Lancet http://www.lancet.com/search/results?fieldName=Authors&searchTerm=Michael+Jerrett (08.04.10).

[iii] Available at http://www.airquality.co.uk/laqm/laqm.php (04.06.10).

[iv] See, for example, the Health Protection Agency and Committee on the Medical Effects of Air Pollutants (COMEAP) work, available at http://www.hpa.org.uk/ProductsServices/ChemicalsPoisons/Environment/Air/ (07.04.10) and World Health Organisation Air Quality Guidelines, available at http://www.euro.who.int/air/activities/20050222_2 (07.04.10).

[v] Available at http://neighbourhood.statistics.gov.uk/dissemination/LeadHome.do;jessionid=ac1f930c30d89376adfd82ac4d408449f805e456e643?m=0&s=1270588811518&enc=1&nsjs=true&nsck=true&nssvg=false&nswid=1192 (06.04.10).

[vi] Available at http://www.apho.org.uk/ (06.04.10).

[vii] Available at www.ordancesurvey.co.uk (06.04.10).

[viii] Available at http://www.ons.gov.uk/census/index.html (07.04.10).

[ix] See Ising, H. & Kruppa, B. *'Health effects caused by noise: Evidence in the literature from the past 25 years'*. Noise & Health: A Quarterly Inter-disciplinary International Journal. 2004. 6:22:5-13. Available at http://www.noiseandhealth.org/article.asp?issn=1463-1741;year=2004;volume=6;issue=22;spage=5;epage=13;aulast=Ising (07.04.10). See also World Health Organisation information on Noise and Health, available at http://www.euro.who.int/Noise/activities/20021203_2 (07.04.10) and UK Health Protection Agency information at http://www.hpa.org.uk/noise (07.04.10).

[x] Available at http://services.defra.gov.uk/wps/portal/noise (04.06.10).

[xi] *Supra* n30.

[xii] Available at http://neighbourhood.statistics.gov.uk/dissemination/LeadHome.do;jessionid=ac1f930c30d89376adfd82ac4d408449f805e456e643?m=0&s=1270588811518&enc=1&nsjs=true&nsck=true&nssvg=false&nswid=1192 (06.04.10).

[xiii] Available at http://www.apho.org.uk/ (06.04.10).

[xiv] Available at www.ordnancesurvey.co.uk (06.04.10).

[xv] Available at http://www.ons.gov.uk/census/index.html (07.04.10).

[xvi] See World Health Organisation information regarding physical activity and health, available at http://www.who.int/dietphysicalactivity/en/ (07.04.10), British Heart Foundation http://www.bhfactive.org.uk/ (07.04.10) and http://www.patient.co.uk/health/Physical-Activity-For-Health.htm (07.04.10).

[xvii] Available at www.ordnancesurvey.co.uk (06.04.10).

[xviii] Available at www.ordnancesurvey.co.uk (06.04.10).

[xix] Available at http://neighbourhood.statistics.gov.uk/dissemination/LeadHome.do;jessionid=ac1f930c30d

89376adfd82ac4d408449f805e456e643?m=0&s=1270588811518&enc=1&nsjs=true&nsck=true&nssvg=false&nswid=1192 (06.04.10).

[xx] Available at http://www.apho.org.uk/ (06.04.10).

[xxi] Available at http://www.ons.gov.uk/census/index.html (07.04.10).

[xxii] Available at http://www.ons.gov.uk/census/index.html (06.04.10).