

Darnall, Acres Hill, Housteads, Tinsley & Handsworth 2008

Air Quality

Health Effects of Air Pollution

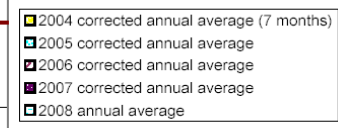
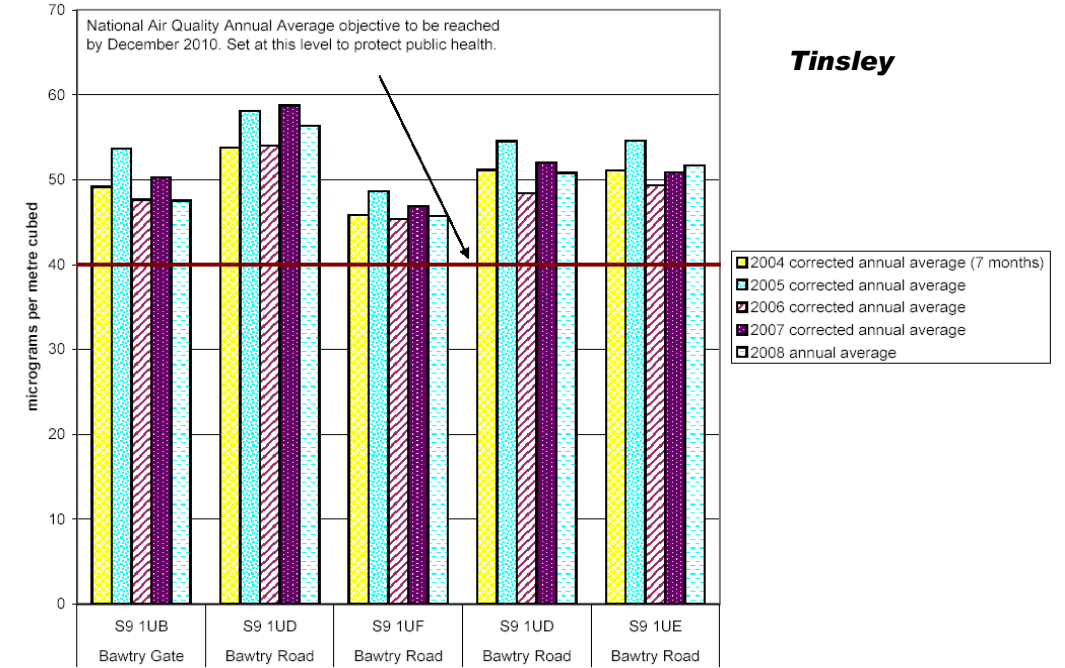
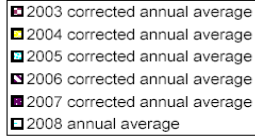
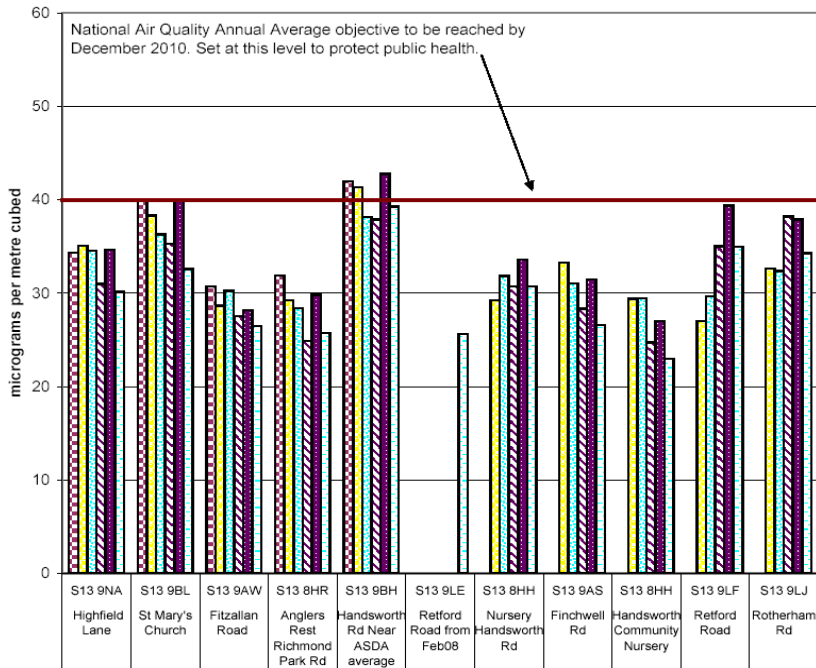
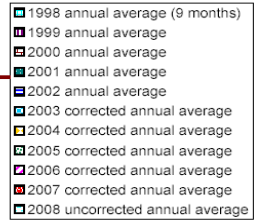
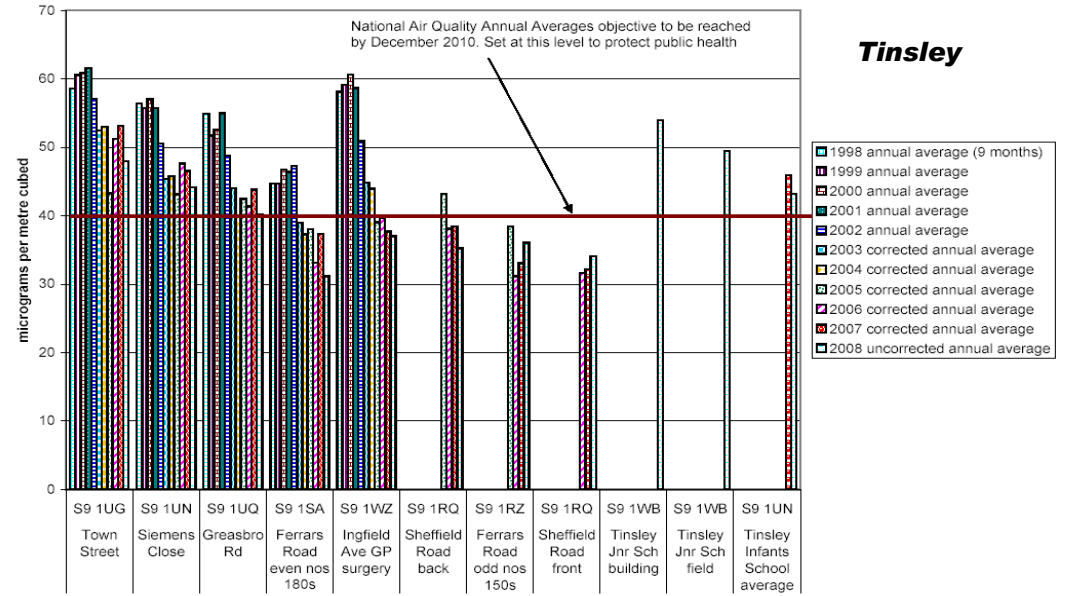
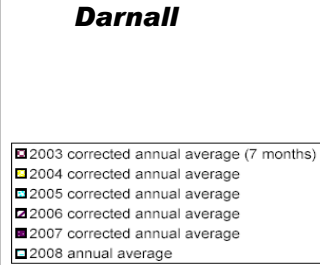
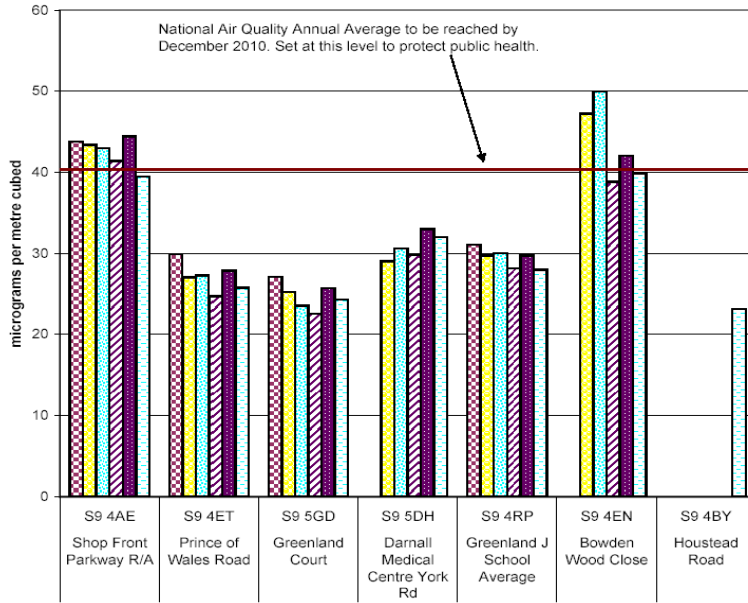
Some Health Trends

Sheffield Neighbourhoods Information System (SNIS)



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Community Air Quality Monitoring of Nitrogen Dioxide - Annual Averages



Health Effects of Air Pollution

Pollutant	Effects related to short-term exposure	Effects related to long-term exposure
Particulate matter	<ul style="list-style-type: none"> • Lung inflammatory reactions • Respiratory symptoms • Adverse effects on the cardiovascular system • Increase in medication usage • Increase in hospital admissions • Increase in mortality 	<ul style="list-style-type: none"> • Increase in lower respiratory symptoms • Reduction in lung function in children • Increase in chronic obstructive pulmonary disease • Reduction in lung function in adults • Reduction in life expectancy, owing mainly to cardiopulmonary mortality and probably to lung cancer
Ozone	<ul style="list-style-type: none"> • Adverse effects on pulmonary function • Lung inflammatory reactions • Adverse effects on respiratory symptoms • Increase in medication usage • Increase in hospital admissions • Increase in mortality 	<ul style="list-style-type: none"> • Reduction in lung function development
Nitrogen dioxide (in ambient air, NO ₂ serves as an indicator for a complex mixture of mainly traffic-related air pollution)	<ul style="list-style-type: none"> • Effects on pulmonary function, particularly in asthmatics • Increase in airway allergic inflammatory reactions • Increase in hospital admissions • Increase in mortality 	<ul style="list-style-type: none"> • Reduction in lung function • Increased probability of respiratory symptoms

Source: World Health Organization, June 2004, *Health Aspects of Air Pollution: Results from the WHO project 'Systematic Review of Health Aspects of Air Pollution in Europe.'* p7

Air Pollution and Noise: their effects on human health and social inclusion - a review of recent literature

Executive Summary

This review of recent papers looks at the growing body of evidence of how environmental factors, and particularly road-traffic related air pollution, affect health. Some of the most recent studies focus on the effects of small particulates which penetrate to the lungs and their adverse effects on cardiovascular disease, coronary heart disease, and stroke. Other studies have highlighted the disproportionate burden of environmental degradation, particularly air quality and noise, on deprived communities, with consequent impacts on increasing social deprivation.

Children (and the unborn foetus) are especially vulnerable to the effects of air pollution, because their lungs, metabolic and immune systems are still developing, they have higher rates of respiratory infections, and have activity patterns which lead to higher exposure. The effects in childhood and foetal development can include:

- aggravation of asthma
- increased cough and bronchitis
- low birth weight
- infant deaths (due to respiratory and Sudden Infant Death Syndrome)
- pre-term births
- birth defects

leading to effects throughout adult life:

- premature ageing
- higher risk of infection
- susceptibility to tobacco smoke
- susceptibility to occupational exposure.

Air pollution has been associated with a range of health impacts, including:

- aggravating and causing respiratory disease (including asthma, bronchitis, emphysema, etc.)
- increased risk of cardiovascular disease and death
- increased risk of coronary heart disease and death
- increased risk of stroke
- eye disease
- DNA damage.

Air Pollution and Noise: their effects on human health and social inclusion - a review of recent literature

Examples of the costs of air pollution from Europe, the UK and Sheffield

European Union	<p>kills 370,000 people per year reduces life expectancy by up to 9 months on average costs between €427 billion and €790 billion per year</p>
United Kingdom	<p>6,500 deaths brought forward (in 2002) 6,400 hospital admissions (in 2002) A 1 mg/m³ decrease in PM_{2.5} would give between 1.5 and 3.5 extra days of life per person NOx damage per tonne emission for 2010 €3,900 (low estimate) PM_{2.5} damage per tonne emission for 2010 €37,000 (low estimate) SO₂ damage per tonne emission for 2010 €6,600 (low estimate)</p>
Sheffield	<p>6% coronary heart disease deaths 11% stroke deaths Annual health costs of £48.1m (low estimate) based on: 8,000 tonnes per annum NOx emissions (£20.9m) 1,480 tonnes per annum SO₂ emissions (£6.5m) 1,190 tonnes per annum PM₁₀ emissions (£20.7m - costs estimated on PM_{2.5} being 70% of PM₁₀) Estimated annual cost benefits of introducing a Low Emission Zone between £1.8 million and £11.4 million per year (compared with inner relief road, costing £59m capital costs, bringing annual cost benefits of £0.03m to £0.2m)</p>

Air Pollution and Noise: their effects on human health and social inclusion - a review of recent literature

Noise and health

As well as the adverse effects of air pollution on health, road traffic generates noise which affects health in the following ways:

annoyance

sleep disturbance

quality of sleep

ischaemic heart disease

impaired performance by school children

some evidence to suggest that it may cause low birthweight in babies and psychiatric disorders.

Conclusion

The growing body of evidence would suggest that bolder and more effective measures should be taken to reduce people's exposure to air pollution and noise attributable to road-traffic and thus reduce their risk of disease and mortality due to cardiovascular, respiratory, and other symptoms. The evidence suggests that there is no safe level of exposure to particulate matter, and especially to very small particles (PM_{2.5}) which penetrate into the lungs. Many studies highlight the possible under-estimates of the health effects of traffic-related air pollution and noise, due to problems in isolating these from other effects on health.

The most deprived communities experience the worst environmental degradation. The implications for policy therefore would seem to be to target measures to reduce air pollution in deprived areas and highly populated urban areas, where the relatively small individual health benefits can make a big impact because they reach a large population. Concerns about the U.K.'s ability to meet current targets to reduce air pollution, particularly in urban areas, further emphasise the need for reducing motor vehicle traffic but at the same time enhancing alternatives such as walking, cycling, and public transport.

Revised January 2006

Cardiovascular Disease and Air Pollution



Cardiovascular Disease and Air Pollution

A report by the Committee on the
Medical Effects of Air Pollutants

Chairman: Professor JG Ayres

Chairman of the Sub-Group on Cardiovascular Disease
and Air Pollution: Professor JG Ayres

February 2006

“Cardiovascular disease is very common and, as exposure to air pollution, both in the long and short term contributes to initiation and exacerbation of disease, it is likely that even modest reductions in exposure will result in significant health gain”

The term cardiovascular disease includes all diseases of the heart and blood vessels including stroke.

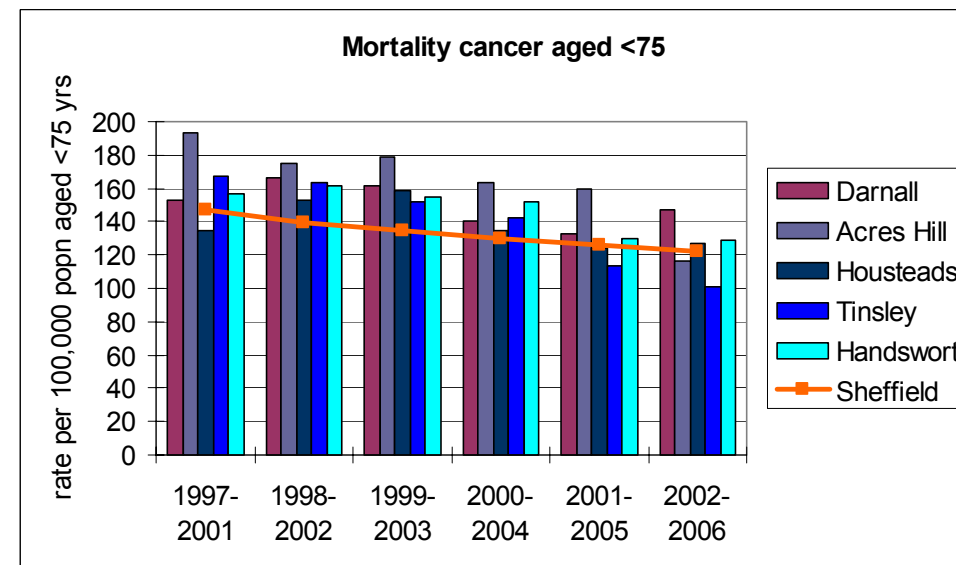
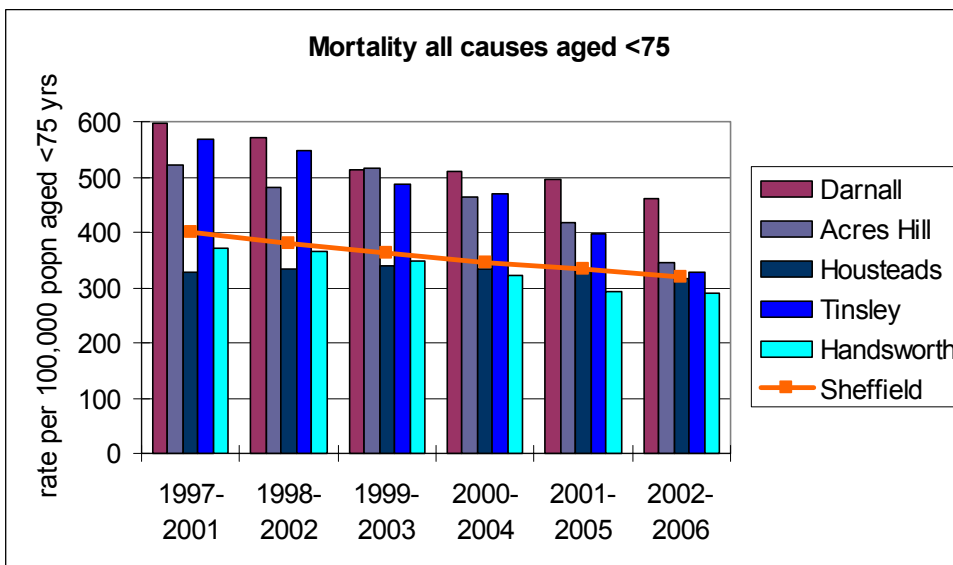
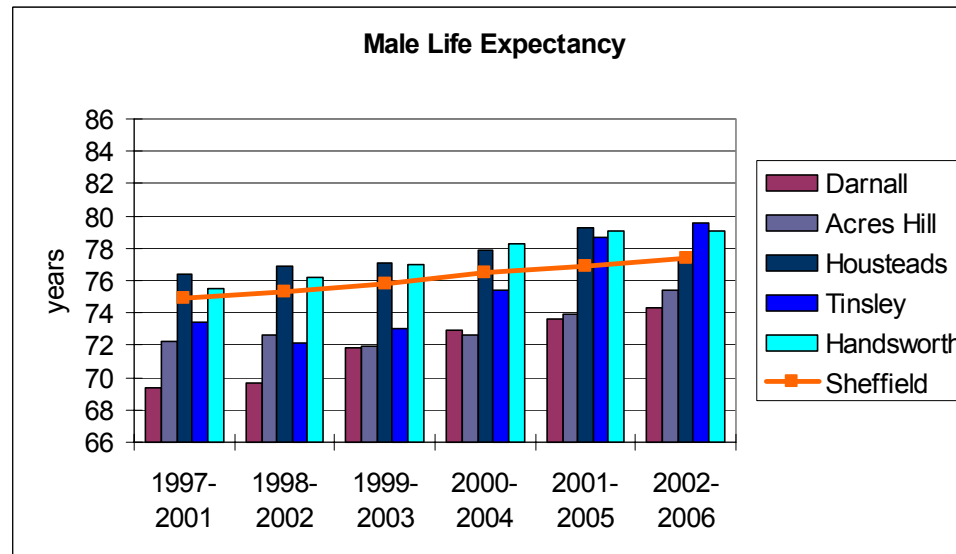
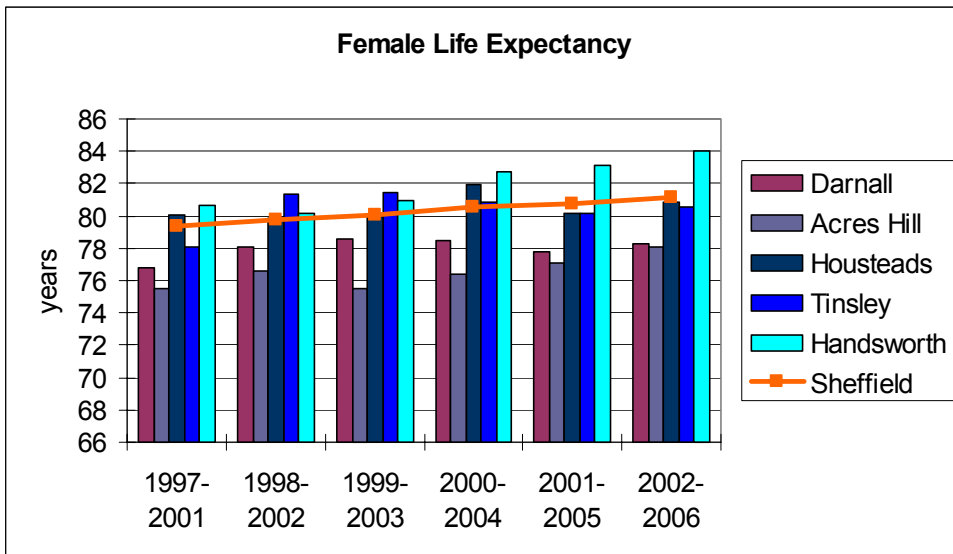
WHO REGIONAL OFFICE FOR EUROPE



WHO Monograph¹
**The effects of air pollution on children's health and
development: a review of the evidence**

While recognizing the need for further research, current knowledge about the health effects of air pollution is sufficient for a strong recommendation to reduce children's current exposure to air pollutants, in particular to the pollutants related to traffic. The experts who conducted this review consider that such reductions in levels of air pollution will lead to considerable children's health benefits.

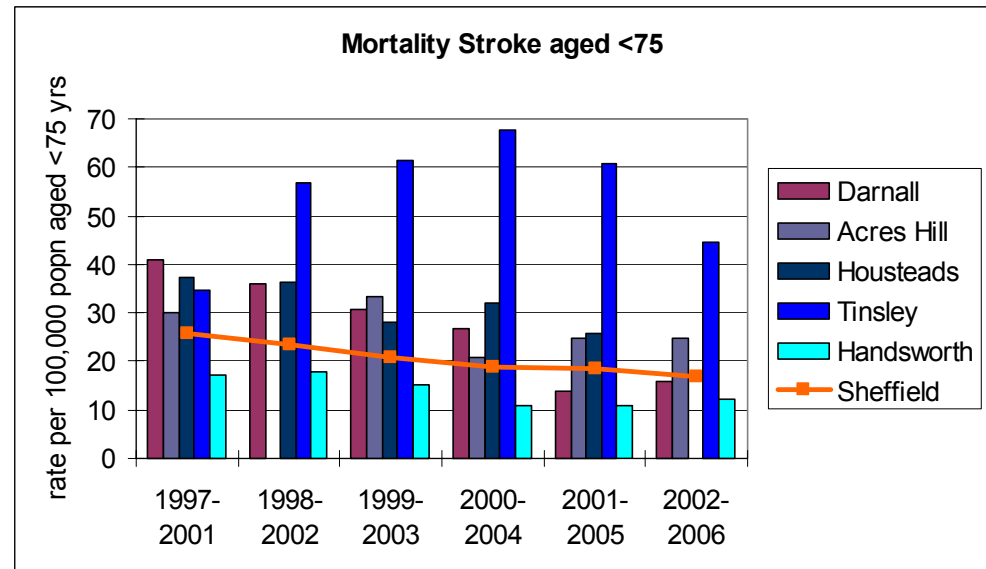
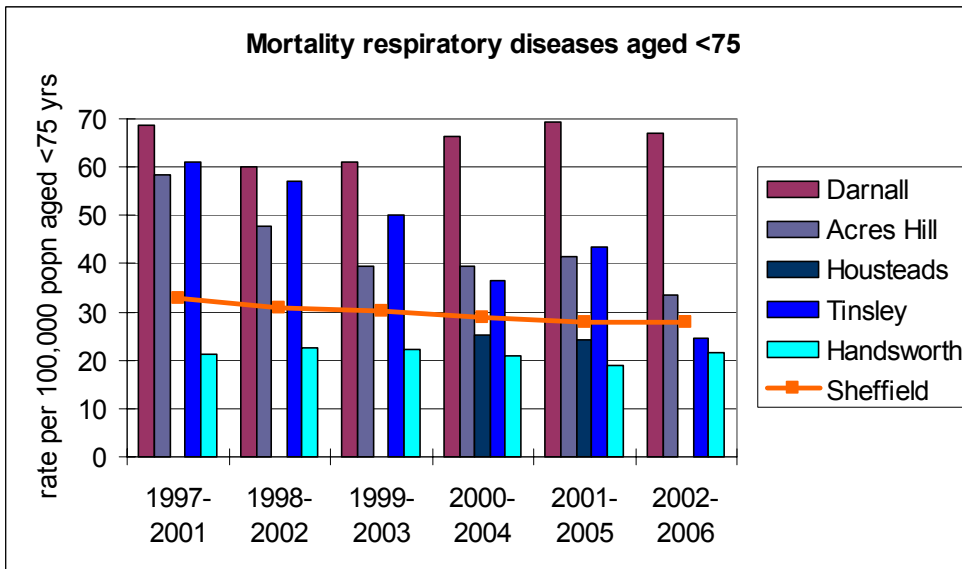
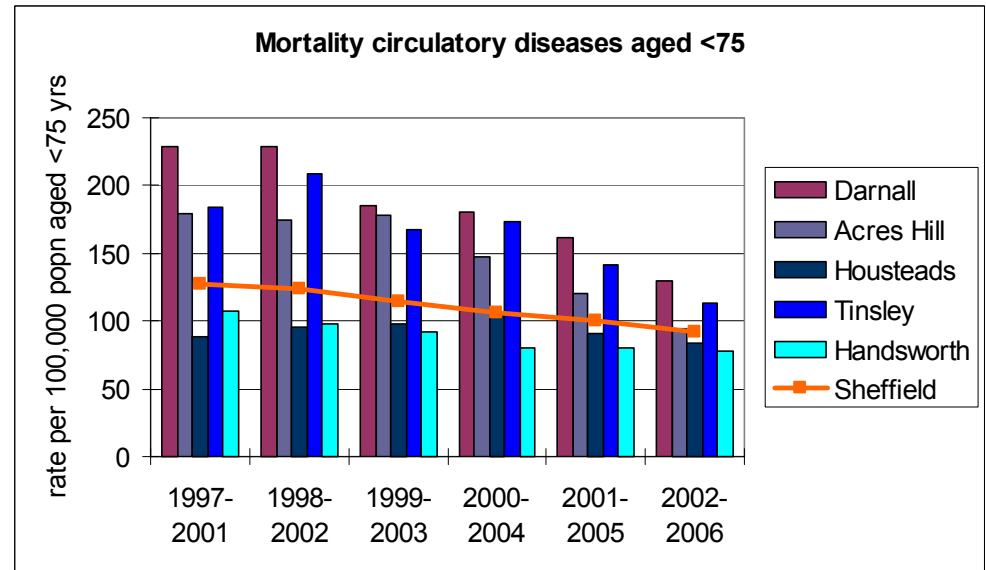
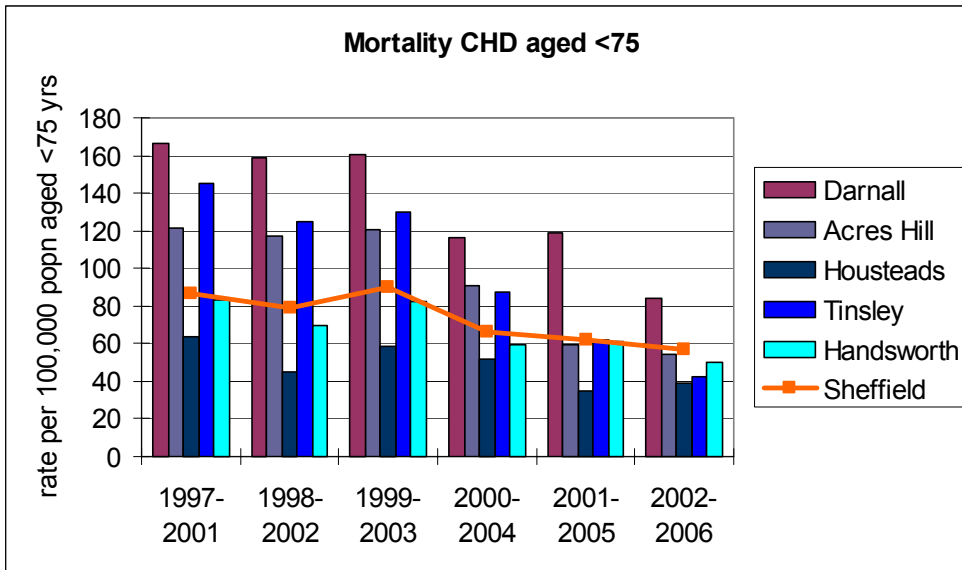
Life Expectancy and Deaths



Data Source: Public Health Mortality Files, Office for National Statistics, 2002-2006; Population Health Register, 2002-2006.

Life Expectancy calculation based on a method calculated by the West Midlands Public Health Observatory.

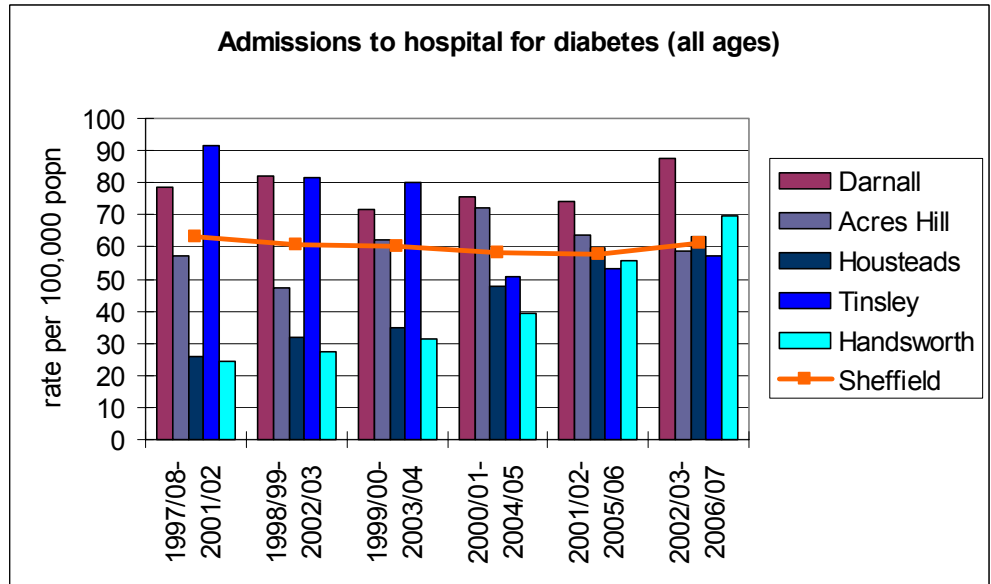
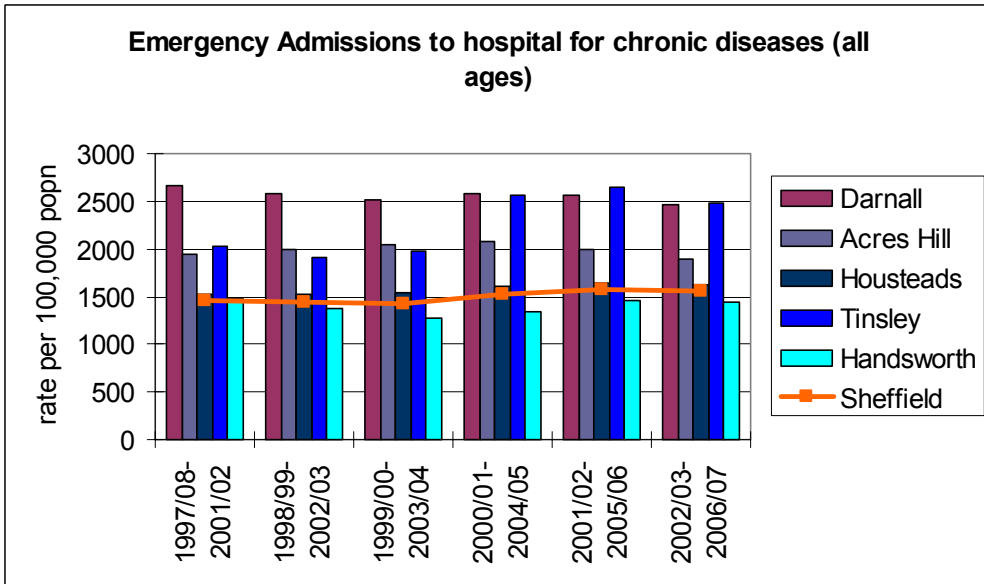
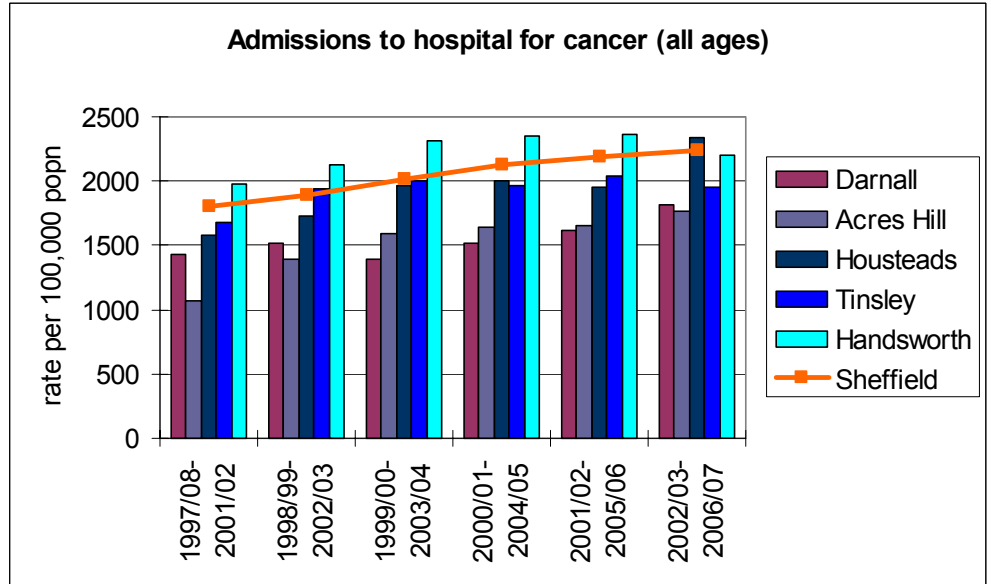
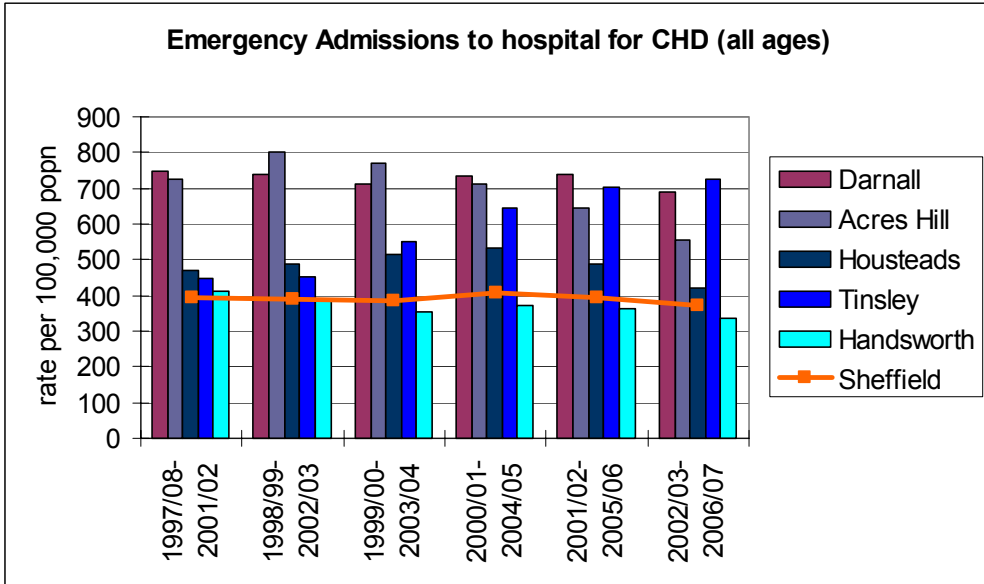
Deaths



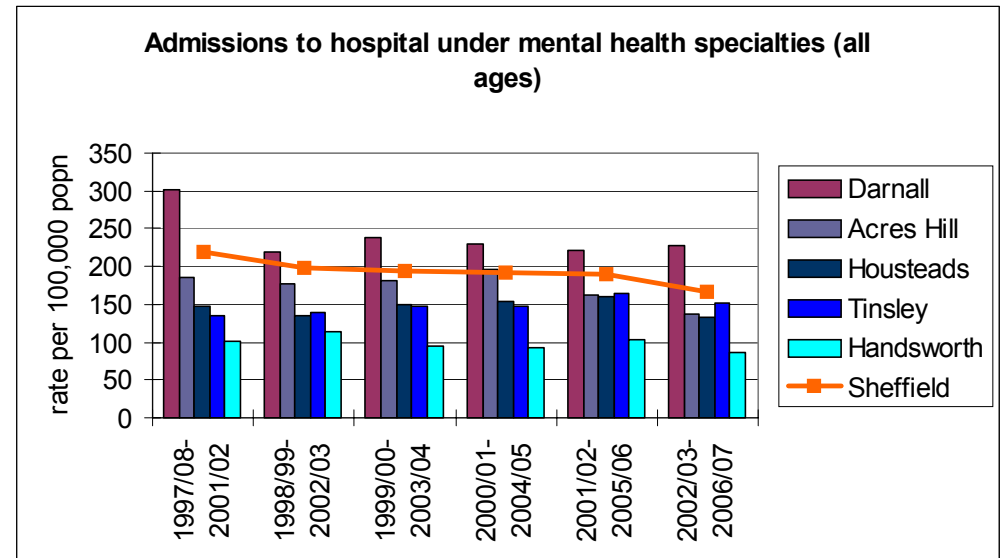
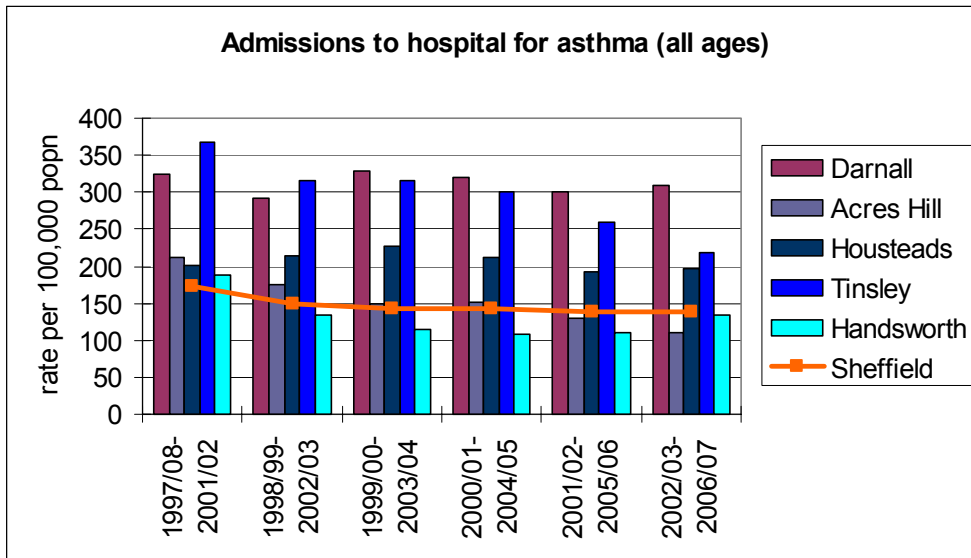
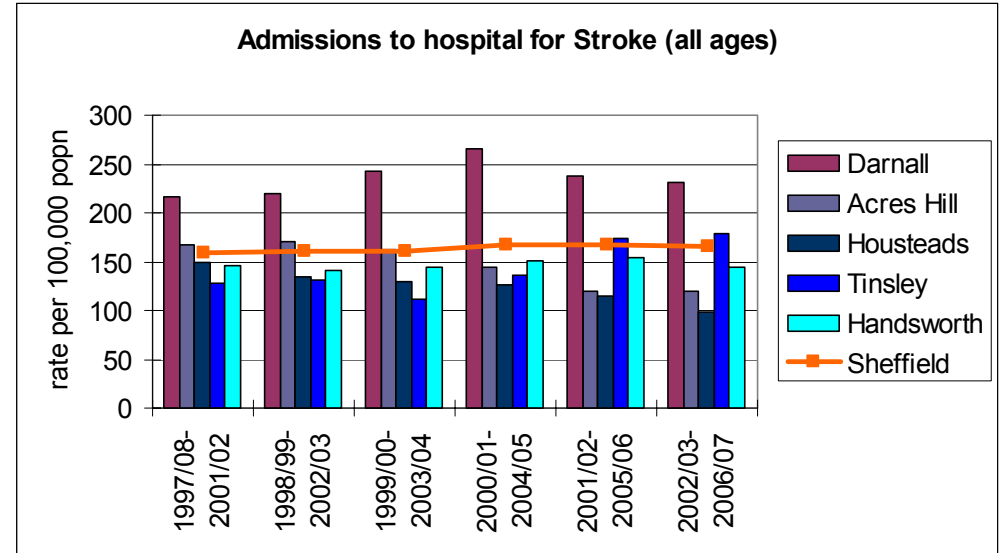
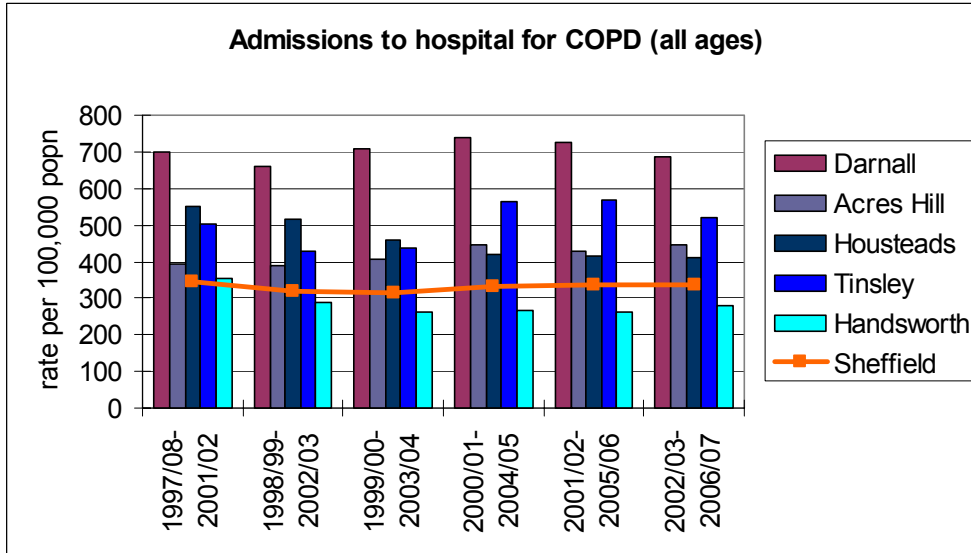
Data Source: Public Health Mortality Files, Office for National Statistics, 2002-2006; Population Health Register extracts, 2002-2006.

Hospital Admission Rates - *Emergency Admissions / A&E*

Hospital Admission Rates - *Other Admissions*



Hospital Admission Rates - Other Admissions



Data Source: Inpatient Minimum Data Sets, 2006/07; Population Health Register extracts, 2006/07.

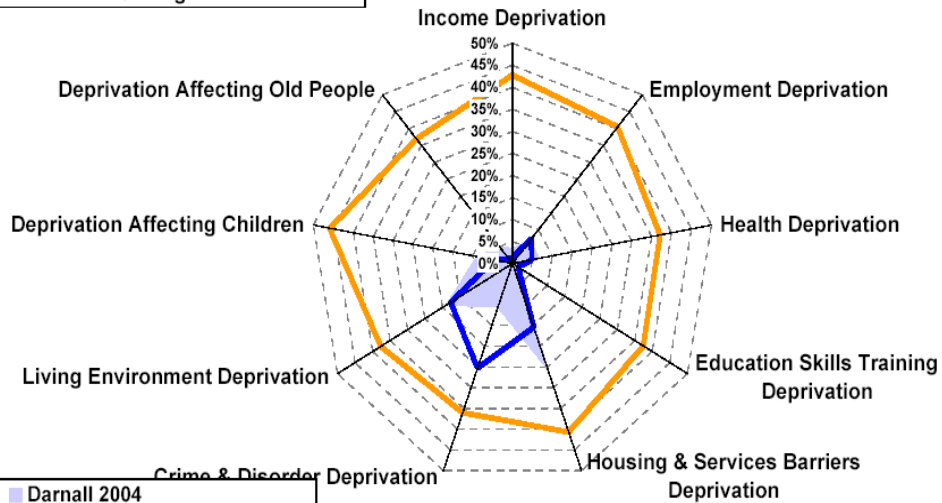


England Index of Deprivation by Domains % Ranking

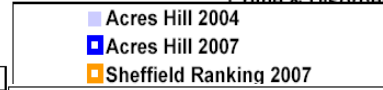
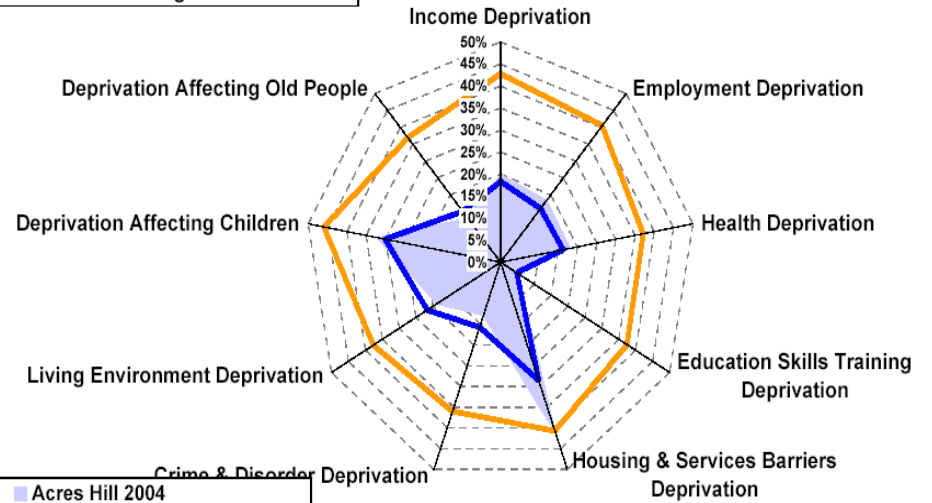
Darnall

England Index of Deprivation by Domains % Ranking

Acres Hill



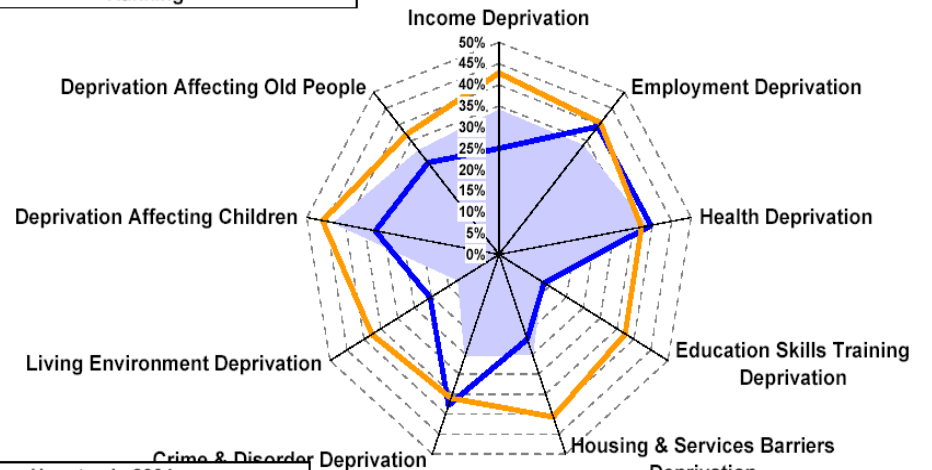
10%= within most deprived 10% of areas in England



10%= within most deprived 10% of areas in England

England Index of Deprivation by Domains % Ranking

Housteads



10%= within most deprived 10% of areas in England

Data source: Sheffield City Council Neighbourhoods, 2007

2008DAHTHHealthAir



SNIS 2



SNIS 2



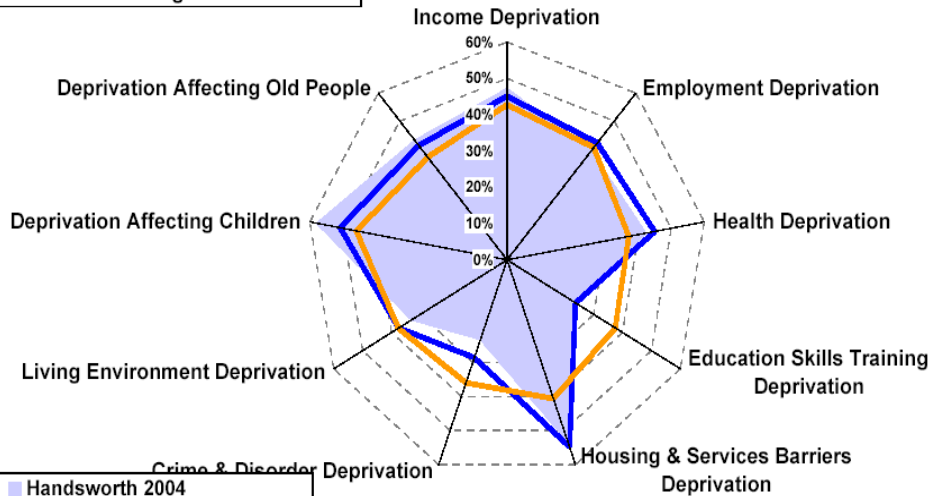
SNIS 2

England Index of Deprivation by Domains % Ranking

Handsworth

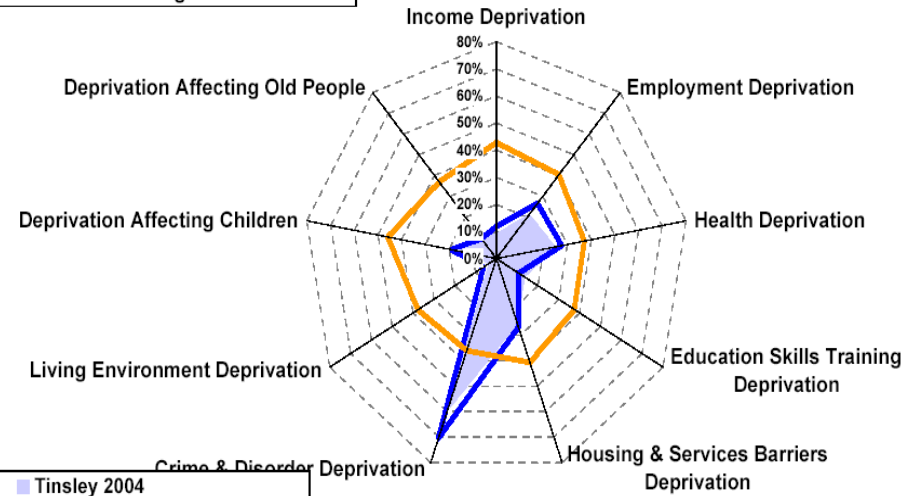
England Index of Deprivation by Domains % Ranking

Tinsley



■ Handsworth 2004
■ Handsworth 2007
■ Sheffield Ranking 2007

10%= within most deprived 10% of areas in England



■ Tinsley 2004
■ Tinsley 2007
■ Sheffield Ranking 2007

10%= within most deprived 10% of areas in England