THE HEALTH IMPACT ASSESSMENT OF THE 'CLEAN ACCESSIBLE TRANSPORT FOR COMMUNITY HEALTH' PROJECT

FINAL

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A HEALTH IMPACT ASSESSMENT REPORT OF THE ‘CLEAN ACCESSIBLE TRANSPORT FOR COMMUNITY HEALTH’ PROJECT

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Executive Summary

1. What is the 'CATCH' Health Impact Assessment?

1.1 This Executive Summary of the 'CATCH' - Clean Accessible Transport for Community Health - Health Impact Assessment (HIA) encapsulates the work undertaken by IMPACT, the International Health Impact Assessment Consortium at the University of Liverpool. Merseytravel commissioned IMPACT,

'... To assess the health impacts of the ... operation of the 'CATCH' project...'

1.2 The primary purpose of this HIA is to provide an assessment of the potential health effects of 'CATCH' that can then be compared to the actual health effects, which will be assessed at the end of the project.

2. What is the 'CATCH' project?

2.1 'CATCH' is a research and development project supported by DG Environment of the European Commission, which aims to contribute to reducing road traffic-generated air pollution in the City centre of Liverpool. Parts of Liverpool City Centre have been designated Air Quality Management Areas (AQMA) as a result of predicted exceedances of nitrogen dioxide (NO$_2$). Approximately 45% of all NO$_2$ emissions are from motor vehicles; this proportion is estimated at 74% in cities.

2.2 There are several tasks associated with CATCH. The key tasks for the HIA are:

<table>
<thead>
<tr>
<th>Task</th>
<th>Action</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reduce emissions from existing vehicles</td>
<td>Fit particulate filters and other technological innovations (Selective Catalytic Reduction - SCR) to 89 existing Arriva buses used on routes into the City Centre</td>
<td>- Reduce emissions of carbon monoxide (CO) and hydrocarbons (HC) by 90%, and particulates by 95% from 'CATCH' buses - Reduce NOx by at least 15% from 'CATCH' buses - Fit emission reducing technologies to 10% of buses operating in Liverpool City Centre by the end of year 1</td>
</tr>
<tr>
<td>2. Reduce emissions from new vehicles</td>
<td>Introduce a new city centre circular bus route operated by hybrid buses. Introduce clean vehicle technology into the Council fleet. Provide options for sustainable transport.</td>
<td>- 6-hybrid shuttle buses operating the 'city centre circular' by 1st January 2005</td>
</tr>
<tr>
<td>3. Air Quality Management</td>
<td>- Air Quality Management (AQM) Plan - Transport Demand Management - Public Transport Enhancements - Cycling and Walking Measures</td>
<td>- 5% increase in City centre residents using environmentally friendly modes of travel by August 2004, and 10% by 2005 - Develop (2004) and implement (2005) AQM action plan - Increase proportion of cycling and walking journeys within the City centre by 5% in June 2004 and 10% in April 2005 - To increase the percentage of City centre streets where significant improvements in pedestrian/cycling facilities have been made to 3% by June 2004, 5% by August 2004, 7% by June 2005 and 10% by August 2005</td>
</tr>
<tr>
<td>4. Working with markets and citizens</td>
<td>- Sustainability Mobility Information Bureau (SMIB) - Community mobility plans</td>
<td>- 10% of Liverpool City centre residents are aware of SMIB by the end of year 1, 25% by the end of year 2 and 50% by the end of year 3 - One mobility plan to be implemented by the end of August 2003, three by the end of August 2004 and five by the end of August 2005</td>
</tr>
</tbody>
</table>
3. **What methods were used in this Health Impact Assessment?**

3.1 The HIA methods were based on the 'Merseyside Guidelines for Health Impact Assessment' (Scott-Samuel et al, 1998); this methodology is the most widely used in the UK (Ison & Griffiths, 2000). It is a systematic process involving a set procedure and the use of a number of different methods as follows:

**Executive Summary: Figure 1 A Generic HIA Methodology based on the Merseyside Guidelines**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screening</td>
<td>a. Profiling of communities</td>
</tr>
<tr>
<td>Identify policies for HIA</td>
<td>b. Analysis of policy proposals</td>
</tr>
<tr>
<td>Develop terms of reference</td>
<td>c. Primary Data Collection: Participatory,</td>
</tr>
<tr>
<td></td>
<td>quantitative approaches</td>
</tr>
<tr>
<td>Identify assessment team</td>
<td>d. Impact analysis: data assembled and</td>
</tr>
<tr>
<td></td>
<td>evidence of impacts assessed</td>
</tr>
<tr>
<td>Undertake assessment</td>
<td>e. Priority impacts established</td>
</tr>
<tr>
<td>Report on health impacts and</td>
<td>f. Recommendations developed</td>
</tr>
<tr>
<td>policy options</td>
<td>g. Monitor and evaluate</td>
</tr>
<tr>
<td>Monitor and evaluate</td>
<td></td>
</tr>
</tbody>
</table>

Report appraisal - Policy revision
4. **What are the key findings from the Health Impact Assessment?**

4.1 Data from the profiling, policy analysis and from the HIA fieldwork have been collected and analysed to identify evidence of the potential health impacts of the 'CATCH' project on the population who live and work in the 5 most affected City centre wards - Abercromby, Everton, Granby, Smithdown, and Vauxhall. Approximately 18 interviews and focus groups were conducted with community and organisational stakeholders, as well as with key informants, independent witnesses with expertise in transport or transport and health.

4.2 The matrices below define the *Potential Health Impacts* of the scheme on different health determinants and their subsequent effect on health outcomes (the impacts on health status are described after the impacts on health determinants and follow the arrow symbol \(\rightarrow\)). The *Direction* indicates whether this impact is a health gain (+) or loss (-). *Scale* is a measure of the severity of the impact (in terms of effects on mortality, morbidity and well being) and the size/proportion of the population affected - is represented by the number of symbols as follows:

<table>
<thead>
<tr>
<th>Severity/population proportion</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>---- or ++++</td>
<td>--- or +++</td>
<td>-- or ++</td>
</tr>
<tr>
<td>Illness/injury</td>
<td>--- or +++</td>
<td>-- or ++</td>
<td>- or +</td>
</tr>
<tr>
<td>Well being</td>
<td>-- or ++</td>
<td>- or +</td>
<td>negligible</td>
</tr>
</tbody>
</table>

As the CATCH project is a demonstration project it needs to be recognised that the populations affected are small.

4.3 The *Likelihood* of impact describes the probability that the impact will occur. The likelihood can be definite (in the case of retrospective HIAs), probable, possible or speculative - which in turn relates to the strength of the evidence. Where there is a close correlation between evidence from all data sets (which includes published literature and information from stakeholders/key informants), this is regarded as strong evidence. In addition to the analysis of the potential health impacts on the population as a whole, the potential impacts on health inequalities are also discussed. The impact analysis considers the operation of the CATCH project.
### Executive Summary: Table 1

#### Health Impacts of the Operational Phase of CATCH

<table>
<thead>
<tr>
<th>Potential Health Impacts</th>
<th>Direction/Scale</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Individuals and families - lifestyle</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CATCH 5-ward Population</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase in mobility (Tasks 2, 3, 4)</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td>New city centre shuttle services introduced enhancing mobility. High demand for mobility maintained. Increase in independence and well being from increased mobility.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase in physical activity (Tasks 2, 3, 4)</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td>Increase in walking, cycling with new facilities and services reductions in risk of obesity, hypertension, diabetes (type 2), heart disease etc from increase in activity - health outcomes not quantified. Increase in mental well being.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase in personal safety (Task 3, 4)</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td>Contributes to reductions in risk of road traffic accidents from restrictions in road traffic - reduced risks of fatalities and serious injuries (KSIs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase in healthier travel behaviour (Tasks 1-4)</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td>Some car journeys converted to bus, walking or cycling and/or multi-occupant car journeys ('car clubs'). Some walking converted to shuttle bus journeys.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Inequalities within CATCH wards</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Older people and people with disabilities will benefit least from additional City centre shuttle service and facilities promoting physical activity.</td>
<td>-</td>
<td>Probable</td>
</tr>
<tr>
<td>• People on low incomes <em>may</em> benefit less from City centre shuttle service if fares policy prohibits use. This has mobility implications.</td>
<td>-</td>
<td>Possible</td>
</tr>
<tr>
<td>• BME groups <em>may</em> benefit less from information service if diversity needs not provided for eg translation, interpretation service. This has mobility implications.</td>
<td>-</td>
<td>Possible</td>
</tr>
<tr>
<td><strong>Inequalities between CATCH wards and Liverpool</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Working populations coming into the City centre may particularly benefit from City centre circular route.</td>
<td>-</td>
<td>Probable</td>
</tr>
<tr>
<td>• Lower proportion of CATCH population likely to switch to healthier transport mode, compared to elsewhere in Liverpool as currently high proportion (25.2%) of CATCH population walk or cycle to work compared with 18.1% for Liverpool as a whole.</td>
<td>-</td>
<td>Probable</td>
</tr>
</tbody>
</table>
**Socio-economic environment**

**CATCH 5-ward Population**

- Increase in social support (Tasks 2, 3, 4)
  Enhancing social networks by increasing mobility contributes to increases in social support (stress ‘buffers’) short term: improves physical and emotional well being; longer term: reduces risk of heart disease

- Enhances local economy (Tasks 2, 3, 4)
  Contributes to reduced vehicle access in City centre, restricted movement of goods, but improves traffic flow around City centre. Enhances access to jobs for workforce from additional bus service, public transport corridor. Enhanced local economy stimulates job creation, increasing employment. Employment is 'health enhancing', associated with reduced risk of premature mortality (3 excess deaths for every 2000 unemployed men), physical and psychological ill health

- Increase in access to people and places (employment, education) (Tasks 2, 3, 4)
  Increased access due to additional/enhanced public transport services; reduced access to certain areas by motor vehicles.

**Health Inequalities within CATCH**

- Older people and disabled people will benefit least from networking and social support as their mobility will be least enhanced compared with the CATCH population as a whole

- People on low incomes may benefit less from City centre shuttle service if pricing policy prohibits use. This has access and networking implications

- BME groups may benefit less from information service if diversity needs not provided for eg translation, interpretation service. This has access and networking implications

**Health Inequalities between CATCH wards and Liverpool**

- Working populations coming into the City centre may particularly benefit from City centre circular route.

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Physical environment

CATCH 5-ward Population

- Reductions in rate of road traffic growth and congestion (Tasks 2, 3, 4)
  Reduction in rate of growth (predicted 1.052 in 2005) and congestion of road traffic by promotion of healthier transport modes, change in travel behaviour, restricted vehicle access, change in traffic flows

- Improvements in Air Quality (Tasks 1-4)
  Reductions in general road traffic-generated and bus-generated air pollutants (Task 1): NOx, PMs, CO, VOCs

Reductions in NOx to bring within NAQS
  Prevent 'sensitising' asthmatics, people with Chronic Obstructive Pulmonary Disease reducing risks of reduced lung function and morbidity (WHO, 2003)

Reductions in generation of ground level O3 (resulting from NOx photochemical oxidation in the presence of VOCs)
  Reductions in risk of deaths brought forward eg asthmatics (+ 0.6% per 10 ug m\(^{-3}\) 8-hour mean O3 concentration (above 100 ug threshold) m\(^{-3}\)) (COMEAP, 1998).

Reductions in PMs
  Reductions in risk of deaths brought forward (+ 0.75% for a 10 ug m\(^{-3}\) increase in PM concentrations (no threshold)) (COMEAP, 1998).

Reductions in outdoor air pollutants prevent long term lung damage.

Health Inequalities
CATCH will contribute to reducing the health inequalities experienced in the 5 wards due to road-traffic generated air pollution.
Groups most vulnerable to poor air quality:
Children, pregnant women, people with existing heart or respiratory disease, older people, 'responders' (people who are susceptible to allergic responses from pollutants)

Services

CATCH 5-ward Population

- Reductions in demand for health services
  Reduced risk of respiratory-related morbidity reductions in hospital admissions, medication

- Health service access
  Some increase in access to health services where shuttle route passes. Increase in performance of emergency services as a result of reduced traffic congestion, eg, ambulance attendance times.

- Public transport (Tasks 1-4)
  Enhanced public transport service and patronage. Support proliferation of electric and hybrid buses as standard.
5. Conclusion

5.1 CATCH is assessed as potentially contributing to improving health in the 5 ward City centre area of Liverpool. It will achieve this through impacts primarily on the following health determinants/health risk factors:
- Reductions in traffic generated air pollutants - NOx, PMs, VOCs and indirectly \( O_3 \)
- Increases in physical activity - walking and cycling

The potential positive impacts on health outcomes result from the reductions in risks associated with respiratory and cardiovascular morbidity and mortality, which health data for the CATCH population indicate are well above both Liverpool and regional averages. For example the CATCH area has an SMR of 261 for mortality from respiratory disease; this is 181 for Liverpool. It is possible to estimate the health effects from project change data, eg changes in ambient pollutant concentrations due to CATCH.

5.2 CATCH will also potentially impact positively on other health determinants, eg mobility and social support, personal safety and access, although the scale of these impacts is small.

5.3 However although CATCH benefits the 5 ward population overall, some population groups are likely to benefit more than others. This differential distribution of impacts may actually widen health inequalities between some groups and the population as a whole, eg older people, people with disabilities, BME groups and people on low incomes. Health inequalities are a concern locally and nationally. Whilst health is generally improving in the population, for example as measured by life expectancy, for certain groups, eg high income and low income groups, the gap between them is increasing.

5.4 There were no major risks identified to the successful implementation of CATCH; it links very well with local, national and international policies. However the project will undoubtedly benefit from political and community support. There are also various opportunities for CATCH, eg other sustainable transport projects that could help maximise CATCH outputs.

6. Recommendations

6.1 Increasing healthier travel behaviour
- Target populations for direct support from CATCH to promote healthy travel behaviour - for example, communities on City centre periphery, University students living in the CATCH zone
- Link with existing initiatives in Liverpool to provide indirect CATCH support - for example, health sector (Green transport plans, physical activity action plan), schools (school transport plans, Healthy School awards), the voluntary sector (community transport, car sharing schemes) and other existing neighbourhood specific-community development projects (Alleygating)
- Adopt evidence-based community development approaches in work with communities - for example, methods used in Alleygating scheme by HAZ/Safer Merseyside Partnership, School Nutrition Action Groups working with families
6.2 Increasing personal safety
- Identify political/community leaders to act as CATCH 'Champions'
- Through CATCH, promote the reduction of speed limits within the City centre zone to 20 m.p.h. (HDA, 2003)
- Through CATCH, promote the use of safety equipment, such as cycle helmets (WHO, 2000)

6.3 Increasing mobility
- Explore the feasibility of introducing additional routes for the City centre shuttle that for example, cater for people with mobility impairments in the City centre zone
- Ensure the needs of people with mobility impairments can be met with the development of pedestrian priority areas, parking restrictions
- Consider a radical fares policy for the new shuttle service, for example free for certain routes (GMPTE)
- Ensure travel information and services meet the diversity needs of the community, for example in appropriate community languages

6.4 Increasing access
- Map access to primary care facilities along new shuttle route/s and promote in literature
- Map access of new shuttle route to neighbourhood centres or 'nodes' and promote in literature

6.5 Reducing road traffic
- Liase with key agencies concerning the enforcement of the pedestrian priority zones, parking restrictions and vehicle access restrictions
- Liase with key NHS agencies (Hospital Trusts, PCTs) concerning developments effecting travel and transport, for example Strategic Service Development Plans, Green Transport Plans

6.6 Reducing and monitoring air pollutants
- Widen the monitoring spectrum of CATCH buses to include PM2.5 and the monitoring conditions, for example, different bus speeds
- Monitor emissions from hybrids as well as retrofitted buses
- Through CATCH, explore feasibility of developing a local Air Quality Alert System to inform professionals and the public
Section 1: INTRODUCTION

1.1 Background

1.1.1 IMPACT, the International Health Impact Assessment Consortium at the University of Liverpool was commissioned by Merseytravel to undertake two rapid Health Impact Assessments (HIAs) of the Clean Accessible Transport for Community Health ('CATCH') project. The brief from Merseytravel was, firstly, to identify and assess the health impacts of the CATCH project in Liverpool at its initiation using existing data and also new data from stakeholders and key informants (a prospective HIA) and, secondly, to repeat this assessment at the project's completion (a retrospective HIA).

This report describes the process, findings, conclusions and recommendations from the prospective rapid HIA. It is supplemented by an executive summary.

1.2 Health Impact Assessment

1.2.1 It is now generally accepted that non-health care policies are key determinants of public health. This reflects evidence from the Black Report (Townsend et al, 1982), The Health Divide (Whitehead, 1987) and more recently the Independent Inquiry into Health Inequalities (Acheson et al, 1998). Health Impact Assessment (HIA) builds on the understanding that a community's health is determined by a wide range of variable economic, environmental and psychosocial influences as well as fixed factors such as heredity and age. HIA aims to identify what potential changes in health determinants might result from a new policy or project, for example a transport project, and what effects these changes might have on a defined population, for example communities affected by the transport project.

1.2.2 The elements of this approach have much in common with the established field of environmental impact assessment (EIA), and build on this methodology. However it has been recognised that impacts on human health were not an explicit concern of EIA. As such HIA methodology has been developed. The Departments of Health in England, Northern Ireland, Scotland, and Wales (eg, DoH, 1999) now recommend HIA on new policy or project developments at national and local levels. In addition the European Community advocates HIA of EC policies and actions (EC, 2002).

The HIA methodology used in the CATCH HIA reflects the Merseyside Guidelines for HIA (Scott Samuel et al, 1998), the most well-used HIA methodology in the UK (Griffiths and Ison, 2000), which adopts a socio-environmental model of health; this will be discussed in section 3.
SECTION 2: SUMMARY OF THE 'CATCH' PROJECT

2.1 Background and context

2.1.1 Parts of Liverpool City Centre have been designated Air Quality Management Areas (AQMA) as a result of predicted exceedances of nitrogen dioxide (NO\(_2\)). Other parts of Liverpool are also likely to exceed levels allowed under the National Air Quality Strategy for both NO\(_2\) and particulates (PM\(_{10}\)). Approximately 45% of nitrogen oxide emissions are from motor vehicles, rising to 74% in cities.

2.1.2 'CATCH' - Clean Accessible Transport for Community Health - is a research and development project supported by DG Environment of the European Commission, which aims to contribute to reducing this road traffic-generated air pollution in the centre of Liverpool. The project proposal was co-ordinated by Merseytravel, in collaboration with its partners.

2.2 Summary of the CATCH project

2.2.1 Introduction

The following summary of the CATCH project is drawn directly from the Inception report (Merseytravel, 2003) produced for the EC's Directorate General for the Environment.

'CATCH' has 10 tasks each with specific objectives and targets as follows:

- Task 1  Reduce emissions from existing vehicles
- Task 2  Reduce emissions from new vehicles
- Task 3  Air Quality Management
- Task 4  Working with markets and citizens
- Task 5  Pollution monitoring
- Task 6  Monitoring and evaluation
- Task 7  Transfer to candidate countries
- Task 8  Transfer to Southern Europe
- Task 9  Dissemination
- Task 10 Project Management

2.2.2 Partners

The project is being implemented by 6 partner organisations:
- Merseytravel - Project Co-ordinator (UK)
- Transport & Travel Research Ltd (UK)
- Liverpool City Council (UK)
- Arriva North West Ltd (UK)
- CTP (Italy)
- Suceava Municipality (Romania)

The project will work in partnership with local residents, developers, public transport providers and other groups to implement a range of solutions which will improve provision of clean transport options through a mixture of planning, awareness and technical measures.
2.2.3 Task 1  Reduce emissions from existing vehicles

The objective of this task was stated as 'to significantly expand the use of clean fuels in public transport and local authority vehicle fleets by applying innovations to existing vehicles within partners' fleets.'

The expected activities associated with this were:
   i. The fitting of particulate filters to 89 existing Arriva buses (59 Volvo and 30 DAF) used on routes into the City Centre
   ii. The use of 'Purinox' - a water/diesel emulsion fuel - on these buses to reduce NOx emissions

During the project initiation's however the latter approach was replaced with an alternative technological intervention - Selective Catalytic Reduction (SCR).

Baseline emissions and fuel consumption data from each of the buses was collected prior to the fitting of the filters and SCRs and is being monitored against agreed milestones and targets.

The targets are:
   • To reduce emissions of carbon monoxide (CO) and hydrocarbons (HC) by 90%, and particulates by 95% from 'CATCH' buses
   • To reduce NOx by at least 15% from 'CATCH' buses
   • To fit emission reducing technologies to 10% of buses operating in Liverpool City Centre by the end of year 1

The budget for this task is approximately £ 554, 000.

2.2.4 Task 2  Reduce emissions from new vehicles

The Inception report states the objective of task 2 is 'to significantly expand the use of clean fuels in public transport and local authority vehicle fleets by introducing new clean vehicles within the partners' fleets to test innovative technologies and applications.'

Key activities are:
   iii. Providing options for sustainable transport modes such as walking and cycling
   iv. Introducing 6 new electric buses to operate a new city centre circular route not currently supported by the existing public transport network
   v. Phased introduction of clean vehicle technology into the City Council ancillary vehicle fleet

Details of the 'city centre circular' route and passenger market to be targeted are to be developed following a feasibility study; in addition technical vehicle specifications will also be refined. The installation of the recharging infrastructure is another key activity.

The target is to have 6-electric shuttle buses operating the 'city centre circular' by 1st January 2005.

The budget for this task is £ 1.345 million.
2.2.5 Task 3 Air Quality Management

The objective of this task is 'to demonstrate how an air quality management plan in Liverpool City centre can be implemented effectively.'

The task has 4 key activities:
vi. Air Quality Management Plan - assessing N0x pollution sources in City centre, eg routes, class of vehicles and developing an action plan to reduce N0x levels by the end of 2005, eg travel plans, re-routing of traffic, modal shifts
vii. Transport Demand Management for City centre residents (linked to Task 4) - developing a parking policy for existing residents by March 2003 to control the number of car parking places; developing car parking management guidelines for future residential developments for the UDP review by the end of 2003
viii. Public Transport Enhancements (linked to Task 2) - linking key development areas and providing public transport not currently served by the existing public transport network, e.g. the City centre circular electric shuttle, and in context of traffic circulation patterns advocated in City Centre Movement Strategy (CCMS)
ix. Cycling and Walking Measures - development and integration of cycling and walking measures, e.g. widening footpaths, improved pedestrian crossings, better maintenance and security

The targets are:
- To complete an action plan for the reduction of harmful emissions in the City centre AQMA by March 2004 and
- To implement this action plan by March 2005
- To achieve a 5% increase in City centre residents using environmentally friendly modes of travel by August 2004, and 10% by 2005
- To operate 6 electric shuttle buses on the City centre circular starting by 1st January 2005
- To increase the proportion of cycling and walking journeys within the City centre by 5% in June 2004 and 10% in April 2005
- To increase the percentage of City centre streets where significant improvements in pedestrian/cycling facilities have been made to 3% by June 2004, 5% by August 2004, 7% by June 2005 and 10% by August 2005

The budget for this task is £381,000 approximately.

2.2.6 Task 4 Working with Markets and Citizens

The objective of this task is 'to work with community groups and individual citizens to encourage the use of less polluting means of travel within the urban environment.'

The activities to support this task are two-fold:
x. Information provision - creating a Sustainability Mobility Information Bureau (SMIB), for individuals and businesses, to provide a one-stop service for all travel-related information for environmentally-sustainable modes of transport, eg journey planners, alternative fuels
xi. Community mobility plans (CMPs) - developing CMPs with a range of housing providers, eg promoting alternative, sustainable travel options to the car to new tenants and residents (students, mixed housing, private); working with land-use planners to restrict vehicle access in the City centre

The targets are:
• 10% of Liverpool City centre residents is aware of SMIB by the end of year 1, 25% by the end of year 2 and 50% by the end of year 3
• One mobility plan to be implemented by the end of August 2003, three by the end of August 2004 and five by the end of August 2005

The budget for Task 4 is E480,000 approximately.

2.2.7 Task 5 Advanced Pollution Monitoring
The objective of this task is 'to implement advanced pollution monitoring in Liverpool City centre.'

The activities associated with this are monitoring pollution:
xii. At fixed sites, eg Paradise Street bus station, bus depots
xiii. On board vehicle corridor
xiv. On vehicle exhaust

Particulates are to be CCTV monitored using polychromatic light scattering techniques and gaseous compounds (N0x, S0x) by mass spectrometry with chromatic processing. 'Background' emissions from sources other than the vehicles' exhausts, eg brake and tyre wear, industry, will be standardised for.

Targets are:
• 50% of pollution monitors deployed and operational by the end of year 1, 100% by the end of year 2.

The budget for this task is E 160,000 approximately.

2.2.8 Task 6 Monitoring and evaluation
This task's stated objective is 'to evaluate the impacts of CATCH...' and to report on the impacts of the project as whole and individual tasks.

Activities include:
xv. Pre and post surveys of stakeholders
xvi. Prospective and retrospective health impact assessments
xvii. Collation/analysis of secondary data (CATCH and non-CATCH)
xviii. Observational studies

This task evaluates the predicted and actual impacts on air quality in the City centre, as well as achievement of the task targets and attitudes, beliefs and behaviours of stakeholders.

The budget for this task is E 320,000 approximately.

2.2.9 Task 7 Transfer to candidate countries
This objective is concerned with implementing a package of measures to improve air quality in Suceava, Romania.

Activities will include measures based on those introduced in Liverpool:
xix. Pollution reduction technologies (tasks 1 & 2), eg retrofits for bus and municipal vehicles,
xx. Information and planning activities (tasks 3 &4), eg cycling and walking facilities, mobility plans, promoting 'clean' vehicles.
Targets are:
- 50% of target vehicles equipped with emission reduction technologies by the end of year 1, 100% by the end of year 2
- 1% of City centre designated a Low Emission Zone by the end of year 1, 2% by the end of year 2 and 5% by the end of year 3
- increase the percentage of LPG cars used by Suceava citizens
- develop a local and national network of LPG car providers

The budget associated with this task is £191,000 approximately.

2.2.10 Task 8  Transfer to Southern Europe

The stated objective is 'to transfer knowledge and policy guidance between the other partners and Southern Europe through a demonstration in the province of Naples.'

Identified activities reflect those undertaken in Liverpool and include:
xxi. Pollution reduction technologies (tasks 1 & 2), eg introduction of 'clean' vehicles and fuels
xxii. Information and planning activities (tasks 3 & 4), eg Air Quality Management Plan, Community Mobility Plan

Targets are:
- Improved collaboration between public and private sector organisations to reduce the environmental impacts of transport
- Greater understanding by the community of the impacts of personal travel decisions on air quality, quality of life and the urban environment
- Improved air quality - directly, through the use of clean fuels and reduced traffic - indirectly, through increased use of public transport, cycling and walking
- Enhanced methods of environmental impact assessment of transport and land-use measures

The budget for task 8 is approximately £301,000.

2.2.11 Task 9  Dissemination

This task is concerned with ensuring the highest possible positive profile of CATCH at local, national and international levels.

Activities include:
xxiii. Logo and website design
xxiv. Local dissemination
xxv. National dissemination
xxvi. International dissemination

Various media and methods will be used to target politicians and policy-makers, business stakeholders, transport providers, fuel suppliers and vehicle manufacturers, communities.

Targets include:
- To produce one journal or conference paper each year
- To build a dissemination database of 500 contacts by the end of year 1 and 1000 by the end of year 3

The budget for dissemination is £340,000 approximately.
2.2.12 Task 10  Project Management
This task's objective is 'to ensure effective management of the project and delivery of deliverables within time, cost and resource constraints.

The activities identified:
xxvii. Management responsibilities, eg production of a projection handbook describing administrative arrangements, financial co-ordination, internal quality control, management of demonstration sites
xxviii. Technical responsibilities, eg task delivery
xxix. Meetings co-ordination
xxx. Financial management

The budget for project management is approximately E 284, 000.

2.2.13 The scope of the HIA, defined in the terms of reference, was to examine the impacts of tasks 1 to 4.
SECTION 3: METHODS

3.1 Introduction
3.1.1 This section describes the methods used to collect and analyse the primary and secondary data used in this rapid HIA. A rapid HIA has been defined as

‘a systematic assessment of the health impact of a policy, programme or project by a number of experts, decision-makers and representatives of those potentially affected by the proposed policy. It is based on an exchange of the existing knowledge of the participants involved, including knowledge gained from previous similar exercises and research.’ (Lehto & Ritsatakis, 1999).

It describes in some depth the process by which the views, opinions and beliefs of stakeholders including local communities living in the five wards mainly affected by CATCH were collected. These methods were underpinned by IMPACT's values:

**Participation:** involving people in decisions that affect their lives is fundamental to good health  
**Equity:** fairness and justice are essential in working to reduce inequities in health experience  
**Power sharing:** by working towards a more equitable balance of power in our communities we can improve health  
**Meaningful process:** engaging in empowering processes with people and communities will have a beneficial effect on their wellbeing  
**Integrity:** we have to demonstrate our accountability to all those with whom we work, based on openness, honesty and mutual respect

3.2 Research design
3.2.1 As indicated in earlier sections, the methods and procedures used in this Health Impact Assessment (HIA) broadly reflected the Merseyside Guidelines HIA methodology. This is summarised in table 3.1 below.

<table>
<thead>
<tr>
<th>HIA procedures</th>
<th>HIA methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish a Steering Group and Terms of Reference</td>
<td>Policy analysis</td>
</tr>
<tr>
<td>Carry out the health impact assessment</td>
<td>Profile the area and communities</td>
</tr>
<tr>
<td>Negotiate the favoured option(s)</td>
<td>Primary data collection - involve stakeholders and key informants</td>
</tr>
<tr>
<td>Monitor and evaluate</td>
<td>Impact analysis - assess the importance, scale and likelihood of predicted impacts from all data collected</td>
</tr>
<tr>
<td></td>
<td>Consider alternative options</td>
</tr>
<tr>
<td></td>
<td>Make recommendations for action - enhance positive or mitigate negative impacts</td>
</tr>
</tbody>
</table>
3.2.2 Social model of health
At every stage of life, health is determined by complex interactions between social and economic factors, the physical environment and individual behaviour. Factors such as housing, income, employment, where you live, the range of services you have access to such as schools, shops etc., influence the degree of health, wellbeing and quality of life achievable by individuals and communities. These factors are referred to as 'determinants of health' (Black, 1980; Acheson, 1998; Whitehead et al, 2000). HIA uses a socio-environmental model of health (Dahlgren & Whitehead, 1991) to encompass these broader determinants to gain a clearer picture as to how a project such as CATCH may impact upon health.

3.3 Establishing a steering group
3.3.1 An important influence in planning to undertake a health impact assessment is the success or otherwise, in engaging and maintaining commitment of key stakeholders to the process and outcome of the assessment. It is important to have a steering group comprising of key stakeholders with a range of expertise and perspectives that can assist with the negotiation and implementation of recommendations from the HIA. A partnership approach is more likely to facilitate ownership and develop a more realistic understanding of what can and cannot be achieved when reviewing any recommendations for changing a policy, programme or project.

3.3.2 The CATCH HIA Steering Group was convened shortly after the commencement of the project and contributed to the scoping of the HIA, identification of stakeholders and development of tools. The Steering Group was also invited to comment on the draft CATCH HIA report. The Members consisted of the CATCH UK working group and community engagement workers. In addition to the HIA Steering Group, informal regular meetings were convened between the CATCH Project Co-ordinator and the HIA project co-ordinator.

3.4 Data collection
3.4.1 Documentary analysis
The documentary audit and analysis normally draws on four document sources:
- The policy proposals and supporting documentation - in this case the Inception Report of the CATCH project
- Official policy documents at international, national and local level related to the main targets and outcomes of the CATCH project
- Evidence of the social, economic, political, cultural scientific context of the policy
- Evidence from the literature defining the relationship between policy interventions, the effects on health determinant and health outcomes, and ‘determinants of determinants’ - in this case a literature search was undertaken to establish the evidence base associated between the introduction of similar light rail interventions and the effects on health determinants

The audit involves document and literature searches followed by their systematic qualitative and quantitative analysis in order to identify:
- the rationale, context and strategies of the policy
- the targeted populations and sub-populations who are affected, positively or negatively, by the policy
- key informant and stakeholder sample groups
- the health determinants affected and if known the magnitude of the effects
• health promotion opportunities
• the impacts of the proposed policy on other policies and vice versa
• the results from output evaluations of other similar policies

3.4.2 Health and demographic profile
Existing data was collected from a variety of different sources to define the baseline position of the following data categories:
• Populations, eg EU, member state, population sub-groups
• Health status, eg mortality rates, perceived health & well being
• Health Determinants, eg personal circumstances and lifestyles, socio-economic environment, physical environment, physical & social infrastructure,
• 'Determinants of determinants'

The data for the HIA profile was cross-referenced with data from the baseline survey report.

Data sources included: aggregated datasets of routinely collated information held by the North West Public Health Observatory (NWPHO) at different levels (health authority, local authority and PCT), Merseyside Information Services (MIS) and the Office for National Statistics (ONS). This enabled a contextualised exploration of health within the 5-ward area that predominantly relates to CATCH.

3.4.3 Stakeholder and key informants
The purpose of participatory, qualitative approaches is to gather evidence from the experience, knowledge, opinions and perceptions of populations affected by the policy (stakeholders) and people with expert knowledge (key informants). This evidence:
• provides a more in-depth picture of the range of health determinants effected by the policy
• provides a detailed understanding of how they think this impacts on health outcomes and why
• contributes to prioritisation of impacts
• provides a valuable perspective on health inequalities
• contributes to a robust HIA process by using triangulation (multiple methods)
• supports better policy-making

Purposive, snowballing and convenience sampling methods were used to generate the community and organisational stakeholder groups once the sectors most likely to effect, and be affected by, the CATCH project had been confirmed. Representatives from the following groups and organisations were invited to participate:
Table 3.2  Stakeholder and Key Informant Groups invited to participate in the HIA

<table>
<thead>
<tr>
<th>Stakeholder/Key Informant Category</th>
<th>Stakeholder/Key Informant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisational stakeholder - health</td>
<td>Respiratory Medicine Consultant General Practitioner with Special Interest (respiratory medicine) Director of Public Health Exercise on prescription scheme</td>
</tr>
<tr>
<td>Organisational stakeholder - economic development/regeneration</td>
<td>Liverpool 1 Partnership</td>
</tr>
<tr>
<td>Organisational stakeholder - policy proponents</td>
<td>Merseytravel representative Liverpool City Council representative</td>
</tr>
<tr>
<td>Organisational stakeholder - public transport provider</td>
<td>Arriva representative</td>
</tr>
<tr>
<td>Organisational stakeholder - air quality</td>
<td>Liverpool City Council</td>
</tr>
<tr>
<td>Community stakeholder - adult (special interest - health)</td>
<td>Breathe Easy group representative (south Liverpool) Toxteth Health &amp; Community Care Forum</td>
</tr>
<tr>
<td>Community stakeholder - adult (special interest - disabilities)</td>
<td>Liverpool Association of Disabled People Transport Access Panel</td>
</tr>
<tr>
<td>Community stakeholder - adult (older people)</td>
<td>Age Concern, Liverpool</td>
</tr>
<tr>
<td>Community stakeholder - adult (employed people)</td>
<td>Unison representative</td>
</tr>
<tr>
<td>Community stakeholder - adult (unemployed people)</td>
<td>Unemployed Resource Centre</td>
</tr>
<tr>
<td>Community stakeholder - adult (Black and Minority Ethnic groups)</td>
<td>Liverpool City Council</td>
</tr>
<tr>
<td>Community stakeholder - adult (residents in CATCH area)</td>
<td>Tenants and residents associations - Ironbridge Residents Association Everton Tenants &amp; Residents Association</td>
</tr>
<tr>
<td>Community stakeholder - women &amp; young children</td>
<td>Sure Start Women's Transport Panel</td>
</tr>
<tr>
<td>Community stakeholder - children &amp; young people</td>
<td>Year 6 students Liverpool University students</td>
</tr>
<tr>
<td>Community stakeholder - policy makers</td>
<td>Ward councillors</td>
</tr>
<tr>
<td>Key informants</td>
<td>Transport Transport &amp; health</td>
</tr>
</tbody>
</table>

Data collection methods from community and organisational stakeholders consisted of:
- Focus groups
- One to one semi-structured interviews
- Observation notes and written submissions

3.4.4 Stakeholder engagement process
- Existing networks and naturally occurring groups were identified by the assessors either from their own knowledge or via local community workers
- Organisational stakeholders and key informants were also identified by the assessors
- Initial contact was made by telephone
• Confirmation of the interview or focus group was made in writing
• Details of the HIA, a summary of the Merseytram proposals and the question themes for the interview or focus group were circulated with the confirmation letter
• Consent forms were completed by interviewees (or their parents for minors)
• Expenses were reimbursed

3.4.5 Development of question guides

The HIA research team developed two question guides: one for community stakeholders and one for organisational stakeholders and key informants. Each was designed with a number of themes (table 3.3), which started with broad open questions and then focused down to more specific questions. The schedules can be found in appendix 1. Table 3.3 summarises the key themes used for community and organisational groups and individuals.

<table>
<thead>
<tr>
<th>Table 3.3 Themes for workshops and focus groups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Community Stakeholders</strong></td>
</tr>
<tr>
<td>THEME 1</td>
</tr>
<tr>
<td>THEME 2</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>THEME 3</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>THEME 4</td>
</tr>
<tr>
<td>THEME 5</td>
</tr>
</tbody>
</table>
3.4.6 Transcription and data analysis
As soon as possible after each focus group and interview the facilitator wrote down their broad impressions about how the group process worked and any limitations or procedural variations they were aware of. Notes that were taken during the focus group were written up in full. Small focus groups, organisational and key informant interviews were tape recorded and transcribed verbatim. Qualitative data was coded according to the themes generated, and analysed systematically for similarities and differences (Knodel, 1993; Robson, 1996).

3.5 Impact Analysis
3.5.1 Impact analysis involves assembling evidence of impacts from the different data sources, qualitative and quantitative, and defining:
- Health impacts - the health determinants effected and the subsequent effect on health outcomes
- Direction of change - indicates a health gain or loss
- Latency - when the impact will occur - immediate, short, medium or long term
- Measurability - refers to the measurability of the impact, quantitative (impacts that can be measured by direct indicators), qualitative (non-quantifiable opinions or perceptions), estimable (quantifiable impacts that cannot be measured directly, but can be estimated by proxy measures)
- Scale - magnitude of the impact and the size/proportion of the population affected

This should include an analysis at population and sub-population levels to consider the implications for health inequalities.

3.6 Limitations to the study
3.6.1 All studies have limitations. In this study, the timing of the fieldwork was initially scheduled over the summer period and engaging particular stakeholder groups and individuals proved difficult; there was also a reluctance of some community stakeholder groups to participate - for some this was on the grounds of principle. As a consequence the fieldwork was extended into the autumn. In addition the availability of and access to a wider range of routine health and health service data at ward level was an issue. Other threats to reliability and validity have been minimised by a robust research design including the use of multiple methods.
SECTION 4: HEALTH PROFILE OF COMMUNITIES MOST AFFECTED BY THE 'CATCH' PROJECT

4.1 Introduction

4.1.1 This health profile presents data on the communities that will be most effected by the CATCH project; this has been defined geographically as the following 5 Liverpool City centre wards: Abercromby, Everton, Granby, Smithdown and Vauxhall. It is recognised that the effects of CATCH will be more widespread than this geographical area and also more focused in some parts of these wards than others; however this represents a pragmatic approach. The profile seeks to contribute to a general health profile of the CATCH 5-ward area identifying, retrieving and analysing routinely collected socio-economic, environmental and health data. Where appropriate it also draws on data that is relevant to CATCH but may not be available at ward level.

Figure 4.1 Map of CATCH area
4.2 **Methodology and Source Materials**

4.2.1 This health profile has been produced using a range of source materials. Merseyside Information Services (MIS) have provided a significant amount of ward-related health and illness data, largely pertaining to Standardised Mortality Ratios (SMRs). Further socio-economic data, at ward level, has been accessed from the 2001 census provided online by the Office for National Statistics (see [www.neighbourhood.statistics.gov.uk](http://www.neighbourhood.statistics.gov.uk)).

4.2.2 This health profile seeks to compare the health experiences of those communities residing within the CATCH 5-ward area. However, in order to provide contextual analysis to this exercise, this profile will compare socio-economic, health and travel behaviour indicators for the ward average value in relation to:

- Liverpool
- Merseyside
- North West Region
- England

**Small Area Statistics: Explanatory Note on ‘5 Ward Average’**

4.3.1 **Small Area Statistics: Explanatory Note on ‘5 Ward Average’**

It should be emphasised that ward-level statistics are concerned with small populations, and it is important to bear this in mind when considering the analysis. Nonetheless, undertaking small area analysis enables us to explore demographic differences between areas having small populations with surrounding areas having comparatively larger populations, as well as between wards.

4.3.2 Through combining the total values / percentages of each ward, it is possible to compute an average ward / percentage for all 5 wards. This ‘5 ward average’ statistic appears in all the tables and charts that appear in this community profile. Given that the 5 ward statistic is based upon a total combined population of over 47,000 people, it enables us to obtain a truer comparative picture that is less skewed by the small population sizes of each individual ward.

4.4 **Population data**

4.4.1 **Population: Age Structure**

Table 4.1 (below) shows the percentage of people within different age bands for each of the 5 wards, the average for all combined wards, as well as for the four comparative population areas given above.

In terms of total population, it is interesting to note that two of the wards (Granby and Smithdown) have virtually identical populations. Abercromby has the highest population, and Vauxhall has the lowest population. Everton has a slightly larger population than Vauxhall.
### Table 4.1 Population: Age Structure (under 20 years)

<table>
<thead>
<tr>
<th>Area</th>
<th>Population</th>
<th>Percent aged 0-4</th>
<th>Percent aged 5-7</th>
<th>Percent aged 8-9</th>
<th>Percent aged 10-14</th>
<th>Percent aged 18-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>49,138,000</td>
<td>5.9</td>
<td>3.7</td>
<td>2.6</td>
<td>6.6</td>
<td>2.4</td>
</tr>
<tr>
<td>North West</td>
<td>6,729,000</td>
<td>5.9</td>
<td>3.8</td>
<td>2.7</td>
<td>6.9</td>
<td>2.5</td>
</tr>
<tr>
<td>Merseyside</td>
<td>1,362,000</td>
<td>5.6</td>
<td>3.7</td>
<td>2.7</td>
<td>7.1</td>
<td>2.7</td>
</tr>
<tr>
<td>Liverpool</td>
<td>439,473</td>
<td>5.6</td>
<td>3.5</td>
<td>2.6</td>
<td>7.0</td>
<td>3.4</td>
</tr>
<tr>
<td>Abercromby</td>
<td>11,473</td>
<td>3.6</td>
<td>1.8</td>
<td>1.3</td>
<td>3.8</td>
<td>8.4</td>
</tr>
<tr>
<td>Everton</td>
<td>7,398</td>
<td>4.1</td>
<td>2.9</td>
<td>2.0</td>
<td>5.6</td>
<td>10.2</td>
</tr>
<tr>
<td>Granby</td>
<td>10,978</td>
<td>6.5</td>
<td>3.9</td>
<td>2.7</td>
<td>7.8</td>
<td>3.4</td>
</tr>
<tr>
<td>Smithdown</td>
<td>10,757</td>
<td>5.5</td>
<td>2.9</td>
<td>2.1</td>
<td>6.2</td>
<td>6.7</td>
</tr>
<tr>
<td>Vauxhall</td>
<td>6,699</td>
<td>5.5</td>
<td>3.3</td>
<td>2.3</td>
<td>7.4</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>5 Ward Average</strong></td>
<td><strong>9,461</strong></td>
<td><strong>5.1</strong></td>
<td><strong>2.9</strong></td>
<td><strong>2.1</strong></td>
<td><strong>6.2</strong></td>
<td><strong>6.3</strong></td>
</tr>
</tbody>
</table>

Within all of the pre-18 age ranges illustrated above, the 5 wards have, on average, smaller proportions of young people in comparison with Liverpool, Merseyside, North West Region and England. As an example, within the 0-4 age range, the 5 ward average (5.1%) is slightly less than Liverpool, North West region and England. A similar pattern is evident for the 5-7, 8-9 and 10-14 age ranges.

The median age of the population across the 5 wards (35.3) is lower than the respective median ages for Liverpool, Merseyside and the North West region.

Within the late teens and early 20s age ranges, a very different picture emerges. The 5 ward average population within the 18-19 age range (6.3%) is well over twice as high as for Merseyside, North West region and England. This pattern continues into the 20-24 age range, where the 5 ward average (see Table 1b) is also over twice as high as the figures for Merseyside, North West region and England. Abercromby and Everton wards (23.4% and 14.2% respectively) have extremely high populations of people aged 20-24 years. In general, Granby, Smithdown and Vauxhall tend to have slightly smaller proportions of young people across most age bands.
Table 4.2  Population: Age Structure (over 20 years)

<table>
<thead>
<tr>
<th>Area</th>
<th>Percent aged 20-24</th>
<th>Percent aged 65-74</th>
<th>Percent aged 75-84</th>
<th>Percent aged 85-89</th>
<th>Mean age of population</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>6.0</td>
<td>8.4</td>
<td>5.6</td>
<td>1.3</td>
<td>38.6</td>
</tr>
<tr>
<td>North West</td>
<td>5.8</td>
<td>8.6</td>
<td>5.6</td>
<td>1.2</td>
<td>38.6</td>
</tr>
<tr>
<td>Merseyside</td>
<td>5.9</td>
<td>9.2</td>
<td>5.6</td>
<td>1.2</td>
<td>38.7</td>
</tr>
<tr>
<td>Liverpool</td>
<td>8.4</td>
<td>8.6</td>
<td>5.1</td>
<td>1.1</td>
<td>37.4</td>
</tr>
<tr>
<td>Abercromby</td>
<td>23.4</td>
<td>5.9</td>
<td>3.1</td>
<td>0.6</td>
<td>33.2</td>
</tr>
<tr>
<td>Everton</td>
<td>14.2</td>
<td>6.9</td>
<td>3.5</td>
<td>0.5</td>
<td>34.1</td>
</tr>
<tr>
<td>Granby</td>
<td>9.4</td>
<td>7.2</td>
<td>4.5</td>
<td>1.0</td>
<td>35.4</td>
</tr>
<tr>
<td>Smithdown</td>
<td>16.6</td>
<td>7.2</td>
<td>3.4</td>
<td>0.8</td>
<td>34.2</td>
</tr>
<tr>
<td>Vauxhall</td>
<td>6.1</td>
<td>10.5</td>
<td>5.4</td>
<td>1.4</td>
<td>39.4</td>
</tr>
<tr>
<td>5 Ward Average</td>
<td><strong>13.9</strong></td>
<td><strong>7.5</strong></td>
<td><strong>3.9</strong></td>
<td><strong>0.8</strong></td>
<td><strong>35.3</strong></td>
</tr>
</tbody>
</table>

Within the older age ranges, the 5 wards tend to have smaller populations. The 5 band average in 65-74 age range (7.5%) is lower than the comparative figures for Liverpool, Merseyside, North West region and England. A similar pattern can be seen for the older age ranges.

It is important to note that there is a trend towards net outward migration from the North West including from Liverpool.

4.4.2 Population: Black and Ethnic Minority Groups

There is a great deal of epidemiological evidence to show that people from black and minority ethnic (BME) groups tend to enjoy fewer health and socio-economic benefits than the majority white population. Related to this, are the particular issues BME groups face in using public transport. The following analysis considers both the proportions of BME groups within the 5 wards, as well as the proportion of residents born within another country.

Table 4.3 (below) shows the percentage of people from different ethnic groups living within each of the 5 wards, as well as the relative figures for Liverpool, Merseyside, North West region and England. It should be emphasised that very small ethnic groupings have been collapsed in order to provide a clearer summary picture. Definitions of these groups are found in Appendix 4.
Table 4.3 Percentage from Different Ethnic Groups

<table>
<thead>
<tr>
<th>Area</th>
<th>White: British</th>
<th>Black: British</th>
<th>South Asian: British</th>
<th>Chinese: British</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>90.9</td>
<td>2.3</td>
<td>4.6</td>
<td>0.9</td>
</tr>
<tr>
<td>North West</td>
<td>94.4</td>
<td>0.32</td>
<td>3.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Merseyside</td>
<td>97.1</td>
<td>0.5</td>
<td>0.6</td>
<td>0.8</td>
</tr>
<tr>
<td>Liverpool</td>
<td>94.3</td>
<td>1.2</td>
<td>1.1</td>
<td>1.6</td>
</tr>
<tr>
<td>Abercromby</td>
<td>82.6</td>
<td>3.4</td>
<td>3.2</td>
<td>6.4</td>
</tr>
<tr>
<td>Everton</td>
<td>94.9</td>
<td>0.24</td>
<td>1.5</td>
<td>1.4</td>
</tr>
<tr>
<td>Granby</td>
<td>66.1</td>
<td>14.0</td>
<td>4.6</td>
<td>5.8</td>
</tr>
<tr>
<td>Smithdown</td>
<td>84.0</td>
<td>3.5</td>
<td>3.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Vauxhall</td>
<td>98.2</td>
<td>0.22</td>
<td>0.23</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>5 Ward Average</strong></td>
<td><strong>85.2</strong></td>
<td><strong>4.3</strong></td>
<td><strong>2.53</strong></td>
<td><strong>3.8</strong></td>
</tr>
</tbody>
</table>

The above table indicates that there is generally a higher preponderance of BME communities living in the 5 wards in comparison with the larger areas for geographical comparison. However, there are important differences in ethnic composition between these wards. The ‘White: British’ population of Granby (61.8%) and Smithdown (84.1%) is appreciably less than the average for Liverpool (94.3%), North West (94.4%) and England (90.9%). However, the ‘White: British’ populations of Vauxhall and Everton are much similar to these regional and national figures. Both Vauxhall and Everton generally have much smaller BME communities than Abercromby, Granby and Smithdown. There are interesting variations in the ethnic composition of the 5 wards. Granby has a very high ‘Black: British’ population (14%) which is roughly six times greater than the English average. Both Granby and Smithdown have ‘Chinese: British’ populations which are roughly four times greater than the average for Liverpool, and eight times greater than the average for England. Of the 5 wards, only Granby has a ‘British: South Asian’ community that compares with the North West (3.4%) and English (4.6%) averages.

Additional data (appendix 4) reinforces the sense that each of the 5 wards has a very different experience of migration and ethnicity within their respective populations. Granby (16.7%) and Abercromby (11.6%) have much higher percentages of people born outside the EU in comparison with Liverpool (3.3%), North West region (3.5%) and England (6.9%). Similarly Abercromby has a proportion of people born in other EU countries which is far greater than Merseyside, the North West region or England. Vauxhall, however, has smaller proportions of its population born in other EU countries, or outside the EU, than the average for the North West region or England. It is argued that such concentrations reflect economic but also discriminatory constraints so that social support is sought from people with shared cultures and beliefs. It is estimated that ethnic minority populations will increase over the next 20 years, although the extent of this increase is difficult to predict.
4.4.3 Population: Socio-Economic Groups

The proportion of residents within different socio-economic groupings defined by occupation is often a useful guide as to relative wealth or deprivation. There is also considerable evidence indicating that life expectancy and healthy life expectancy is higher for people from higher managerial occupations compared with people from non-managerial occupations, and in turn people who have never worked or who are long term unemployed. Table 4.4 (below) illustrates the percentages of residents across England, North West, Merseyside, Liverpool and the 5 wards, as well as the average for these wards, within different socio-economic groupings based upon occupation.

Residents of the 5 wards are, on average, roughly a third as likely to belong to higher managerial occupations than across England or the North West. Similarly they are approximately half as likely to be employed in lower managerial and professional occupations as is the average across England, the North West or, more locally, Merseyside.

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage aged 16-74 : higher managerial occupations</th>
<th>Percentage aged 16-74 : lower managerial occupations</th>
<th>Percentage aged 16-74 : never worked</th>
<th>Percentage aged 16-74 : long term unemployed</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>3.5</td>
<td>18.7</td>
<td>2.7</td>
<td>1.0</td>
</tr>
<tr>
<td>North West</td>
<td>2.9</td>
<td>16.8</td>
<td>3.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Merseyside</td>
<td>2.2</td>
<td>15.5</td>
<td>4.3</td>
<td>1.9</td>
</tr>
<tr>
<td>Liverpool</td>
<td>1.6</td>
<td>13.4</td>
<td>6.0</td>
<td>2.4</td>
</tr>
<tr>
<td>Abercromby</td>
<td>1.5</td>
<td>10.8</td>
<td>5.7</td>
<td>2.6</td>
</tr>
<tr>
<td>Everton</td>
<td>1.4</td>
<td>9.6</td>
<td>8.5</td>
<td>2.4</td>
</tr>
<tr>
<td>Granby</td>
<td>0.9</td>
<td>10.3</td>
<td>15.6</td>
<td>3.7</td>
</tr>
<tr>
<td>Smithdown</td>
<td>0.5</td>
<td>7.9</td>
<td>10.2</td>
<td>2.9</td>
</tr>
<tr>
<td>Vauxhall</td>
<td>0.7</td>
<td>8.2</td>
<td>10.9</td>
<td>3.9</td>
</tr>
<tr>
<td>5-Ward Average</td>
<td><strong>1.0</strong></td>
<td><strong>7.8</strong></td>
<td><strong>10.2</strong></td>
<td><strong>3.1</strong></td>
</tr>
</tbody>
</table>

It is particularly striking to note that over 10% of the 5 wards residents, on average, have never worked. This is roughly three times as many people as have never worked across the North West region and England. There are pockets of very high unemployment within central Liverpool: approximately 16% of Granby’s population have never worked. In a similar vein, a high proportion of 5 wards residents are long-term unemployed, roughly three times as many across England and the North West.

There has been an increasing trend over the last 20 years in the industrialised world including the UK towards more skilled occupations for both men and women.
4.4.4 Economic Activity

There are striking differences in economic activity between the 5 wards, and in relation to larger geographical areas (Table 4.5). There are virtually half as many economically active part-time employees across the 5 wards (6.2%) in comparison with England (11.8%) and the North West regional average (11.9%). Table 4.5 also illustrates a similar pattern in relation to full-time employment.

Table 4.5 Economic Activity

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage aged 16-74 : part-time employed</th>
<th>Percentage aged 16-74 : full-time employed</th>
<th>Percentage aged 16-74 : unemployed</th>
<th>Percentage aged 16-74 : permanently sick / disabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>11.8</td>
<td>40.8</td>
<td>3.4</td>
<td>5.3</td>
</tr>
<tr>
<td>North West</td>
<td>11.9</td>
<td>38.8</td>
<td>3.6</td>
<td>7.8</td>
</tr>
<tr>
<td>Merseyside</td>
<td>11.4</td>
<td>34.8</td>
<td>4.9</td>
<td>10.0</td>
</tr>
<tr>
<td>Liverpool</td>
<td>9.7</td>
<td>31.4</td>
<td>6.0</td>
<td>11.4</td>
</tr>
<tr>
<td>Abercromby</td>
<td>4.5</td>
<td>22.8</td>
<td>5.9</td>
<td>9.7</td>
</tr>
<tr>
<td>Everton</td>
<td>5.8</td>
<td>22.3</td>
<td>6.0</td>
<td>14.9</td>
</tr>
<tr>
<td>Granby</td>
<td>6.7</td>
<td>20.3</td>
<td>10.4</td>
<td>16.0</td>
</tr>
<tr>
<td>Smithdown</td>
<td>6.4</td>
<td>19.6</td>
<td>6.8</td>
<td>13.6</td>
</tr>
<tr>
<td>Vauxhall</td>
<td>7.6</td>
<td>21.6</td>
<td>9.0</td>
<td>20.3</td>
</tr>
<tr>
<td>5 Ward Average</td>
<td>6.2</td>
<td>21.3</td>
<td>7.6</td>
<td>14.9</td>
</tr>
</tbody>
</table>

The 5 wards area has a high student population, which accounts for a three times higher rate of economic activity compared to the national and regional rate. However, the 5 wards area has a slightly lower proportion of retired people in comparison with national, regional and more localised data.

Perhaps the most telling aspect of economic activity relates to the proportion of people economically inactive due to being permanently sick or disabled. On average, the 5 wards combined populations have a permanently sick or disabled population (14.9%) which is virtually twice as high as exists across England (7.8%). Vauxhall and Granby (20.3% and 16% respectively) have particularly high levels of permanently sick or disabled residents.

In spite of the national trend of increasing employment rates and the associated fall in inactivity over the last 10 years, the CATCH area has not benefited from this to the same extent. This may reflect the high levels of the population that are permanently sick or disabled.
4.5 Physical environment data

4.5.1 Transport: Travel to Work

There are striking differences in the ways in which residents of the 5 wards travel to work in comparison with larger geographical areas (Table 4.6). The percentage of people travelling to work on foot within the 5 wards area (23.5%) is more than twice as great as the average for the North West region (10.3%) or the England average (10%). This suggests that many of the residents live within close proximity to their place of work.

Conversely, a far smaller proportion of residents within the 5 wards area (32.1%) travel to work by driving a car or van in comparison with the average for England (54.9%), the North West region (58.4%) and the more localised geographical average for Liverpool (47.6%). However, it is interesting to note that the proportion of 5 wards residents travelling to work as a passenger in a car or a van, and not as a driver of a car or a van, is very similar to the averages for Merseyside, the North West region, and England. In common with people across the North West (2.3%) and Merseyside (2%), a very small proportion of the 5 wards population (1.7%) cycle to work.

Table 4.6 Percentage of People Travelling To Work: Mode of Transport 1

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage aged 16-74 : drive a car/ van</th>
<th>Percentage aged 16-74 : passenger in a car or van</th>
<th>Percentage aged 16-74 : travel on foot</th>
<th>Percentage aged 16-74 : bicycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>54.9</td>
<td>6.1</td>
<td>10.0</td>
<td>2.8</td>
</tr>
<tr>
<td>North West</td>
<td>58.4</td>
<td>7.5</td>
<td>10.3</td>
<td>2.3</td>
</tr>
<tr>
<td>Merseyside</td>
<td>54.8</td>
<td>7.8</td>
<td>9.4</td>
<td>2.0</td>
</tr>
<tr>
<td>Liverpool</td>
<td>47.6</td>
<td>7.5</td>
<td>10.6</td>
<td>1.7</td>
</tr>
<tr>
<td>Abercromby</td>
<td>35.6</td>
<td>6.1</td>
<td>26.7</td>
<td>2.4</td>
</tr>
<tr>
<td>Everton</td>
<td>30.9</td>
<td>6.9</td>
<td>30.7</td>
<td>0.9</td>
</tr>
<tr>
<td>Granby</td>
<td>34.3</td>
<td>5.0</td>
<td>16.6</td>
<td>2.2</td>
</tr>
<tr>
<td>Smithdown</td>
<td>29.2</td>
<td>5.9</td>
<td>25.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Vauxhall</td>
<td>30.4</td>
<td>8.7</td>
<td>18.1</td>
<td>1.3</td>
</tr>
<tr>
<td>5 Ward Average</td>
<td>32.1</td>
<td>6.5</td>
<td>23.5</td>
<td>1.7</td>
</tr>
</tbody>
</table>

The table 4.7 below considers the percentage of people travelling to work by other means of transport. It shows that there are fewer people working from home in the 5-ward area (5.8%) compared with England and the North West, but this is similar to the Liverpool average (5.6%). The low levels travelling to work by underground metro light rail or tram is due to the lack of this transport mode locally. The low levels using the train as their primary transport mode to work reinforces the view that many people work in the vicinity of where they live.

There are very strong variations in the proportion of residents travelling by bus, mini bus or coach. The percentage of bus users in Liverpool (21.2%) is extremely
high in comparison with the average for the North West (8.6%), England (7.5%) and Merseyside (12.5%). However, the 5 wards area average (23.2%) for bus users is even greater. There appears to be a split in bus usage within the 5 wards area: Granby, Smithdown and Vauxhall have much greater bus usage (approximately 28% of their combined populations), whereas Abercromby and Everton residents are much less inclined to use the bus for travelling to work (i.e. approximately 16% of both combined populations).

Table 4.7 Percentage of People Travelling To Work: Mode of Transport 2

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage aged 16-74 : at home</th>
<th>Percentage aged 16-74 : underground / tram</th>
<th>Percentage aged 16-74 : train</th>
<th>Percentage aged 16-74 : bus / minibus/ coach</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>9.2</td>
<td>3.2</td>
<td>4.2</td>
<td>7.5</td>
</tr>
<tr>
<td>North West</td>
<td>8.4</td>
<td>0.6</td>
<td>1.9</td>
<td>8.6</td>
</tr>
<tr>
<td>Merseyside</td>
<td>6.5</td>
<td>0.4</td>
<td>4.1</td>
<td>12.5</td>
</tr>
<tr>
<td>Liverpool</td>
<td>5.6</td>
<td>0.4</td>
<td>3.0</td>
<td>21.2</td>
</tr>
<tr>
<td>Abercromby</td>
<td>6.3</td>
<td>1.2</td>
<td>4.2</td>
<td>15.3</td>
</tr>
<tr>
<td>Everton</td>
<td>5.6</td>
<td>1.1</td>
<td>4.1</td>
<td>16.7</td>
</tr>
<tr>
<td>Granby</td>
<td>7.0</td>
<td>0.6</td>
<td>2.9</td>
<td>29.0</td>
</tr>
<tr>
<td>Smithdown</td>
<td>4.6</td>
<td>0.8</td>
<td>3.5</td>
<td>26.7</td>
</tr>
<tr>
<td>Vauxhall</td>
<td>5.2</td>
<td>0.6</td>
<td>4.4</td>
<td>28.3</td>
</tr>
<tr>
<td>5 Ward Average</td>
<td><strong>5.7</strong></td>
<td><strong>0.9</strong></td>
<td><strong>3.8</strong></td>
<td><strong>23.2</strong></td>
</tr>
</tbody>
</table>
4.5.2 Car or Van Ownership
Access to a car, though suggesting greater access to a variety of services, is increasingly regarded as an indicator of affluence. It can be seen below (Table 4.8) that there are wide variations in car ownership between the 5-ward area and the other areas of geographical comparison.

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage of Households: no car or van</th>
<th>Percentage of Households: one car or van</th>
<th>Percentage of Households: two cars or vans</th>
<th>Percentage of Households: 3 cars or vans</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>26.8</td>
<td>43.7</td>
<td>23.6</td>
<td>4.5</td>
</tr>
<tr>
<td>North West</td>
<td>30.2</td>
<td>43.5</td>
<td>21.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Merseyside</td>
<td>37.6</td>
<td>41.8</td>
<td>17.1</td>
<td>2.8</td>
</tr>
<tr>
<td>Liverpool</td>
<td>48.3</td>
<td>38.2</td>
<td>11.4</td>
<td>1.7</td>
</tr>
<tr>
<td>Abercromby</td>
<td>58.7</td>
<td>33.5</td>
<td>6.5</td>
<td>0.9</td>
</tr>
<tr>
<td>Everton</td>
<td>65.2</td>
<td>29.9</td>
<td>4.3</td>
<td>0.4</td>
</tr>
<tr>
<td>Granby</td>
<td>69.8</td>
<td>25.9</td>
<td>3.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Smithdown</td>
<td>69.2</td>
<td>26.2</td>
<td>3.6</td>
<td>0.5</td>
</tr>
<tr>
<td>Vauxhall</td>
<td>72.3</td>
<td>23.9</td>
<td>3.1</td>
<td>0.2</td>
</tr>
<tr>
<td>5 Ward Average</td>
<td>67.0</td>
<td>27.9</td>
<td>4.2</td>
<td>0.5</td>
</tr>
</tbody>
</table>

The above table shows the very low level of car or van ownership in the 5-ward area: 67% of residents do not have a car, in comparison with Liverpool (48.3%), Merseyside (37.6%) and the North West region (30.2%). Similarly the proportion of residents having one car (27.9%) is markedly less than the average for Liverpool, the North West region and England.

Far fewer of the 5-ward residents have more than one car in comparison with the larger geographical areas.

4.5.3 Transportation and the CATCH Project: analysis
The high proportion of people travelling on foot in the 5-ward area, and the relatively low numbers of car drivers, may be a consequence of socio-economic deprivation and not being able to afford a car. In relation to Task 4 of the CATCH project and the aim of working with communities to encourage the use of less polluting means of travel, it shows that there are already healthier patterns of travel behaviour in the 5-ward area than Liverpool as a whole. This suggests that whilst there may be some opportunity for modal shift in the 5-ward area, eg from cars to buses, the scope for this may be less compared to other locations in Liverpool where there is both higher employment rates and higher car and van use in travelling to and from work. What might be appealing to the CATCH population in view of the low car ownership levels is the objective under Task 3 to establish car...
clubs using electric cars. Similarly, CATCH communities may be more amenable to the development of Community Mobility Plans than elsewhere because of the low levels of car ownership.

The high proportion of commuters travelling by bus has significant ramifications for the CATCH Project, especially in relation to Tasks 1 and 2, which are concerned with reducing emissions from new and existing vehicles. It suggests that there is significant potential for improving the quality of life of CATCH residents by improving air quality through reduced emissions. Some research has suggested has a greater impact upon people within modes of transport than pedestrians, due to greater concentrations of small particles within a confined space.

4.5.4 Air Quality
Liverpool City Centre has been declared an Air Quality Management Area (AQMA) for NO$_2$ following reviews and assessments of whether national air quality standards were likely to be met for key pollutants. The AQMA covers:
Great Crosshall St. (SJ340900)
Tom Mann Cl. (SJ340900)
Gerard St. (SJ340900)
Sea Brow (SJ340900)

In addition Queens Drive (SJ400900) and Bowring Park Road (SJ400900) have also been designated an AQMA for nitrogen dioxide.

Following the screening assessment of NO$_2$ together with carbon monoxide, benzene, 1,3-butadiene, sulphur dioxide and particulates, it was concluded that NO$_2$ standards (annual and hourly means) would be exceeded in 2005 particularly in City centre retail areas.

It has been estimated that 49% of all NO$_2$ emissions in 2000 were from road traffic, but that in cities such as London this is as high as 74%. Major roads with large volumes of high-speed traffic are a predominant source as are conurbations and urban areas with a high density of congested traffic. Current high levels of NO$_2$, particularly roadside values, together with the predicted growth and type of traffic, contributed to this conclusion.

4.5.5 Road Traffic
A traffic growth factor of 1.035 to 2004 and 1.082 to 2010 for Liverpool has been derived from the Tempro 4.4.2 database. This is slightly more than the value of 0.94 for Great Britain.

Three key road links in the City centre have a particularly high volume (25%) of heavy-duty vehicle traffic. Other traffic flow data from the NAEI 2000 roads database, from traffic count data taken in 2002/3 for local roads in Liverpool (LCC, 2003) and speed and flow data, resulted in the conclusion that NO$_2$ standards would be exceeded.

Local people are affected by traffic-related noise, vibration, severance and visual intrusion. In the city the car accounts for about 50% of journeys, public transport for 20%. 60% of journeys are commuting.
4.6 Socio-economic data

4.6.1 Multiple Socio-Economic Deprivation
The Department of Social Policy and Social Work (University of Oxford) have produced an Index of Deprivation (IMD, 2000), which reflects the belief that multiple deprivation is comprised of six separate dimensions of deprivation, which each reflect different aspects of deprivation.

There are six key dimensions of deprivation:

- **Income** (i.e., measures people in receipt of a low income)
- **Employment** (i.e., measures people who wish to work but are unable to do so due to unemployment, sickness or disability)
- **Health, Deprivation and Disability** (i.e., measures people whose quality of life is impaired due to either poor health or disability)
- **Education, Skills and Training** (i.e., measures education deprivation)
- **Housing** (i.e., measures people living in unsatisfactory housing or homeless)
- **Geographical Access to Services** (i.e., measures solely people with low incomes able to access a post office, food shops and a GP)

The generation of ward level IMD scores is described in Appendix 4.

4.6.2 District Level Deprivation: Liverpool and the North West
The Indices of Deprivation also allow district level comparisons of employment and income, which provides very useful contextual information for exploring a community profile of the 5 wards area. There are 354 districts in England.

In terms of average of ward ranks, Liverpool is ranked within the top ten most deprived districts out of 354 across England. The scale of deprivation within Liverpool is very similar to that which exists in Manchester. The Extent and Local Concentration figures reveal the high level of deprivation within the most deprived 10% of Liverpool wards. It is also interesting to note that the level of deprivation in Liverpool is significantly higher than within its neighbouring districts (i.e., Ellesmere Port and Neston, Sefton, St Helens and Wirral), but not Knowsley (appendix 4).

4.6.3 Ward Level Deprivation in Liverpool
Table 4.9 illustrates the rank accorded to each of the 33 Liverpool wards for the six key dimensions given above, as well as the aggregated IMD rank. The table clearly shows the diverse experience of deprivation across the city. Some wards (i.e., Childwall, Church, Grassendale and Woolton) have relatively low levels of multiple deprivation. A few other wards have slightly less relative deprivation (i.e., Aigburth, Allerton and Croxteth). However, the remaining Liverpool wards have extremely high levels of deprivation, with many of the wards (e.g., Picton, Fazakerley and Gilmoss) featuring within the 500 most deprived of all English wards (out of a total
of 8, 414). The highest levels of deprivation can be found within the CATCH 5-ward area within central Liverpool.

Everton is the most deprived ward in England for three of the key dimensions of deprivation: health, employment and income. When all six domains are aggregated, Everton is the fourth most deprived ward in England. Vauxhall is the third most deprived ward for two of the key dimensions of deprivation: employment and health. It is the fourth most deprived ward in England for income. When all six domains are aggregated, Vauxhall is the sixth most deprived ward in England. Granby is located within the tenth most deprived wards in relation to income and employment. As with Vauxhall and Everton, it scores highly for educational deprivation. When all six domains are aggregated, Granby is the tenth most deprived ward in England. Smithdown ward is the 28th most deprived in all England. It lies within the 100 most deprived wards in relation to income, employment, health and education. Abercromby is marginally less deprived than the other four wards. Nonetheless it is within the 100 most deprived wards in relation to employment, and when all six domains are aggregated, it is the 149th most deprived ward in England.

Table 4.9 Liverpool Wards: Multiple Deprivation

<table>
<thead>
<tr>
<th>Ward Name</th>
<th>IMD Rank</th>
<th>Income Rank</th>
<th>Employment Rank</th>
<th>Health Rank</th>
<th>Education Rank</th>
<th>Housing Rank</th>
<th>Access Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abercromby</td>
<td>149</td>
<td>339</td>
<td>86</td>
<td>187</td>
<td>423</td>
<td>575</td>
<td>7669</td>
</tr>
<tr>
<td>Aigburth</td>
<td>1419</td>
<td>1450</td>
<td>698</td>
<td>572</td>
<td>5223</td>
<td>4105</td>
<td>6167</td>
</tr>
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<td>1328</td>
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<td>7488</td>
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<tr>
<td>Arundel</td>
<td>886</td>
<td>959</td>
<td>474</td>
<td>672</td>
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<td>1855</td>
<td>7615</td>
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<tr>
<td>Breckfield</td>
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<td>899</td>
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<td>62</td>
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<tr>
<td>Croxteth</td>
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<tr>
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<td>5976</td>
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<td>59</td>
<td>87</td>
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<td>24</td>
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<td>124</td>
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<td>899</td>
<td>1324</td>
<td>7788</td>
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<td>Valley</td>
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<td>120</td>
<td>89</td>
<td>242</td>
<td>1979</td>
<td>6565</td>
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<tr>
<td>Vauxhall</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>221</td>
<td>856</td>
<td>6562</td>
</tr>
<tr>
<td>Warbreck</td>
<td>431</td>
<td>582</td>
<td>304</td>
<td>244</td>
<td>697</td>
<td>2638</td>
<td>6986</td>
</tr>
<tr>
<td>Woolton</td>
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<td>2657</td>
<td>1247</td>
<td>1009</td>
<td>4231</td>
<td>5770</td>
<td>4660</td>
</tr>
</tbody>
</table>
4.7 Health Status

4.7.1 Introduction
The previous data sets provide a context to the CATCH communities. These are also some of the health determinants that may be affected by CATCH, and subsequently may directly and indirectly, affect the health status of the population. As such a baseline position of health status within the 5 ward area is now described using selected indicators from the following health dimensions:
- Mortality
- Morbidity
- Well being
- Health-related behaviour

This will also draw upon comparative health data from wider geographical areas of Liverpool, the average for Liverpool itself, and the North West average. In addition to providing information for each of the 5 wards, it also provides an average collective statistic for these wards.

Through evaluating comparative data sets held at ward, local authority and regional level, this health profile seeks to explore the 5 wards population’s experience of health, yet place this within the context of the region’s health experience.

The following exploration has been undertaken using Standardised Mortality Ratios (1997 – 1999) provided by Merseyside Information Services (MIS).

- **Standardised Mortality Ratio (SMR)** is used to compare death rates in different populations, taking into account age and sex differences. The average SMR for England and Wales is always 100.
- Where an area has an SMR **above** 100, then the population of that area has a higher mortality rate than the average for England and Wales, after adjusting for differences in the structure of the population.
- Where an area has an SMR **below** 100, then the population of that area has a lower mortality rate than the average for England and Wales, after adjusting for differences in the structure of the population.
- Within each chart, a **horizontal line** is drawn at the SMR = 100 level to indicate the relative health experience of the 5 wards population.

It should be noted that SMRs for larger areas (eg health authority, local authority) as given above provide a more accurate reflection of relative mortality in relation to other similar sized areas of population. Thus it is important to exercise some caution when comparing SMRs at ward level (comprising very small populations), as any small increase in mortality at the local population level can lead to a very notable increase in the recorded SMR (and vice versa).
4.7.2 All Cause Mortality

The chart below clearly shows that the death rate is higher within the North West region, from all causes, than the average for England (ie 100). It also shows that the SMR for Liverpool is considerably higher than the North West average.

All of the 5 wards have a higher death rate than the SMR for Liverpool, and the collective average of these wards (ie 192) is extremely high.

Figure 4.1 All cause mortality, 0-74 years: All persons

4.7.3 Mortality from All Cancers

The chart below illustrates that the 5 wards have extremely high SMRs for cancers. The average for the 5 wards is considerably higher than that for Liverpool, which is itself much higher than the North West average.
4.7.4 Mortality from Coronary Heart Disease (CHD)

The chart below illustrates a similar pattern to those above. The 5 wards have extremely high SMRs for CHD, and the average SMR for this area is virtually twice as high as the average for England. Nonetheless, Liverpool has an SMR rate (156) which is far in excess of the North West average (121).

4.7.5 Mortality from Diseases of the Respiratory System

It is extremely interesting to note the difference in SMR for diseases of the respiratory system within diverse geographical areas. The North West region has a
markedly higher degree of mortality from such diseases in comparison with the average for England (ie 100). However, the SMR for Liverpool as a whole (181) is much higher. All of the 5 wards have an SMR that is over twice the average rate, with the average rate showing extremely high levels (ie 262).

There are 33 wards in Liverpool. Of these wards, 14 have an SMR for respiratory diseases that is above 200, which illustrates the very significant impact that such diseases have in Liverpool.

Figure 4.4 Mortality from Diseases of the Respiratory System, 0-74 years: All persons

Closer examination of SMR data for different areas of Liverpool shows the much greater impact of early death from respiratory diseases upon people living in Liverpool Central West, in comparison with residents in other parts of the city (see chart overleaf). Although all of the districts are well in excess of the average for England (ie 100), the SMR for Central West is substantially greater than that of other Liverpool districts. Given the extent of excess death from respiratory diseases, the CATCH project may have the potential to have a positive influence upon the respiratory health of people living in these areas.
4.7.6 **Households with Limiting Long-term Illness**

The chart below illustrates the increased rate of ill health amongst the 5 wards population, with 46.4% of households having one or more residents with a limiting long-term illness. This is substantially greater than the average for the North West region (38%) or England (33%). It is particularly notable given that the 5 wards area has a lower elderly population compared to larger geographical areas.

---

**Liverpool Districts: SMR from Respiratory Diseases**

<table>
<thead>
<tr>
<th>Liverpool Districts</th>
<th>SMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central East</td>
<td>158</td>
</tr>
<tr>
<td>Central West</td>
<td>246</td>
</tr>
<tr>
<td>North East</td>
<td>169</td>
</tr>
<tr>
<td>North West</td>
<td>198</td>
</tr>
<tr>
<td>South</td>
<td>152</td>
</tr>
</tbody>
</table>

**Households with limiting long-term illness**

<table>
<thead>
<tr>
<th>Geographical Areas</th>
<th>Percentage of Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>34</td>
</tr>
<tr>
<td>5 Ward Average</td>
<td>46</td>
</tr>
<tr>
<td>Merseyside</td>
<td>43</td>
</tr>
<tr>
<td>Abercromby</td>
<td>37</td>
</tr>
<tr>
<td>Everton</td>
<td>47</td>
</tr>
<tr>
<td>Granby</td>
<td>48</td>
</tr>
<tr>
<td>Smithdown</td>
<td>47</td>
</tr>
<tr>
<td>Vauxhall</td>
<td>54</td>
</tr>
</tbody>
</table>

---

Figure 4.5  Mortality from Diseases of the Respiratory System: Liverpool districts

Figure 4.6  Households with Limiting Illness
4.7.7 Mortality from Road Traffic Accidents

The following table illustrates the diverse rate of death from road traffic accidents for the different government office regions of England. The East Midlands region has the highest SMR (i.e. 142), and the North West SMR (i.e. 99) is just below the average rate for England (i.e. 100). However, the North West had the second highest number of fatalities from road traffic accidents after the South East.

<table>
<thead>
<tr>
<th>Area (Government Office Region or Local Authority)</th>
<th>All Persons: Observed Cases</th>
<th>SMR (lower level)</th>
<th>SMR (upper level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>8602</td>
<td>100</td>
<td>101</td>
</tr>
<tr>
<td>North East</td>
<td>366</td>
<td>97</td>
<td>101</td>
</tr>
<tr>
<td>North West</td>
<td>1179</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td>Yorkshire &amp; Humber</td>
<td>929</td>
<td>142</td>
<td>151</td>
</tr>
<tr>
<td>East Midlands</td>
<td>1032</td>
<td>133</td>
<td>151</td>
</tr>
<tr>
<td>West Midlands</td>
<td>958</td>
<td>104</td>
<td>111</td>
</tr>
<tr>
<td>East of England</td>
<td>1036</td>
<td>103</td>
<td>117</td>
</tr>
<tr>
<td>London</td>
<td>873</td>
<td>100</td>
<td>113</td>
</tr>
<tr>
<td>South East</td>
<td>1402</td>
<td>100</td>
<td>113</td>
</tr>
<tr>
<td>South West</td>
<td>827</td>
<td>95</td>
<td>105</td>
</tr>
<tr>
<td>Knowsley</td>
<td>25</td>
<td>98</td>
<td>100</td>
</tr>
<tr>
<td>Liverpool</td>
<td>87</td>
<td>107</td>
<td>102</td>
</tr>
<tr>
<td>St Helens</td>
<td>30</td>
<td>98</td>
<td>140</td>
</tr>
<tr>
<td>Sefton</td>
<td>34</td>
<td>68</td>
<td>95</td>
</tr>
<tr>
<td>Wirral</td>
<td>41</td>
<td>73</td>
<td>99</td>
</tr>
</tbody>
</table>

The table above shows that only Liverpool has an SMR in excess of the average for England. Sefton and Wirral have SMRs that are slightly lower than this.

However, it is important to bear in mind that there are very few fatalities from road traffic accidents, and consequently when dealing with such few observed cases, the SMR can be subject to large fluctuation on the basis of a few additional (or fewer) deaths.

**Land transport accidents (2001)**

At ward level, the small populations make the extrapolation of relative risk from accidents unreliable. However, in the context of nationally declining accident rates they do provide a baseline for future comparison. The following table gives a breakdown of land transport accidents for the five local authorities in Merseyside, and there is little difference between them.

<table>
<thead>
<tr>
<th>Area</th>
<th>Land Transport Accidents: Males</th>
<th>Land Transport Accidents: Females</th>
<th>Land Transport Accidents: Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>2108</td>
<td>728</td>
<td>2836</td>
</tr>
<tr>
<td>North West</td>
<td>277</td>
<td>101</td>
<td>378</td>
</tr>
<tr>
<td>Liverpool</td>
<td>13</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Knowsley</td>
<td>11</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>St Helens</td>
<td>12</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Sefton</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Wirral</td>
<td>17</td>
<td>2</td>
<td>19</td>
</tr>
</tbody>
</table>
4.7.8 Morbidity

Comparing relative levels of illness between the populations of Liverpool and other geographical areas in the North West using hospital admission rates can evaluate relative levels of morbidity.

For 2002/03, Hospital Episodes Statistics (HES) recorded episodes of admitted patients treated by NHS hospitals in England is provided in Table 4.13. This groups hospital admissions according to the responsible Primary Care Trust:

- ‘Finished Episodes’ is a count of the number of HES records submitted on behalf of English NHS hospital providers that relate to episodes of admitted patient care which ended during the 2002/03 HES year.
- ‘Emergency’ is the percentage of admission episodes that occurred as a consequence of an emergency.
- ‘Length of stay’ indicates the mean (average) of the hospital spell duration in days.

Table 4.12 Hospital Activity Levels for Elective and Emergency Care

<table>
<thead>
<tr>
<th>Primary Care Trusts (PCTs)</th>
<th>Finished Episodes</th>
<th>Emergency (%)</th>
<th>Length of stay (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All PCTs</td>
<td>12,755,911</td>
<td>35</td>
<td>7.9</td>
</tr>
<tr>
<td>Central Liverpool</td>
<td>71,601</td>
<td>44</td>
<td>8.3</td>
</tr>
<tr>
<td>North Liverpool</td>
<td>37,297</td>
<td>39</td>
<td>7.7</td>
</tr>
<tr>
<td>South Liverpool</td>
<td>26,584</td>
<td>42</td>
<td>8.5</td>
</tr>
<tr>
<td>Average for PCTs within Cheshire &amp; Merseyside St. Health Authority</td>
<td>665,978</td>
<td>36</td>
<td>7.2</td>
</tr>
<tr>
<td>Average for PCTs within Cumbria &amp; Lancashire St. Health Authority</td>
<td>438,404</td>
<td>35</td>
<td>7.8</td>
</tr>
<tr>
<td>Average for Greater Manchester St. Health Authority</td>
<td>727,881</td>
<td>34</td>
<td>7.0</td>
</tr>
</tbody>
</table>

Table 4.13 illustrates hospital admission data for Liverpool PCTs. It also shows admissions for each of the strategic health authorities in the North West region, through combining PCT data within each of them, in order to allow for comparison of emergency admissions and average length of stay.
There is a greater proportion of emergency admissions for Central Liverpool PCT (44%) than the average for all PCTs (35%). At the regional level, it is also greater than the average for the North West strategic health authorities, that have roughly 35% emergency admissions. A higher proportion of emergency admissions suggests a greater preponderance of morbidity in Central Liverpool. Furthermore, patients admitted within Central Liverpool spend (on average) longer periods of time in hospital (i.e. 8.3 days) than the average for all PCTs (7.9 days), as well as the average for all PCTs in the North West strategic health authorities. This also indicates higher levels of morbidity in Central Liverpool than elsewhere. Similarly data from recent studies (Salisbury et al, 2000) indicates a 70% increase in use of primary care out of hours services for more deprived communities.

It has been estimated that:
- particulates (PMs) in urban areas (mainly attributed to road vehicles) are responsible for 8,100 premature deaths (all causes) per year, and for 10,500 hospital admissions (brought forward and additional) for people with respiratory diseases in the UK (COMEAP, 1998),
- ozone (O$_3$) - formed by the action of sunlight on nitrogen dioxide - is responsible for 700-12,500 deaths and 500-9,900 hospital admissions per year in the UK (COMEAP, 1998). In the UK 50% of NO$_2$ is produced by motor vehicles, with the highest concentrations in busy, urban streets (SNAP, 2000).

4.7.9 Well Being (Self-Reported General Health)

The following table gives an indication of how the communities of Liverpool have perceived their quality of health over the previous 12 months. Reporting poor health has been shown to be strongly associated with use of health services and mortality. It is also clear that long-term illness or disability can affect economic activity. The information is taken from the 2001 Census (ONS, 2002), and illustrates some interesting differences.

<table>
<thead>
<tr>
<th>Area</th>
<th>Good Health</th>
<th>Fairly Good Health</th>
<th>Not Good Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>68.8</td>
<td>22.2</td>
<td>9.0</td>
</tr>
<tr>
<td>North West</td>
<td>66.9</td>
<td>22.2</td>
<td>11.0</td>
</tr>
<tr>
<td>Merseyside</td>
<td>65.7</td>
<td>21.8</td>
<td>12.5</td>
</tr>
<tr>
<td>Liverpool</td>
<td>64.5</td>
<td>21.7</td>
<td>13.8</td>
</tr>
<tr>
<td>Abercromby</td>
<td>65.6</td>
<td>20.9</td>
<td>13.5</td>
</tr>
<tr>
<td>Everton</td>
<td>62.7</td>
<td>20.7</td>
<td>16.6</td>
</tr>
<tr>
<td>Granby</td>
<td>60.3</td>
<td>22.2</td>
<td>17.2</td>
</tr>
<tr>
<td>Smithdown</td>
<td>61.3</td>
<td>23.1</td>
<td>15.6</td>
</tr>
<tr>
<td>Vauxhall</td>
<td>55.8</td>
<td>23.4</td>
<td>20.9</td>
</tr>
<tr>
<td>5-ward Average</td>
<td>61.1</td>
<td>22.1</td>
<td>16.8</td>
</tr>
</tbody>
</table>

There is a definite trend of worsening self-perception of health. Across England, the proportion of people reporting good health (68.8%) is markedly higher than the average for Liverpool residents (64.5%), which in turn is higher than the CATCH average of 61.1%. Similarly, a much lower proportion of residents feel they have ‘not good health’ across England (9.0%) in comparison with Liverpool (13.8%) and the CATCH average of 16.8%. Even across the 5-ward areas there are marked differences with over one in five people reporting they are not in good health in Vauxhall compared with 13.5% in Abercromby.
4.7.10 Health-related behaviour

A. Physical Activity
Residents of Liverpool and Sefton are less likely to take part in moderate exercise (slightly out of breath but being able to speak whilst exercising) than the average for England. The Liverpool and Sefton lifestyle survey (September 2003) found that the participation rate of involvement in exercise (27.4%) is lower than the national average (30%). However, Liverpool and Sefton did have higher proportions of people taking exercise between once and four times per week (i.e. 51%) in comparison with the national average (39%). Table 4.14, provided by Central Liverpool Primary Care Trust, shows the breakdown of participation rates in Liverpool and Sefton.

Table 4.14 Percentage of Liverpool and Sefton Residents taking moderate exercise

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>11</td>
</tr>
<tr>
<td>Less than once per month</td>
<td>8</td>
</tr>
<tr>
<td>More than once a month but less than once a week</td>
<td>2</td>
</tr>
<tr>
<td>Once a week</td>
<td>18</td>
</tr>
<tr>
<td>Between 2 and 4 times per week</td>
<td>33</td>
</tr>
<tr>
<td>5 times per week or more</td>
<td>28</td>
</tr>
</tbody>
</table>

B. Obesity
Within the 16-64-age range, the rates of obesity vary across England. Table 4.15 (taken from Health Survey for England (DoH, 1995)) summarises these differences.

Table 4.15 Prevalence of Obesity

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage of Population: All Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16-44</td>
</tr>
<tr>
<td>England</td>
<td>16</td>
</tr>
<tr>
<td>Northern and Yorks</td>
<td>15</td>
</tr>
<tr>
<td>Trent</td>
<td>14</td>
</tr>
<tr>
<td>Anglia and Oxford</td>
<td>15</td>
</tr>
<tr>
<td>North Thames</td>
<td>15</td>
</tr>
<tr>
<td>South Thames</td>
<td>15</td>
</tr>
<tr>
<td>South and West</td>
<td>18</td>
</tr>
<tr>
<td>West Midlands</td>
<td>21</td>
</tr>
<tr>
<td>North West</td>
<td>15</td>
</tr>
</tbody>
</table>

Table 4.15 indicates that the North West has a high rate of obesity (28) within the 45-64 age range, with only one other English region having a rate as high (ie Northern and Yorkshire). Across the whole range from 16-54, the rate (20) of obesity is higher than most other regions, with the exception of the West Midlands, including the average for England (19%).

Rates of obesity across Liverpool are higher than the average for England, and there are significant differences within Liverpool. Table 4.16 (taken from the Liverpool and Sefton lifestyle survey (Sefton & Liverpool PCTs)) indicates that North Liverpool has a higher rate of obesity in comparison with south and central Liverpool.
Table 4.16  Body Mass Index (BMI): Percentages of Liverpool people

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Liverpool</td>
<td>2</td>
<td>48</td>
<td>32</td>
<td>18</td>
</tr>
<tr>
<td>South Liverpool</td>
<td>1</td>
<td>43</td>
<td>35</td>
<td>21</td>
</tr>
<tr>
<td>North Liverpool</td>
<td>5</td>
<td>40</td>
<td>31</td>
<td>24</td>
</tr>
</tbody>
</table>

C. Cigarette Smoking

Table 4.16 (taken from the General Household Survey, 2001 (ONS, 2001)) indicates that there is a greater prevalence of cigarette smoking amongst females in the North West (29%) than the average for England (25%). Male smoking, however, is roughly the same as the average for England (28%).

Table 4.17  Prevalence of cigarette smoking, ages 16 and above

<table>
<thead>
<tr>
<th>Areas</th>
<th>Males: Percentage</th>
<th>Females: Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>28</td>
<td>25</td>
</tr>
<tr>
<td>Northern and Yorks</td>
<td>31</td>
<td>28</td>
</tr>
<tr>
<td>Trent</td>
<td>29</td>
<td>26</td>
</tr>
<tr>
<td>Eastern</td>
<td>28</td>
<td>25</td>
</tr>
<tr>
<td>London</td>
<td>29</td>
<td>26</td>
</tr>
<tr>
<td>South East</td>
<td>26</td>
<td>23</td>
</tr>
<tr>
<td>South West</td>
<td>27</td>
<td>22</td>
</tr>
<tr>
<td>West Midlands</td>
<td>27</td>
<td>22</td>
</tr>
<tr>
<td>North West</td>
<td>28</td>
<td>29</td>
</tr>
</tbody>
</table>

The Liverpool and Sefton lifestyle survey provides a breakdown of smoking patterns for current smokers across Central Liverpool PCT (see Table 4.18). It indicates high rates within the 35-44 and 45-54 age ranges.

Table 4.18  Central Liverpool PCT: Percentages of Current Smokers

<table>
<thead>
<tr>
<th>Age range</th>
<th>Percentage of respondents in age group in PCT</th>
<th>Percentage of male respondents</th>
<th>Percentage of female respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-24</td>
<td>20</td>
<td>23</td>
<td>19</td>
</tr>
<tr>
<td>25-34</td>
<td>33</td>
<td>30</td>
<td>35</td>
</tr>
<tr>
<td>35-44</td>
<td>35</td>
<td>35.5</td>
<td>33.5</td>
</tr>
<tr>
<td>45-54</td>
<td>33</td>
<td>33.5</td>
<td>32</td>
</tr>
<tr>
<td>55-64</td>
<td>26</td>
<td>26.5</td>
<td>26</td>
</tr>
<tr>
<td>65-74</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>75+</td>
<td>16</td>
<td>25</td>
<td>12</td>
</tr>
</tbody>
</table>
4.8 Health Services

4.8.1 Performance for local NHS organisations is evaluated against various targets, including 'access'. This refers to how quickly a patient sees a General Practitioner (GP), primary care professional (PCP) or hospital consultant. However physical access to health services - eg getting to and from consultations - also effects a patient's ability to seek treatment and to keep appointments. Transport is key to ensuring that patients and carers receive appropriate and timely care, and has been identified as such in enabling patients 'Choice' in their care. In addition as indicated above (4.7.8), various health determinants, eg air quality can influence the demand on health services.

In 2002/03 Central Liverpool PCT was not able to meet targets for access to a GP or PCP. Similarly less than 90% of PCT patients accessing emergency care were seen within 4 hours. For both cervical and breast screening, the targets set for the percentage of women being screened were not met.

Whilst there are clear relationships between transport-related variables and health services, eg:
- physical access and timely care,
- poor air quality, respiratory episodes and demands on health services,

it is not possible to say to what extent the performance against the above targets may have been effected by transport issues.

The CATCH project not only will contribute to reducing air pollutant emissions, but it may also facilitate access to health services through the introduction of the City Centre Circular'. It is estimated that 78% of patients access primary care services (NHS Executive, 2004).
SECTION 5: DOCUMENTARY ANALYSIS

5.1 Introduction

5.1.1 As described in section 3, the purpose of the documentary analysis in a HIA is to assess the context of the CATCH proposals:

- What is the political context in which CATCH is being implemented?
- How could CATCH affect other related policies, particularly health or key health determinant policies, eg, air quality strategies, and vice versa?
- Is there synergy between CATCH and other policies?
- Are there any risks to CATCH being implemented as intended?
- What is the evidence of the effectiveness of similar interventions?
- What is the evidence of the health effects associated with CATCH's targets?

5.1.2 The documentary analysis reviews qualitative data contained within key official documentation, at international, national and local levels, relevant to CATCH's activities and targets. It also examines evidence from the literature concerning transport and the relationship with health determinants and health outcomes effected by CATCH.

5.2 International Policies and Strategies: Air Quality, Sustainable Development and Health

5.2.1 Table 5.1 provides a summary of some key international policies relevant to CATCH.

Table 5.1 Summaries of Key International Air Quality, Sustainable Development and Health Policies and Strategies

<table>
<thead>
<tr>
<th>Policy/Strategy</th>
<th>Author/Date</th>
<th>Objectives/Key features</th>
</tr>
</thead>
<tbody>
<tr>
<td>'Our Common Future'</td>
<td>The World Commission on Environment and Development, 1987</td>
<td>Established importance of environmental issues globally; defined concepts regarding air quality management.</td>
</tr>
<tr>
<td>'Rio Declaration' (Agenda 21)</td>
<td>United Nations Conference on Environment and Development, 1992</td>
<td>Established principles for: • Achieving sustainable development • Environmental protection • EIA as a national tool • Precaution ('precautionary principle') • 'Polluter pays'</td>
</tr>
<tr>
<td>'Air Quality Guidelines for Europe'</td>
<td>The World Health Organisation (WHO), 1987, 2000 (2nd edition)</td>
<td>• Provides pollutant levels below which lifetime exposure or exposure for a given averaging time does not constitute a health risk • Protects public health by eliminating or reducing to a minimum those pollutants known or likely to be hazardous to human health and well being • Contributed to national and international standards for air pollution • Updated in 2000 with new scientific evidence from air pollution, toxicology, epidemiology</td>
</tr>
<tr>
<td>Document Title</td>
<td>Year/Reference</td>
<td>Summary</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>'Convention on Long-Range Transboundary Air Pollution (CLRTAP)'</td>
<td>United Nations Economic Commission for Europe (UNECE), 1999</td>
<td>National emission ceilings for non-EU countries in Europe</td>
</tr>
<tr>
<td>'Health 21'</td>
<td>WHO, 1998</td>
<td>The updated 'Health for All' strategy for the 21st century includes targets to create a healthy and safe physical environment - supporting environmental taxes which reduce health damaging pollution.</td>
</tr>
<tr>
<td>'Assessment and Management of Ambient Air Quality'</td>
<td>European Council (EC), 1996</td>
<td>To maintain and improve air quality within the Community by defining basic principles which make it possible to:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• establish quality objectives for ambient air (outdoor air in the troposphere);</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• draw up common methods and criteria for assessing air quality;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• obtain and disseminate information on air quality (to public by, eg alert thresholds)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• avoid, prevent or reduce harmful effects on human health and the environment.</td>
</tr>
<tr>
<td>'A reciprocal exchange of information and data collected from networks and individual stations measuring ambient air pollution within the Member States'</td>
<td>EC, 1997</td>
<td>To establish a Community-wide procedure for the exchange of information and data on ambient air quality in the European Community.</td>
</tr>
<tr>
<td>'Guidance report on Preliminary Assessment under EC Air Quality Directives'</td>
<td>EEA, 1998, EC, 1998 (final version)</td>
<td>To establish the basic principles of a common strategy to define and set objectives for ambient air quality in order to avoid, prevent or reduce harmful effects on human health and the environment. (relate to WHO AQ guidelines)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• To assess ambient air quality in the Member States and inform the public, notably by means of alert thresholds.</td>
</tr>
<tr>
<td>'Limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air'</td>
<td>EC, 1999 (Directive)</td>
<td>To maintain or improve the quality of the ambient air by establishing limit values for the concentrations of sulphur dioxide, nitrogen dioxide and nitrogen oxides, particulates and lead.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Establish alert thresholds for concentrations of sulphur dioxide and nitrogen dioxide in the ambient air by evaluating those concentrations on the basis of common methods and criteria, and by bringing together suitable information on such concentrations in order to keep the public informed.</td>
</tr>
<tr>
<td>'Limit values for benzene and carbon monoxide in ambient air'</td>
<td>EC, 2000 (Directive)</td>
<td>• Established limit values for concentrations of benzene and carbon monoxide in ambient air.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Requires assessment of concentrations of those pollutants using common methods and criteria.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ensures that information is made available to the public.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The limit value for carbon monoxide must be met by 2005 and for benzene must be met by 2010 unless an extension is granted.</td>
</tr>
<tr>
<td>'Health Strategy of the EC'</td>
<td>EC, 2000 (Com)</td>
<td>• Emphasised joint action to integrate health-related work at Community level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Assessment of health impacts of EU policies in policy planning</td>
</tr>
<tr>
<td>'National emission'</td>
<td>EC, 2001</td>
<td>• To set national emission ceilings for pollutants causing</td>
</tr>
<tr>
<td>ceilings for certain atmospheric pollutants' (Directive)</td>
<td>acidification and eutrophication and for ozone precursors in order to provide fuller protection for the environment and human health against their adverse effects.</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>'Air quality and health strategy' WHO, 2001</td>
<td>• To foster knowledge and understanding of the global, regional and local disease burden of air pollution; • To develop and update health-based air quality guidelines for existing pollutants; • To establish proactive partnerships and co-ordination mechanisms that promote improvement of air quality; • To support the infrastructure and development, teaching and training for health risk assessment and management; and • To strengthen networking.</td>
<td></td>
</tr>
<tr>
<td>'Johannesburg Declaration' UN World Summit on Sustainable Development, 2002</td>
<td>• Redefined global issues for sustainable development, including air pollution and its health effects, and the need for environmental protection. • Emphasises the development and transfer of modern technology to reduce under development.</td>
<td></td>
</tr>
<tr>
<td>Guidelines and target values for ambient ozone EC, 2002 (Directive). Linked to 2001 Directive.</td>
<td>• Defines detailed requirements to monitor and assess ozone concentrations, and to inform citizens about the actual pollution load. • Sets alert thresholds and requires Member States' authorities to take short-term action if exceeded. • Non-compliance of national emission ceilings requires Member States to develop and report on reduction plans and programmes.</td>
<td></td>
</tr>
<tr>
<td>EC Public Health Strategy EC, 2003 (Com)</td>
<td>• Emphasises action on health determinants (eg air pollutants) and to reduce health inequalities • Includes health impact assessment of EC policies in work programme</td>
<td></td>
</tr>
<tr>
<td>'Europe's Environment' Chapter 5 Air Pollution European Environment Agency, 2003</td>
<td>• Air pollution in cities from tropospheric ozone and PMs as well as nitrogen dioxide above standards • Health effects main issue • Measures need to focus on cities • Adopt flexible mechanisms for implementing Kyoto protocol</td>
<td></td>
</tr>
</tbody>
</table>

5.2.2 There is clear synergy between the aims of CATCH and these key international policies and strategies. In particular CATCH (tasks 1-4) contributes directly to those EC Directives setting limit values and emission ceilings for pollutants. The piloting of new mobile emission monitoring systems (task 5) also relates to the introduction of new emission levels for ozone precursors. There is a clear association between CATCH and potential health benefits as indicated by eg the WHO air quality and health strategy. The relevance and applicability of CATCH to other EC cities is reinforced. In addition CATCH contributes to the sustainable development agenda. However, whilst EC limit values relate to PM$_{10}$ WHO Air Quality Guidelines (2000) indicate PM$_{2.5}$ a more reliable indicator of health effects associated with particulates. This suggests monitoring systems will need to be adapted and refined as evidence emerges about health effects of pollutants.
### 5.3 United Kingdom Policies and Strategies: Air Quality, Sustainable Development and Health

5.3.1 Table 5.2 summarises the main UK policies and strategies (appendix 5) relating to air quality, sustainable development and health that are relevant to CATCH. It also highlights features of transport policies and plans as they relate to CATCH.

#### Table 5.2 Summaries of Key UK Policies and Strategies relevant to CATCH

<table>
<thead>
<tr>
<th>Policy/Strategy</th>
<th>Author/Date</th>
<th>Objectives/Key features</th>
</tr>
</thead>
<tbody>
<tr>
<td>'A New Deal for Transport: Better for Everyone'</td>
<td>Dept. for Transport, 1998 (White Paper)</td>
<td>• Recognises traffic related air, noise pollution and health effects and identifies congestion as undermining competitiveness by £15 billion a year&lt;br&gt;• Indicates EC directives for fuel and vehicle emissions will reduce urban NO₂ by 67% and PMs by 70% (from 1996 levels) by 2010&lt;br&gt;• Aims to develop sustainable, integrated transport system with links to land use planning, education and health policies supporting wealth creation and inclusiveness&lt;br&gt;• Measures include Local Transport Plans, national Transport Plan, wider choice of transport modes (public transport, walking and cycling), greener, fuel efficient transport (Cleaner Vehicle Task Force, Quality Partnerships and Contracts, motoring tax incentives)</td>
</tr>
<tr>
<td>'Transport 2010: The 10 Year Plan'</td>
<td>Dept. of Environment Transport and the Regions (DETR), 2000</td>
<td>Targets relevant to CATCH include to:&lt;br&gt;• reduce road congestion below current levels by 2010... by promoting integrated transport solutions and investing in public transport and the road network...&lt;br&gt;• increase bus use in England ... from 2000 levels by 10% 2010..&lt;br&gt;• improve air quality by meeting National Air Quality Strategy targets...&lt;br&gt;• reduce greenhouse gas emissions by 12.5% from 1990 levels, and move towards a 20% reduction in carbon dioxide emissions by 2010 (after Kyoto protocol)&lt;br&gt;• triple the number of cycling trips by 2010 compared to 2000 base&lt;br&gt;• reduce average age of buses in fleet from 12 to 8 years by 2001&lt;br&gt;• reduce the congestion on local roads</td>
</tr>
<tr>
<td>The UK National Air Quality Strategy (NAQS)</td>
<td>Dept. for the Env., Food and Rural Affairs (DEFRA), 2000</td>
<td>• Sets objectives (concentrations and measurement) for 8 pollutants: Benzene, carbon monoxide, lead, 1,3 - butadiene, NO₂, particulates and sulphur dioxide&lt;br&gt;• Objectives relate to EC directives on limit values</td>
</tr>
<tr>
<td>Local Air Quality Management Policy Guidance</td>
<td>DEFRA, 2003</td>
<td>• Provides a legislative framework for assessing air quality, designating air quality management areas and developing action plans&lt;br&gt;• Suggests ways to consult/share data between LAs&lt;br&gt;• Summarises land use planning and transport measures&lt;br&gt;• Relates to EC strategies</td>
</tr>
<tr>
<td>'A Better Quality of Life: A Strategy for Sustainable Development for the United Kingdom'</td>
<td>DEFRA, 1999</td>
<td>Comprises of four overarching aims:&lt;br&gt;• social progress which recognises the needs of everyone;&lt;br&gt;• effective protection of the environment;&lt;br&gt;• prudent use of natural resources; and&lt;br&gt;• maintenance of high and stable levels of economic growth and employment.&lt;br&gt;For the UK, priorities relevant to CATCH are:&lt;br&gt;• reducing the level of social exclusion;&lt;br&gt;• promoting a transport system which provides choice, and also minimises environmental harm and reduces congestion;</td>
</tr>
</tbody>
</table>
• improving the larger towns and cities to make them better places to live and work;
• improving energy efficiency and tackling waste;
• working with others to achieve sustainable development internationally.

<table>
<thead>
<tr>
<th>'Saving Lives: Our Healthier Nation'</th>
<th>Dept. of Health (DoH), 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Aims to improve health for everyone and reduce inequalities</td>
<td></td>
</tr>
<tr>
<td>• Sets targets in 4 priority clinical areas: cancer, coronary heart disease/stroke, mental health and accidents</td>
<td></td>
</tr>
<tr>
<td>• Described wider health determinants causing poor health, eg poor air quality and action to address</td>
<td></td>
</tr>
<tr>
<td>• Advocated health impact assessment on national and local policies</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>'The NHS Plan'</th>
<th>DoH, 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Includes in it's principles the recognition of economic, social and environmental factors in determining health status and the need to keep people healthy and reduce inequalities</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>'Tackling Health Inequalities'</th>
<th>DoH, 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Recognises the widening health inequalities (life expectancy, infant mortality) between socio-economic groups</td>
<td></td>
</tr>
<tr>
<td>• Defines short and longer term action: lifestyle, eg nutrition, wider health determinants, eg social support, education and employment, housing, and ill health prevention, treatment and care</td>
<td></td>
</tr>
<tr>
<td>• Specific action relevant to CATCH: improving access ('accessibility planning') to primary care and other key services, jobs in second LTP in 2005, encourage children to walk and cycle ('sustainable travel to school'), and changes to bus registration system to allow door to door services to meet passenger needs</td>
<td></td>
</tr>
</tbody>
</table>

5.3.2 Once again there is a complementary relationship between CATCH and national policies on transport, air quality and sustainable development, eg CATCH is testing 'greener' public transport vehicles, promoting healthier transport modes whilst linking this and other developments to land use plans such as the City Centre Movement Strategy. In addition it is supporting the improvement of health through the reduction of air pollutants and the promotion of walking and cycling.

5.3.3 An economic analysis of the health benefits from the Air Quality Strategy associated with a reduction in particulate emissions based on statistical modelling techniques advocated by WHO (on population weighted changes in PM$_{2.5}$) showed that with a 0.751 µg/m$^3$ reduction in particles the following would occur over a 101 year period:

- a gain of 278,000 to 508,000 life years for the UK population over the years from 2010 to 2110 (equivalent to 81,000 to 212,000 life years gained after discounting;
- 25,200 fewer respiratory hospital admissions in the UK;
- 4,820 fewer deaths brought forward (2,510 after discounting)
- 3,690 fewer respiratory hospital admissions (additional or brought forward) due to UK reductions in sulphur dioxide arising from the additional measures to reduce particles.
5.4 Merseyside Policies and Strategies: Air Quality, Sustainable Development and Health

5.4.1 Background
There are various policy documents, both in Merseyside as a whole, and also specifically within Liverpool that relate to CATCH. The most relevant are the Merseyside Local Transport Plan, Liverpool Unitary Development Plan, Air Quality Management Strategy and the City Centre Movement Strategy. In addition summaries of sustainable development and health plans are also examined.

5.4.2 Merseyside Local Transport Plan
The Merseyside Local Transport Plan contains a strong commitment to developing a fully integrated and sustainable transport system through a package of measures, including:
- A single integrated public transport network;
- Measures to improve access to key facilities and employment opportunities; and
- Better freight routes.

With regard to air quality and noise, the Merseyside Transport Plan emphasises that the five local authorities on Merseyside have established an organisational framework for integrated and co-operative management of these issues. The Merseyside Pollution Group deals with all pollution-related issues, and includes representatives from all Merseyside authorities. There are also specific sub-groups that deal with the different pollution areas, including the Merseyside Air Quality Management Group. These groups provide a forum for:
- Liaison and exchange of ideas on a Merseyside wide basis;
- Appraisal of Merseyside wide proposals requiring joint funding; and
- Co-ordination and management of Merseyside wide initiatives such as the Atmospheric Emissions Inventory and Health Action Zone proposals.

The integration of air quality issues into the LTP is co-ordinated by a separate group of transport planners and environmental health professionals known as the Transport Environment Group, which meets regularly to discuss recent monitoring results, consider the implications of transport emissions and identify ways of managing or reducing the environmental impacts of transport.

In addition to preparing the environmental input to the LTP, the group also provided input to the Health Impact Assessment (HIA) of the LTP.

All 5 local authorities have progressed with the three-stage process of air quality review and assessment, and all completed and published the Stage 1 review. This provided a general indication of areas where there is a risk of not meeting one or more of the national objectives by the target dates. Second and third stage reviews are only required for those pollutants where a potential problem exists.
Results of Stage 1 Review
These show that, in each authority, further assessment will only be required for nitrogen dioxide, particles and sulphur dioxide. Road transport emissions make a significant contribution to nitrogen dioxide and particulates.

Possible problem areas relate to:

- Heavily trafficked radial routes and motorways; and
- Town centres, especially Liverpool city centre

All of the motorways, and most of the main roads on Merseyside, require further assessment, especially in relation to nitrogen dioxide, due to the high traffic levels they carry.

The city centre of Liverpool is of particular concern, due to the number and density of congested streets. Buses and taxis are major contributors to the problems in the city centre.

Stage 2 and Stage 3 Assessments
Stage 2 and Stage 3 assessments will include detailed monitoring of the city centre to help define specific problem areas. This work will then feed into the review of traffic circulation in Liverpool City centre, and also influence proposals for traffic management.

The transport plan also highlights good practice in relation to air quality on Merseyside. Sefton council’s air quality strategy is given particular emphasis, particularly its proposed focus on:

- Vehicle emissions testing and enforcement;
- Promotion of clean vehicles, including increasing the proportion of clean fuelled vehicles in the Council fleet;
- Integration of land use and transport planning,
- Assessment of proposed transport schemes for air quality impacts, and
- Development of an outstanding website concerned with air quality issues.

5.4.3 ‘Making the Links’: HIA and the Merseyside Local Transport Plan
The Merseyside Transport Plan highlights the important links between transport, environmental conditions and health. Referring to the Department of Health publication, ‘Making the Links’, it has addressed these links through the establishment of the Transport, Health and Environment Forum, but also through the completion of a comprehensive Health Impact Assessment (HIA) of the Merseyside Local Transport Plan. This HIA is currently being updated.

5.4.4 Liverpool Unitary Development Plan (LUDP)
The LUDP contains some important plans for improving air quality through careful transport development schemes. It states, for example, that new roads will only be supported where it can achieve any of the following aims:

- Secure environmental improvements by removing extraneous traffic from congested areas, especially residential areas, and
Help urban regeneration by attracting new investment.

Furthermore, where planning permission is sought for new development like to cause a significant change in the volume of traffic, the LUDP states that the applicant must submit a full Traffic Impact Assessment (TIA).

Proposals that exceed any of the following parameters generally require a TIA as part of the planning application:

- Residential developments in excess of 200;
- Business development in excess of 5,000 square metres;
- Warehousing development in excess of 10,000 square metres;
- Retailing development in excess of 1,000 square metres;
- 100 trips in/out combined in the peak hour; and
- 100 on-site parking spaces.

The LUDP also states that developments likely to be used by the public must incorporate provision for taxi and Hackney Carriage facilities where there are no existing facilities in close proximity. This would be an important pointer towards reducing congestion in Liverpool.

5.4.5 Liverpool Transport Plan: Annual Progress Report

The most recent progress report of the Liverpool Transport Plan highlights some significant improvement that impact upon air quality. These can be summarised as follows:

- Strong progress with the development of the Single Integrated Public Transport Network (including improvements to buses, trains and John Lennon Airport);
- Merseytram Line 1 investment appraisal submitted to DTLR;
- Freight strategy progressing well;
- Extensive consultation carried out as part of Hall Lane improvements; and
- Innovative parking management in the City Centre.

In relation to inclusive sustainable regeneration, the Progress Report highlights:

- Reducing the environmental impact of transport through promoting sustainable travel choice, new technology designed to reduce emissions and monitoring emissions;
- Transport supporting new jobs in Strategic Investment Areas; and
- Maintaining access from Merseyside’s rural areas by ensuring access to the single integrated public transport network.

5.4.6 Air Quality Review and Assessment

The following assessment commissioned from the National Environmental Technology Centre (NETCEN), highlights key issues concerning air pollution in Liverpool.

The review and assessment of air quality is usually carried out as a three-stage process. The first stage identifies all sources of pollutants, which could have a significant impact within the authority. The second stage provides screening of pollutant concentrations and determines whether a third stage review should be conducted. The third stage provides an accurate and detailed review and assessment of current and future air quality in a particular district and determines
the location of any necessary Air Quality Management Areas. This review incorporates a stage two assessment of carbon monoxide, nitrogen dioxide, PM$_{10}$ and sulphur dioxide and a stage three assessment of nitrogen dioxide, PM$_{10}$ and sulphur dioxide as outlined in the Government’s published guidance. The air quality review investigates current and potential future air quality through an examination of the location and size of principal emission sources, emissions modelling exercises and by reference to monitored air quality data.

The stage three assessment investigates the air quality at a number of locations close to major roads and industrial sources identified in the stage two screening assessment as potentially at risk of exceeding the objectives. Predicted concentrations of nitrogen dioxide, PM$_{10}$ and sulphur dioxide are presented as “contour” plots extending over the areas of concern. An estimate of the likelihood of meeting the air quality objective has been assigned to each ‘contour’ based on statistical analysis of model validation studies and of monitoring data. The contour plots allow an assessment of the likelihood of meeting the air quality objectives to be made at each location.

The results indicate that it is probable that the air quality objectives for nitrogen dioxide will not be met at the following locations:

- All buildings within 1 km × 1 km region SJ400960
- Great Crosshall St. (SJ340900)
- Tom Mann Close (SJ340900)
- Gerard St. (SJ340900)
- Sea Brow (SJ340900)
- Queens Drive (SJ400900)
- Bowring Park Rd. (SJ400900)

It was recommended that Liverpool City Council declare Air Quality Management Areas for nitrogen dioxide at the following locations:

- Great Crosshall St. (SJ340900)
- Tom Mann Close (SJ340900)
- Gerard St. (SJ340900)
- Sea Brow (SJ340900)
- Queens Drive (SJ400900)
- Bowring Park Rd. (SJ400900)

There is considerable uncertainty regarding exceedances predicted within the 1 km × 1 km region SJ400960, which are principally due to NO$_x$ emissions from “off-road vehicles” identified in the 1995 Merseyside Emission Inventory, which may be outdated. It is recommended that either monitoring be carried out or the “off-road vehicles” contribution to NO$_x$ emissions be reassessed prior to declaring an Air Quality Management Area within this region.

The results for PM$_{10}$ indicate that it is probable that the air quality objectives will not be met within 600 m of Wavertree Trading Est., Rexmore Way. Principally, this is due to PM$_{10}$ emissions from RMC Bendale Motors Ltd. However, limited stack data were available for RMC Bendale Motors Ltd. so conservative assumptions had to be made, which could have lead to an overestimation of concentrations. There is also considerable uncertainty over the quantity of PM$_{10}$ emission from this process.
It was recommended that Liverpool City Council carry out monitoring of PM$_{10}$ concentrations around Wavertree Trading Est. prior to declaring an Air Quality Management Area for PM$_{10}$.

For sulphur dioxide, the results indicate that it is likely that the air quality objectives will be met at all the locations assessed, where members of the public might be exposed for the relevant periods. As such it was recommended that Liverpool City Council do not declare Air Quality Management Areas for sulphur dioxide.

### 5.4.7 City Centre Movement Strategy (CCMS)

The CCMS has the following objectives:
- To improve accessibility to the city centre to aid economic regeneration and provide access for all;
- To create a 'people friendly' city centre that is safe, clean and attractive for work, shopping, business, tourism and leisure;
- To make the best use of the city centre transport assets – the Merseyrail stations, bus facilities, ferries and major car parks;
- To support the improvement of the city centre’s architecture and townscape;
- To ensure that the proposals can be funded and implemented within the five year Local Transport Plan period.

Action to implement the CCMS includes:
- reallocation of road space to pedestrians, cyclists and public transport along Park lane, Dale Street and Lime Street.
- Lime Street Gateway improvements
- environmental and pedestrian improvements to the Strand
- comprehensive package of signing and information
- variable Message Signing on car park availability
- pedestrian and public transport improvements to Hanover/Ranelagh Street
- cycle network developments
- introduction of Travel Plans to city centre businesses
- development of integrated car park, bus layover and coach park facility at Pall Mall.
5.4.8 Local Agenda 21: 'Building Sustainable Ways of Working' (LCC, 2001)

This sustainable development plan builds on the Council's earlier LA21 strategy. It defines 8 themes, 4 of which relate directly to CATCH:

Table 5.3 Summary of Action for Sustainable Development in Liverpool relevant to CATCH

<table>
<thead>
<tr>
<th>Theme</th>
<th>Action</th>
</tr>
</thead>
</table>
| Improving health, well being and access to essentials | • Promote walking and cycling  
• Promote physical activity  
• Develop parking strategy  
• Emergency footway repairs  
• ‘Healthy Schools awards’ |
| Access and sustainable transport           | • Sustainable transport integrated into regeneration planning  
• Cycle strategy - review strategy, develop cycle routes/network, safe cycle storage  
• Walking strategy - develop pedestrian routes  
• Quality Bus Partnerships - incorporate latest technological developments  
• Bus priority measures  
• Home zones  
• Access & Mobility - Guidelines, Code of Practice, audits  
• School travel plans  
• Green transport and commuter plans  
• Travelwise |
| Limiting pollution                         | • Promote awareness of polluting vehicles |
| Efficient and effective use of resources   | • Reduce C0₂ emissions (in line with Kyoto agreement) |

5.4.9 Health Plans: 'Local Delivery Plan 2003-2006' (Central Liverpool PCT, 2003)

Within Central Liverpool PCT, existing plans generally reflect the priorities (DoH, 2002) and targets set nationally:

- Cancer
- Coronary heart disease
- Mental health
- Drugs, alcohol and HIV
- Sexual health
- Rehabilitation and disability
- Prescribing
- Learning Disabilities

And focus on older people, children and women. However improving health and reducing health inequalities are key drivers for the PCT.

Whilst there is no published document, the PCT is also in the process of developing a green transport plan building on the commitment to improve health and tackle wider health issues related to this.

Links with other health plans include with Liverpool Healthy Cities' City Health Plan and the Merseyside Health Action Zone (HAZ) strategy. Within these there are various projects that relate directly to CATCH, eg
• Cycling - Liverpool Community Transport and Local Initiative for Transport
• Car sharing - Slowdown

5.4.10 Policy Analysis
At a local level there is a clear and coherent approach to addressing road transport and associated air quality issues at a policy and strategy level; these link to national developments and are supportive of CATCH. At project level there is also much underway within different City Council departments, Merseytravel, the voluntary, independent and health sectors which is directly relevant to CATCH, eg promoting walking and cycling, car parking strategy, school and commuter travel plans, car sharing schemes. Other project work although not directly related to CATCH could be used to support or promote CATCH tasks, eg Healthy School awards, Alleygating projects.

However there were some areas of concern, which represent potential risks for CATCH. For example the Community Empowerment Networks set up to engage communities as part of the formal community planning process for Liverpool First were not readily accessible. This may impact on CATCH's ability to engage communities (task 4) through these topic and area based networks. Similarly there was difficulty engaging local politicians in this HIA.

From this policy analysis potential risks to CATCH are political commitment, community access and awareness, and co-ordination/overlap between other sustainable-transport projects. Potential opportunities are to work with the health sector (Green transport plans), schools (school transport plans, Healthy School awards), the voluntary sector (community transport, car sharing) and other existing neighbourhood specific-community development projects (Alleygating).
5.5  Transport, health determinants and health: Evidence from the literature

5.5.1  Air pollutants

The health effects of air pollutants that originate from motor vehicles and are controlled under the UK NAQS are summarised in table 5.4.

Table 5.4  Effects of pollutants and air quality objectives

<table>
<thead>
<tr>
<th>Source</th>
<th>Airborne particulates</th>
<th>Sulphur dioxide</th>
<th>Nitrogen oxides</th>
<th>Carbon monoxide</th>
<th>Ozone</th>
<th>Benzene</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Diesel exhaust, coal burning</td>
<td>Fossil fuels, power stations (73%), diesel exhaust</td>
<td>Motor vehicles (45%), power stations (35%)</td>
<td>Incomplete combustion fossil fuel, tobacco smoke</td>
<td>Photochemical reaction between nitrogen oxides and hydrocarbons</td>
<td>Engine emissions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health effects</th>
<th>Health effects</th>
<th>Health effects</th>
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<th>Health effects</th>
<th>Health effects</th>
<th>Health effects</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Carry acidic gases and volatile hydrocarbons into lungs. Raise blood pressure. May be carcinogenic. Possible link with diabetes.</td>
<td>Bronchitis, bronchospasm (especially in asthmatics)</td>
<td>Respiratory irritation</td>
<td>Reduces oxygen carrying capacity of blood. Causes headaches, impairs concentration, exacerbates angina, precipitates arrhythmias, retards foetal growth</td>
<td>Coughing; impaired lung function; eye, nose, and throat irritation; headaches. Aggravates asthma and bronchitis</td>
<td>Causes leukaemia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental effects</th>
<th>Environmental effects</th>
<th>Environmental effects</th>
<th>Environmental effects</th>
<th>Environmental effects</th>
<th>Environmental effects</th>
<th>Environmental effects</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Soiling of buildings, reduced visibility, odour</td>
<td>Main constituent of acid rain. Damages plants and aquatic life</td>
<td>One third of acidity of rainfall</td>
<td>Oxidises to carbon dioxide, contributing to greenhouse effect</td>
<td>Greenhouse gas. Damages crops, trees, plastics, rubber and paints</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Air quality objectives:</th>
<th>Air quality objectives:</th>
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<tbody>
<tr>
<td></td>
<td>1h mean</td>
<td>8h mean</td>
<td>24h mean</td>
<td>1 year mean</td>
<td>NO$_2$:</td>
<td>NO$_2$:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>350 µg/m$^3$</td>
<td>200 µg/m$^3$</td>
<td></td>
<td>11.6 mg/m$^3$</td>
<td>16.25 µg/m$^3$</td>
</tr>
<tr>
<td></td>
<td>125 µg/m$^3$</td>
<td></td>
<td></td>
<td>PM$_{10}$: 50 µg/m$^3$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PM$_{10}$: 40 µg/m$^3$</td>
<td></td>
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</tr>
</tbody>
</table>


Air quality objectives: The Air Quality (England) Regulations 2000

Evidence on the health effects of air pollutants from the WHO Air Quality and Health Strategy is in appendix 5. However because of the relevance to CATCH and
particular pollutant monitoring (task 5), recent reviews of evidence (WHO, 2003) on PM, N02 and also 03 will be discussed in more detail below.

**Particulates**
A recent review of evidence of ambient PM has attributed an increase in cardiopulmonary and lung cancer deaths to exposure to this pollutant. Morbidity effects include lower respiratory symptoms and reduced lung function in children, and chronic obstructive pulmonary disease and reduced lung function in adults.

There is an estimated reduction in life expectancy of a few years with possibly some increase in infant mortality in highly exposed areas. Older people, people with existing lung and heart disease and people from lower socio-economic groups are more susceptible than the population as a whole. In addition exposure to PMs affects lung growth in children. Fine particles (PM$_{2.5}$) and sulphates associated with them are believed to be particular toxic. This has led to a recommendation that ultra fine particles (PM$_{2.5}$) also be used as an indicator for health effects induced by particulates, but currently assessed by coarse particulate (PM$_{10}$) measurements.

**Nitrogen Dioxide**
Small, statistically significant, reversible effects on lung function and airway responsiveness have been observed in mild asthmatics during a 30-minute exposure to nitrogen dioxide concentrations of 380–560 µg/m$^3$ (0.2–0.3 ppm). The sequelae of repetitive exposures of such individuals or the impact of single exposures on more severe asthmatics are not known. Nitrogen dioxide puts children at increased risk of respiratory illness. This is of concern because repeated lung infections in children can cause lung damage later in life. Studies of asthmatics exposed to 380–560 µg/m$^3$ indicate a change of about 5% in pulmonary function and an increase in airway responsiveness to bronchoconstrictors. Asthmatics are more susceptible to the acute effects of nitrogen dioxide: they have an higher baseline airway responsiveness. Thus, a nitrogen-dioxide-induced increase in airway responsiveness is expected to have clinical implications for exaggerated responses to a variety of provocative agents, such as cold air, allergies or exercise.

Nitrogen oxides emitted from motor vehicles (and other sources) form N02 which reacts with other pollutants (eg VOCs and PMs) to produce other toxic pollutants such as ozone. According to current forecasts, by 2006 HGVs will have the largest share of NOx emissions. Collectively, by 2005 HGVs and LGVs will be the biggest source of particulates, although the introduction of particulate traps will lead to reductions from this source. Buses are also know to be a significant source of NOx and particulate emissions; added to this is that they tend to be kept on the road longer than other vehicles, eg in 1997 71% of buses were pre-Euro I vehicles.

**Ozone**
Ozone toxicity occurs in a continuum in which higher concentrations, longer exposure duration and greater activity levels during exposure cause greater health effects. Short-term acute effects include respiratory symptoms, pulmonary function changes, increased airway responsiveness and airway inflammation. These health effects were statistically significant at a concentration of 120-160 µg/m$^3$ (0.08 ppm) for 6.6-hour exposures in a group of healthy exercising adults, with the most sensitive subjects experiencing functional decrements of > 10% within 4–5 hours. Controlled exposures of heavily exercising adults or children to an ozone concentration of 240 µg/m$^3$ (0.12 ppm) for 2 hours have also been observed to
produce decrements in pulmonary function. There is no question that substantial acute adverse effects occur with 1 hour of exercising exposure at concentrations of 500 µg/m³ or higher, particularly in susceptible individuals or subgroups.

Field studies in children, adolescents and young adults have indicated that pulmonary function decrements can occur as a result of short-term exposure to ozone concentrations of 120–240 µg/m³ and higher. Mobile laboratory studies using ambient air containing ozone have observed associations between changes in pulmonary function in children or asthmatics and ozone concentrations of 280–340 µg/m³ (0.14–0.17 ppm) with exposures lasting several hours. Respiratory symptoms, especially cough, have been associated with ozone concentrations as low as 300 µg/m³ (0.15 ppm). Ozone exposure has also been reported to be associated with increased hospital admissions for respiratory causes and exacerbation of asthma (particularly for children); admission rates increase with age. That these effects are observed both with exposures to ambient ozone (and copollutants) and with controlled exposures to ozone alone demonstrates that the functional and symptomatic responses can be attributed primarily to ozone. There is new epidemiological evidence on long-term O₃ effects and experimental evidence on lung damage and inflammatory responses. The exposure patterns have implications for monitoring and assessment.

5.5.2 Physical activity
There are a range of health outcomes influenced by poor physical activity, and these include coronary heart disease, diabetes, stroke, obesity / overweight and mental well-being. The risk of coronary heart disease is twice as great for an inactive person as an active one, yet it is estimated that six out of ten men (and seven out of ten women) in the UK are not regularly active. Integrating physical activity into everyday life, through cycling and walking, can substantially improve aerobic fitness and reduce risks of these clinical conditions.

5.5.3 Social support
Evidence from elsewhere (eg WHO, 2000; Acheson et al, 1998; Appleyard & Lintell, 1972) also shows the important relationship between road traffic and the effect on social networks, and health and well being outcomes. Traffic volumes and speed affects behaviour and perceptions of the area - the busier an area, the less friendly they are perceived to be and the less social contact there is. Poor social support networks are associated with a four fold increased risk of coronary heart disease (Marmot & Hemingway, 2000).

5.5.4 Road traffic accidents (RTAs)
In 2002, 3,431 people were killed in road accidents, of which 775 were pedestrians and 1,146 car drivers; on Merseyside approximately 3 people a day are killed or seriously injured from road traffic accidents. Although traffic volume has increased substantially, deaths from road traffic accidents have approximately halved since 1960. Casualties to vulnerable groups, such as children, pedestrians and cyclists have reduced in recent years, although this is more likely due to road danger (i.e. fewer people walk or cycle, with parents more restrictive of their children’s activities) than to a lowering in risk reduction posed by road traffic. Risk factors associated with RTAs include speed, alcohol, use of safety devices and vehicle design.
5.5.5 Hybrid vehicles

Hybrid electric vehicles use both electric motors and a petrol or diesel engine to drive the vehicle. Hybrids are currently on the market in Japan with plans to introduce them into the UK. Manufacturers’ evidence indicate a 10% reduction in emissions and fuel savings of 50% compared to conventionally powered vehicles (Cleaner Vehicles Task Force, 1999; Nakata, 2000). There is also no need for dedicated recharging infrastructure as the petrol or diesel engine can recharge its battery.

The development of hybrid vehicles has necessitated technological developments in drivetrain system components such as high-efficiency high-specific power electric motors and controllers; load levelling devices such as ultracapacitors and flywheels; direct injection diesel and Otto cycle engines; and advanced batteries, such as lithium-ion and Nickel/metal hydride.

Further developments in hybrid vehicles indicates that series hybrid vehicles have lower emissions while parallel hybrid vehicles can significantly reduce fuel consumption. Currently cost and market considerations favour parallel hybrid vehicles (Gutmann, 1999).

5.5.6 Particulate traps

Improvements to conventional engines through particulate traps and catalytic converters help to improve air quality. However, it needs to be noted that the development of new technologies has not always resulted in benefits to health and the environment. For example newly developed diesel engines with lower CO\textsubscript{2} emissions produce many ultra-fine particles (PM\textsubscript{2.5} and below), which it is now indicated (WHO, 2003) are responsible for additional adverse health effects of particulate matter (Peters et al, 1997).
SECTION 6: EVIDENCE FROM STAKEHOLDERS AND KEY INFORMANTS

6.1 Introduction
6.1.1 This section presents evidence of health impacts identified from the data collected from 'stakeholders' and 'key informants'. 'Stakeholders' are defined as individuals or groups of people who have a stake or interest in the policy under investigation. For the CATCH project, stakeholders included people who live and work within the City centre, particularly the following wards: Abercromby, Everton, Granby, Smithdown and Vauxhall. In addition data from individuals and organisations involved in the development of the project proposals was also collected. 'Key informants' are experts or specialists in a specific policy field. For the purpose of this HIA, key informants in transport and transport and health were invited to be involved.

6.2 Presentation of evidence
6.2.1 The findings are presented under three headings:
- Perspectives on Liverpool
- Potential positive impacts of CATCH project
- Potential negative impacts of CATCH project

6.2.2 The themes that emerged from the interviews and focus groups are grouped under each heading. Contributions have been anonymised to preserve confidentiality. The aim of the interviews and focus groups was to gain a range of opinions, experiences and beliefs, and to generate from this an understanding of the potential effects of the intervention - in this case the CATCH scheme - on the stakeholders. It was not the purpose of the qualitative approaches used to attribute numerical values to different views.

6.2.3 Eighteen focus groups and interviews were facilitated between August and October 2003. Focus groups were held with each of the stakeholder and key informant categories identified in section 4.

6.3 Organisational Stakeholders and Key Informants: Perspectives of Liverpool

6.3.1 Socio-economic environment
Families / communities
The sample presented a variety of views in this regard. Some felt that strong communities existed in the area, and that these were very committed to the area. Social networks were also seen as fairly well developed, despite the fact that younger people were perceived as more excluded from the community as a whole. This spirit was seen in the engagement local people had with statutory authorities, particularly within a regeneration context. However, there was a sense that this spirit may be declining as poorer families are priced out of the city centre through the development of apartments:
Others, however, felt that only certain communities exhibited a strong sense of community spirit. This was evidenced by the successful Capital of Culture bid:

“I haven’t come across any ‘this is Liverpool Capital of Culture, we’re all together in this’, that hasn’t really come across”

The transport networks within the city centre, however, were seen as having a positive effect in maintaining the quality of family and community life through enabling people to socialise:

“...families being able to visit and meet friends and relatives, people having nights out ... this is all comparatively easy in most parts of the city conurbation”

**Work / education**
Most respondents commented on the high level of unemployment within the city centre, and this was a reflection on the poor performance of the local economy. The retail sector in the city centre was used as a point of reference for the stagnation of the local economy, coupled with high local unemployment:

“... some areas shops are closing down because of lack of visitors to the city ... there should be a lot more jobs in the retail sector”

However, another respondent felt that a great deal was being carried out to increase accessibility to employment and education within the city and that this marked a realisation that more had not been done previously. One of the programmes cited as being most valuable in this regard is ‘Joblink’, which aims to encourage people from the Pathways areas (i.e. places of high deprivation across Merseyside) to gain employment in other areas of Merseyside. This involves providing young people with public transport to attend job interviews, as well as attend regular employment. Establishing linkages between Pathways areas and the newer investment areas is a key part of the strategy in this regard.

It was also felt that although economic growth is to be welcomed, it can have a damaging effect on the environment within the city centre. An economic upturn will tend to increase the levels of traffic entering the city, although the local transport plan recognises this problem and encourages local people to use other means (such as Park and ride schemes) to enter the city centre.
Safety (including RTAs)
There was a general recognition of the work being done by all of the local authorities on Merseyside to improve road safety, and that this work also impacted upon Liverpool city centre. Road safety officers were working to develop safety programmes through running campaigns at regular intervals, and this was carried in the Local Transport Plan.

Similarly there was a keen awareness of the relationship between social deprivation and the incidence of road traffic accidents, and the impact this was having on statutory services:

“(road safety) is on community’s agendas and its high on the local authority’s agenda to actually try and do something about it”

Others felt that the incidence of road traffic accidents, particularly within the city centre, was not so much of an issue:

“accidents within the city centre is certainly not highlighted at the level of the road safety programme (although) there’s an accident investigation unit within each council and they will look at the black soots”.

However, there was a general sense that the city centre area was not easy to negotiate for pedestrians, and that this has created a public perception of a lack of safety. The scale of traffic on certain routes has added to this perception of a lack of safety. Furthermore, signage in the city centre is felt to be inadequate, and the underpasses around Lime Street station add to a sense of insecurity within the city centre. Initiatives being undertaken sought to address this problem by redirecting traffic along other routes so that pedestrians could feel safer in the city centre. This is one of the key issues being fed into the City Centre Management Strategy (CCMS):

“They’re going to put traffic on the back of Lime Street … I think its Seymour Street … Copperas Hill … which will make it easier for people coming into Lime Street to be able to walk across to the city centre”

In addition to providing a safer environment, CCMS also aims to improve the general urban environment. For pedestrians, this entails the provision of more attractive routes through the city, wider pavements, fewer numbers of cars on the roads, reduced levels of pollution and public seating so that people can take rests from walking.
6.3.2 Physical environment

Traffic
There was a general sense that congestion in the city centre is not as bad as in other areas:

“….. if you compare to Manchester you can easily see the difference”

The absence of much congestion within the city centre, apart from a short period in the morning and late afternoon, was partially due to the well-developed rail network covering the city centre. The underground loop system is particularly effective in this regard:

“we can certainly get to not very far from Central Station or Moorfields or Lime Street fairly fast”

The key traffic issue in the city centre is the haphazard design of the road network, which results in some of the roads cutting off important parts of the city centre from other parts. The Strand, for example, is seen as cutting off the main area of the city centre from the Pier Head or Lime Street. Other examples of poor road design are also highlighted:

“Renshaw Street cuts off the station and the university, parts of the shopping area, and they you’ve got Dale Street … Tithebarn Street … which seem to (have) too much traffic on them”

The CCMS recognises this problem, and the way that it deters people from circulating within the city centre. Forcing traffic out of the city centre is an integral part of the CCMS.

Another important issue that worsens the traffic situation in the city centre is poor traffic engineering. Local authorities in Liverpool have been accused of not developing enough policies to improve the flow of traffic. Other UK local authorities, as well as those in continental Europe, have developed dedicated bus lanes, so that buses can bypass all of the queuing traffic, as well as receive priority status at the traffic lights.

Such an approach would encourage bus transport (particular for motorists), and so enable a less polluted way of transporting people around the city. However, the absence of these policies at the local authority is seen to hamper the situation:

“if a bus is sitting in a traffic jam, engines tend not to be at their most efficient … and all the acceleration and deceleration that’s necessary to stop and start … uses a lot more fuel and produces a lot more pollutants than an engine running at a steady speed”
An associated issue is the lack of political will to tackle these issues, as well as to enforce those regulations aimed at inhibiting traffic congestion. Hanover Street, for example, was originally supposed to be for buses only, but cars frequently use it, leading to traffic jams, and the buses-only status of Hanover Street has not been enforced. This has important ramifications for safety issues in various parts of the city, due to the frustration that it creates for motorists. The absence of effective traffic light phasing means that not only are buses not prioritised over other forms of traffic, but that the lights themselves do not operate according to the levels of traffic at any given time. This leads motorists to "jump the lights", which is extremely dangerous for pedestrians:

"I have never seen a city where there is more traffic jumping than Liverpool …it's the worst city I've been in where people are 'amber gambling' and much of it is fuelled by frustration"

Accessibility
There are difficulties for both able-bodied and disabled people getting around the city centre, and this is largely a consequence of the design of the city centre, which is felt to inhibit pedestrian movement.

In relation to the needs of disabled people, the buses are all built to Disability Discrimination Act Access Standards, which means that there is a prescribed height for the entrance step. Other positive steps include the building of kerbs which can match the height of the bus step, so that there is virtually no step to get into the vehicle. Much of the bus interiors have no steps, certain seats are dedicated for elderly and / or disabled people, there are plenty of handrails and all modern buses in the city centre are now wheelchair accessible. All of this is regarded as extremely positive efforts to enhance accessibility.

Air Quality
Public perceptions of air quality issues are often made in the context of smoky buses, although the age of the cars and their low levels of maintenance has the more definite impact on producing poor air quality.

The poor quality of traffic management is seen as worsening the air quality in the city centre. Even where roads are clearly marked and lanes dedicated for buses, there is insufficient enforcement of the regulations. In London, for example, so-called 'red routes' are solely for bus travel, and where motor cars park on them, they are towed away by the traffic police in a matter of minutes. However, this is not the case in the city centre:

"in Liverpool, you can see bus lanes which are literally obstructed all day with parked vehicles and no-one makes the slightest attempt to move those parked vehicles"

Another stakeholder referred to the political context of air quality given that pedestrianising certain parts of the city centre will prove very unpopular with many people. Alternative measures, such as designing out traffic in certain stretches of road, merely shift the problem to another area. Consequently, air quality might improve in the area where traffic is reduced, but it will increase in the areas where traffic has increased. This stakeholder felt that opportunities for adopting a different
mode of transport (such as a tram) needed to be in place before draconian measures such as banning all traffic in certain areas.

**Travel behaviour**

Another important traffic issue, which is not solely related to the city centre of Liverpool, is the cultural fixation with the motor car. There is a widely held perception that car travel is the only option that is open to people, rather than being the consequence of a carefully planned mode of transport. Although various initiatives, such as the CATCH and tram projects have sought to encourage other travel modes, and various types of campaigns in schools and businesses, it is very difficult to challenge the social stigma attached to bus travel (less so for train travel). There is a clear generational divide: primary school children are very positive about the environment and the merits of public transport, but this recedes by their mid teens into a desire to own a motorcar.

There were some important issues raised regarding the anti-social behaviour of some bus commuters, and this is largely related to vandalism committed by younger people. Such behaviour is seen as having a very significant impact in discouraging people from using buses:

> "you get crowds of yobs who .. abuse the driver, they spit, they throw rubbish about, they create a lot of noise, a lot of hassle, they refuse to pay their fare … as a result evening services are not well patronised in a number of areas, not just the city"

Despite various initiatives to enhance passenger and driver safety, certain areas on the east side of the city are “best described as bandit country”.

**Noise**

Where noise is reported, it is not traffic related, but occurs as a consequence of flats being built next to shopping centres or nightclubs. It is the proximity of housing next to areas of different usage that is the main concern here. Occasionally there are also complaints about the noise from students returning home in the early hours.

**Cleanliness**

The problem of cleanliness relates mainly to the dumping of rubbish in certain residential parts of the city centre, and this is a significant problem. However, some communities have shown a lot of spirit in organising collectively to have this rubbish removed, as well as accessing funds to help with this removal. Another stakeholder highlighted litter as being of great concern to local people, particularly after the weekend. Anti-litter campaigns were an important part of the strategy to deal with this problem. However, this is not an issue only for Liverpool, and it is felt to be more of a cultural problem affecting most UK cities, where it is acceptable to drop litter rather than take it home if a bin is not available.

**Places / buildings**

Virtually all stakeholders mentioned the attractiveness of the buildings in the city centre, particularly Pier Head, St George’s Hall and some of the buildings along Dale Street. However, the local authority was felt to be at fault for not doing more to preserve many other attractive buildings which have been “left to rot” through
inaction. Many of these buildings – such as the Tobacco Warehouse in Stanley Dock – have been left to decline due to a lack of political will to save them.

One stakeholder commented on the successful Capital of Culture bid, and that the new investment into housing, roads and industrial / business type premises would improve the appearance of the city.

6.3.3 Services

Public transport
Key stakeholders have commented on the improvements in public transport, particularly in relation to buses. There is a sense that the ethos of the private market has forced privatised bus companies to offer improved quality to bus passengers, so comfort, cleanliness, better air quality, and improved accessibility have all become key features of an improved service. This has gone hand in hand with better designed vehicles, which provide air suspension (thus offering a more comfortable journey) as well as a quieter travelling environment (through better engine design).

A further positive has been the development of some new bus routes, and the success of drawing down some funds from central government to support this process. However, on the negative side, the development of a commercial ethos can mean that private sector transport providers can withdraw services just as easily as they are provided.

Transport planners
Transport planning is an extremely contentious issue amongst key stakeholders. There is a clear tension between those seeking to support the development of bus services, and the commercial operators who provide the service. This is seen as presenting an enormous obstacle to effective planning and management: whereas the service co-ordinator may recognise the importance of providing a service along a particular route for the local community, this does not guarantee the provision of that service. Commercial operators, whose focus is on maximising profit levels, do not share the public service ethos as represented by the statutory sector. Where services are not making a profit, they can then be curtailed, which can have a highly detrimental effect, particularly for people within the community (i.e. elderly, disabled people, benefit claimants) who are less likely to own a motor vehicle, and are more dependent than most on public transport:

“if they aren’t making enough money on a route, they’ll just stop running that route. They just register with the Traffic Commissioner they want to run on a route .... they run it, they find that they’re not making money, then they’re off”

One stakeholder argued that the public assumes that the organisation paying for the bus services is the same that operates them, but that is not the case. The resulting disenchantment felt by the public, and the lack of certainty whether services will or will not run fuels a general mistrust of transport planning. Although commercial operators are probably here to stay, if there were more control over the commercial routes that are run, the standard of vehicles used and a greater emphasis on keeping to timetables, then the public would be much more satisfied.

However, the bus operator stakeholder also recognises this dilemma, largely a consequence of the 1985 Transport Act, before which Merseytravel was both
provider and operator. Since deregulation in 1985, Merseytravel is purely the provider, while private sector organisations compete to operate the services. This means that the provider has become powerless to provide the integrated services that operate on continental Europe:

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“the ability to integrate ... transport such as in Munich where the bus, the tram, the trolleybus and the train all come together .. has gone out of the window”
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The role of planning, therefore, is less important due to the commercial imperative. The planning itself has become fragmented, and presently there is no real co-ordination of public transport services.

**Health services**

Some stakeholders commented on the lack of GPs in the city centre. Moreover, there was a sense that transport planning was not mindful of the need to integrate with health care planning, particularly when designing services. This links to the issue of accessibility, and particularly whether elderly people – who are without private means of transport – can access new hospital facilities.

**Police / traffic officers**

Some stakeholders spoke positively about relations with the police, and their role in preventing anti-social behaviour on buses through the work of plain clothed officers. On the other hand, traffic officers have been accused of not acting strongly enough in preventing cars from blocking bus routes, which is extremely frustrating for bus service providers.

The local authority, through the Citilink partnership, have taken control over monitoring parking offences from the police service, who are not perceived to have the number of staff to deal with such offences.

### 6.4 Organisational Stakeholders and Key Informants: Potential positive impacts of CATCH project

#### 6.4.1 Socio-economic environment

**Families**

Tasks 3 and 4 are about improving mobility around the city centre, and some stakeholders feel there is certainly potential for reducing social exclusion, helping families and supporting community life in this respect. Better air quality, a cleaner environment and helping people access facilities – all of this makes the city centre more attractive. Similarly the travel bureau (Task 4) has huge scope for giving people, especially new arrivals, the information they need to help get around the city. Another stakeholder remarked upon the benefits to asthmatics and others with respiratory difficulties as a consequence of reduced traffic.

One stakeholder remarked that the introduction of free travel passes could do a great deal to encourage people to travel more into the city centre, and this would help to enhance community social networks.

**Work / Education**
Other stakeholders feel that Task 2, with the development of the hybrid bus service, has the potential to positively impact on employment and education. The bus route will link the city centre with the Princess Dock, which is an expanding employment zone, as well as some educational establishments. This can support young people gain both employment and educational facilities. Students can also benefit through not having to pay taxi fares (as they are presently) to get into the city centre in the evening from north Liverpool.

Another stakeholder felt that a significant number of school travel plans had been developed, and so the CATCH project represented an excellent opportunity to work with the mobility information bureau and encourage children and families to find better, more sustainable methods to get to school other than by car.

Safety (including RTAs)
One stakeholder felt that the information bureau could also serve to enhance a sense of public safety, in that people might be inclined to socialise more in the evening, leading to greater safety in numbers from anti-social behaviour.

Another felt that a positive impact related to the opportunity to educate parents and families that most children are killed by motor cars rather than as a consequence of the school run. Consequently it is safer for children to go to school on the bus, and driving them to school is actually putting them at greater danger. The electric bus could challenge the dominance of the motor vehicle, and the benefits of healthier children walking or cycling to school and breathing fresher air – especially on a regular basis -is considerable.

6.4.2 Physical environment

Traffic
Another stakeholder felt that the positive benefits of CATCH could relate to slowing down the growth of a car culture, through the case that it makes for using the car less frequently. In this sense, CATCH is part of the process to reduce traffic by encouraging people to use public transport, and the potential for car clubs in helping this process offers considerable potential.

The key informant felt that the key to helping poorer families on heavily trafficked streets involved reducing traffic, yet this will not happen as a consequence of CATCH. Reducing traffic in this way would have a much greater impact, as it would encourage cycling, purely because the roads would be deemed safer. This will not happen as traffic speed is linked to a belief in strong economic growth. Radical measures are needed to genuinely discourage traffic and encourage walking and cycling:

“The only way to increase cycling and walking is to reduce traffic and / or give fully segregated cycle paths, along the Danish and Dutch design, and I don’t think that will happen..... Further measures to cut traffic involve a reduction in car parking spaces, increased costs of car parking and a London style congestion charge. ... hell will freeze over before Liverpool City Council will do any of this”
Travel behaviour

The potential for improving travel behaviour relates strongly to Task 3 and challenging the stigma of bus travel by providing potential customers with a modern, environmentally sound, state-of-the-art bus service. A stakeholder commented:

“by providing a sort of high quality environmentally friendly hybrid bus, wonderfully liveried; high tech; quicker ….. can aid the change in the perception of public transport in the city”

The key informant felt that more should have been done to slow down the vehicles, as a great deal of research has illustrated the benefits of reduced speed. At very low speeds, vehicles produce a lot of pollution, but at 20-30 miles per hour, there is the lowest level of pollution. Therefore a reduction in speed equals a reduction in pollution. Furthermore, far fewer pedestrians die when hit at 20 miles an hour. Consequently, reducing car speed equals reduced road traffic accidents. However, there is no mention of reduced car speed in any of the four Tasks.

Air quality

Through developing cleaner vehicles and the technology for improving air quality, a positive outcome will be that bus operators can be shown how they can improve their existing fleet, mainly through the technological developments. Although its impact may not be so great, its value in demonstrating how services can be developed is considerably greater.

Similarly, although there are only 89 buses in relation to Task 1, they will all have the particulate traps, their pollution levels will be monitored at the depot, en route and at the depot, and they will be the predominant buses on the corridor. The positive impacts will, therefore, relate to the establishing some guidance as to how much the air quality will have improve, even at the demonstration level.

However, a key informant commented that Tasks 1 and 2 were very much driven by technological advances (i.e. cleaner fuel and particulate filters) to improve air quality. Yet even new fuels produce pollution. There was a strong sense of cynicism about the ‘true’ aims of Tasks 1 and 2:

“their main value is to increase the profitability for companies that supply buses, so … it's a way of solving a problem that doesn’t need a technological solution”

More could be done for helping families and communities by encouraging walking and cycling.

Noise

One stakeholder felt that noise pollution would be reduced through the advent of the shuttle bus, which could have significant impact if the bus operators decide to run more electric shuttle buses.
6.4.3 Services

*Public transport (especially bus providers)*

Potential positive impacts relate to the potential re-regulation of bus services. This is dependent upon the electric hybrid becoming successful and commercially viable. If this occurred, then operators might decide to pursue such vehicles as standard buses. In the long-term, this could encourage central government to support some level of re-regulation, so that bus co-ordinators would be in a better position to organise bus services more effectively.

*Transport planners*

If the CATCH project is successful, in the sense that there are fewer particulate emissions and more people use the buses, it will support the partnership way of working that has supported the project. In this way, different parties will have greater confidence in working with each other, and more confidence in appreciating the concerns of other groups and their policy agenda, so that future developmental/project work can benefit.

One stakeholder felt that Task 4 offered very significant positive outcomes, particularly if the cycling strategy could be developed through better cycling lanes and cycle storage, so as to increase physical activity.

However, the key informant felt that much more needed to be done. Widening the width of pavements by threefold would enable the building of fully segregated, dedicated cycle lanes that would be very safe.

Furthermore, the key informant was very wary of seeing bus travel as a universal panacea for all ills. The key question for transport planners should be to ask where have the bus users come from. If many of them used to walk or cycle, then that is hardly a successful outcome:

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“is that a good thing? No … we have spent public money persuading people to stop doing things that are good for their health and good for communities. Walking and cycling stimulate community spirit and mutual surveillance…. If we get people off the streets and put them on buses, that’s gone”
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6.5 Organisational Stakeholders and Key Informants: Potential negative impacts of CATCH project

6.5.1 Services

Health services
One stakeholder noted that the route of the CATCH hybrid buses has not been designed to travel past health centres, as the emphasis has been on improving air quality, and not on developing the community’s access to health care services. The transport nodes have focused upon education and employment, not on health. This could be a potentially negative impact of CATCH: community health is about education and employment, but it is also about access to health care services. Users of the hybrid bus, who require specific health care locations, may find that the shuttle bus does not accommodate their needs.

Transport planners
Another stakeholder felt that, despite the benefits of joint working with other partners to carry forward the CATCH project, it would have been better to have had the land use planners in the local authority as the lead partner. The lead partners have been the transport planners, and as it is principally a transport project it seemed natural to lead with transport officers. However, in hindsight, given that CATCH is about much more than transport, the land use planning team have a much better awareness of the whole economic regeneration context of what is happening. The CATCH project is about much more than the introduction of a bus service, and the land use planners would have had a more holistic understanding of what could be achieved, whereas the transport planning team focus purely on transport issues.

6.6 Community Stakeholders: Perspectives of Liverpool

6.6.1 Socio-economic environment

Families / communities
Communities recognised that these are strong, but also that families are often under a lot of pressures.

Crime
Many stakeholders commented on vandalism, crime and anti-social behaviour, and the damage that this causes to people’s sense of security.

Work / education
Community stakeholders recognised that high unemployment and low educational attainment led significant numbers of young people into trouble with drugs and alcohol. There was a strong sense that these damaging influences had had a painful impact upon community life, and the ability of families to remain united. Keeping children away from the dangerous influences of criminal gangs was a difficult task, particularly when the employment prospects are so poor.

Safety
Public safety is seen as having got worse, especially on public transport late at night. There were also concerns from older people about the anti-social behaviour
of young people - this actually prevents people from venturing outside their own home.

6.6.2 Physical environment

Traffic
The congestion caused when the football team played at home was seen as a malign influence, with the football crowds treating the area with disdain through throwing rubbish. There is a strong connection with the crime issue, as many cars are broken into during football matches.

However, there was a general recognition that the authorities were trying to improve the situation through traffic calming measures, which can slow the traffic down.

Land-use planning decisions were seen by many as having encouraged the growing dependence on cars, ample car parking accompanying food retailers.

"...in Manchester I know they've introduced quite expensive parking fees in the City Centre and people are now tending to go out to Trafford Park."

Accessibility
Disabled community stakeholders commented that many local traffic nodes were often inaccessible, and wheelchair users found that lifts were often out of order, particularly at train stations. This had a huge impact on community and social life, as disabled passengers needed to ask for assistance when they did not wish to do so.

Access to goods and services were also seen as affected by transport, with choices of eg good quality food very restricted if you were reliant on public transport.

Air Quality
Air quality is regarded as very poor, partially due to industrial plants being located nearby, and the unpleasant odours they produce. Furthermore, many people come from outside the area and dump discarded rubber tyres, which the local youths then use to ignite after the football has finished, causing terrible odours to be released into the environment. It was suggested that the damp exacerbated the poor air quality and may actually prevent pollutant dispersal.

"The trouble is you can't see [air] pollution; it needs a long-term solution and unfortunately, with governments, they tend to have at the very outside, a five-year horizon."

Cleanliness
Wheelchair users complained that the lack of cleanliness had serious repercussions for them in terms of public safety. Discarded chip wrappers and cans / bottles are easily able to get caught up in the wheels, which can sometimes jolt wheelchair users out of their wheelchairs.

6.6.3 Services

Public transport, especially bus providers
Disabled residents complained that electrical ramps were often not working effectively, so it became difficult for wheelchairs users to access buses. There was also much criticism of bus drivers who, due to the pressures of keeping to timetables perceived to be too rigid, do not always stop to pick up wheelchair users. Similarly electrical ramps on buses do not always function correctly. It was apparent that for disabled people, particularly those in wheelchairs, there are considerable barriers to travelling by public transport, including attitudes to disabled people by passengers and providers, information about services, and physical access on to and in buses (but also trains). This affected disabled people's mobility and ultimately their quality of life.

The reliability, frequency and general inconvenience of using local buses was a reason some older people gave for not using public transport. There was wide-ranging knowledge of public transport systems abroad and other cities nationally; it was thought that similar could bring real benefits to Liverpool.

The deregulation of bus services in the 1980s was felt by many to have been detrimental for public transport in Liverpool. Some people felt there were attitudinal problems of some transport providers; it was suggested that there needed to be more rigorous contracts, which should be enforced to help improve reliability, for example.

Transport planners

One group of stakeholders were extremely critical of public transport, arguing that it is currently much more unreliable than before deregulation, when a better public service ethos persisted. There are seen to be too many companies, and there is a lack of faith in what the service can provide, both in terms of timetabling and quality. Some stakeholders felt that the drivers' slavish obedience to timetables creates a less supportive, more aggressive service. Furthermore the cost of travel was prohibitively expensive, particularly for families:

“you walk or it’s a pound from here to town, fifty pence for each kid, you’ve got three kids - two and a half quid there, - two and a half quid back…. Before they can actually go anywhere, they want five pounds just to go and do something”

There was also a sense that the conduct of buses is not as effective as it might be, particularly in relation to looking after older passengers, and allowing them to sit comfortably before starting off.

Wheelchair-using passengers complained that some bus drivers did not stop to pick them up. Similarly the local authority was seen to adopt a haphazard approach to maintaining roads and pavements: in some areas, dropped kerbs were at the right level for wheelchair users in some areas, but not in others. Similarly, not enough was being done to challenge able-bodied motorists parking in areas reserved for disabled motorists (those displaying blue badges), and this issue is critical for disabled motorists given the inadequacies of the public transport system in supporting them to travel around Liverpool.
Police / traffic officers
The police are seen as turning a blind eye to anti-social problems in the city centre. This can be due to other police priorities, but it creates a sense of insecurity.

6.6.4 Health
A number of respondents referred to the poor health in Liverpool, particularly of older people:

‘...respiratory problems in Liverpool are reputed to be one of the worst in the country.’

Poor respiratory health was largely attributed to the industrial history of the City, as well as local climactic conditions, but poor air quality derived from road traffic was also blamed. It was believed that a 'proper transport system' would help improve this.

Mild mental health problems, such as stress were also mentioned to be common in Liverpool; links to transport included making the journey itself - anecdotes indicated that there was often poor information on public transport services available which makes it difficult to plan a journey and stressful to make the journey. This was particularly so for older and disabled people.
6.7 Community Stakeholders: Potential positive impacts of CATCH project

6.7.1 Socio-economic environment

Families / communities
Community stakeholders felt the CATCH project could help families get about Liverpool more easily, but that more imaginative means could be used to encourage football supporters to park and ride outside the city, or else use the electric shuttle bus (or something like it) to ferry people to football grounds. This would reduce the congestion for the residents of the Anfield and Everton regions, so that levels of safety are increased. Such an initiative would also reduce car crime in the region.

Access to information
In general terms, community stakeholders felt there was some merit in the technological parts of the CATCH project as represented by Task 1. However, the greatest potential seemed to lie with the information bureau (Task 4) and enabling people to get about the city centre, as well as the electric shuttle bus. Where the bus was seen to be reliable and cost effective, it was seen as offering real potential for getting people out of their cars.

6.7.2 Services
It was generally held that schemes such as CATCH would effect the nature of public transport in Liverpool for the better and that eventually this would result in increased public transport use.

6.8 Community Stakeholders: Potential negative impacts of CATCH project

6.8.1 Socio-economic environment

Accessibility
One stakeholder felt there was insufficient emphasis on the accessibility aspect, in that many people were unable to get to buses in the first place. An associated issue is the costing, which some felt would be prohibitively so if the hybrid buses were to run effectively.

Mobility
There were particular concerns from older people and people with disabilities about the effects of increasing pedestrian priority areas; if this means reducing parking in the City centre for people with physical mobility issues this would be detrimental to their quality of life.

Local economy
Some were concerned that the restrictions to car users in the City centre such as high car parking fees may deter some from coming into the City to shop.
6.8.2 Services

Public transport providers
These need to be much more considerate of people’s needs, particularly those people from ethnic minorities for whom English might be a second language. In a general sense, they need to be much more considerate, or else people will still be deterred from using the buses.

Similarly, people will not be coaxed from their cars unless the bus providers can guarantee reliable services where buses can stick to timetables. Where this does not happen, car users become very disenchanted and disillusioned with the services they receive.
SECTION 7: IMPACT ANALYSIS

7.1 Introduction

7.1.1 Data from the profiling, policy analysis and from the fieldwork have been collated and analysed to identify evidence of the potential health impacts of the CATCH project on the population most likely to be affected by the scheme. Approximately 18 interviews and focus groups were conducted with community and organisational stakeholders, as well as with key informants, independent witnesses with expertise in transport or transport and health.

7.1.2 The matrices below define the Potential Health Impacts of the scheme on different health determinants and their subsequent effect on health outcomes (the impacts on health status are described after the impacts on health determinants and follow the arrow symbol \( \rightarrow \)). The Direction indicates whether this impact is a health gain (+) or loss (-). Scale is a measure of the severity of the impact (in terms of effects on mortality, morbidity and well being) and the size/proportion of the population affected - is represented by the number of symbols as follows:

<table>
<thead>
<tr>
<th>Severity/population proportion</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>---- or +++</td>
<td>---- or +</td>
<td>-- or ++</td>
</tr>
<tr>
<td>Illness/injury</td>
<td>--- or +++</td>
<td>-- or +</td>
<td>- or +</td>
</tr>
<tr>
<td>Well being</td>
<td>-- or +</td>
<td>- or +</td>
<td>negligible</td>
</tr>
</tbody>
</table>

As the CATCH project is a demonstration project it needs to be recognised that the populations affected are small.

7.1.3 The Likelihood of impact describes the probability that the impact will occur. The likelihood can be definite (in the case of retrospective HIAs), probable, possible or speculative - which in turn relates to the strength of the evidence. Where there is a close correlation between evidence from all data sets (which includes published literature and information from stakeholders/key informants), this is regarded as strong evidence. In addition to the analysis of the potential health impacts on the population as a whole, the potential impacts on health inequalities are also discussed. The impact analysis considers the operation of the CATCH project.

In addition to the analysis of the potential health impacts on the CATCH 5-ward population as a whole, the potential impacts on health inequalities are also discussed.

The impact analysis considers the operational phase of the scheme.
### 7.2 Potential Health Impacts: Individual, family and lifestyle factors

#### 7.2.1 The potential health impacts on individuals, family and lifestyle due to CATCH are summarised in table 7.1

**Table 7.1 Individuals and families: Summary of potential health impacts**

<table>
<thead>
<tr>
<th>Potential Health Impacts</th>
<th>Direction/Scale</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CATCH 5-ward Population</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase in mobility (Tasks 2, 3, 4)</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td>New city centre shuttle services introduced enhancing mobility. High demand for mobility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>maintained. Increase in independence and well being from increased mobility.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase in physical activity (Tasks 2, 3, 4)</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td>Increase in walking, cycling with new facilities and services reductions in risk of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>obesity, hypertension, diabetes (type 2), heart disease etc from increase in activity -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>health outcomes not quantified. Increase in mental well being.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase in personal safety (Task 3, 4)</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td>Contributes to reductions in risk of road traffic accidents from restrictions in road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>traffic reduced risks of fatalities and serious injuries (KSIs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase in healthier travel behaviour (Tasks 1-4)</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td>Some car journeys converted to bus, walking or cycling and/or multi-occupant car</td>
<td></td>
<td></td>
</tr>
<tr>
<td>journeys (‘car clubs’). Some walking converted to shuttle bus journeys.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Inequalities within CATCH wards</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Older people and people with disabilities will benefit least from additional City</td>
<td>-</td>
<td>Probable</td>
</tr>
<tr>
<td>centre shuttle service and facilities promoting physical activity.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• People on low incomes may benefit less from City centre shuttle service if fares</td>
<td>-</td>
<td>Possible</td>
</tr>
<tr>
<td>policy prohibits use. This has mobility implications.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• BME groups may benefit less from information service if diversity needs not provided</td>
<td>-</td>
<td>Possible</td>
</tr>
<tr>
<td>for eg translation, interpretation service. This has mobility implications.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Inequalities between CATCH wards and Liverpool</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Working populations coming into the City centre may particularly benefit from City</td>
<td>-</td>
<td>Probable</td>
</tr>
<tr>
<td>centre circular route.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Lower proportion of CATCH population likely to switch to healthier transport mode,</td>
<td>-</td>
<td>Probable</td>
</tr>
<tr>
<td>compared to elsewhere in Liverpool as currently high proportion (25.2%) of CATCH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>population walk or cycle to work compared with 18.1% for Liverpool as a whole.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.2.2 Mobility

It is highly probable that CATCH will increase mobility for some people who live in the CATCH 5-ward City centre area. Tasks 2, 3 and 4 include a range of actions that will facilitate this. For example the new hybrid City centre shuttle bus service, the contribution to the City centre movement strategy which will enhance traffic circulation whilst developing pedestrian priority areas, the introduction of facilities and services to support sustainable integrated travelling and modal switches from cars to healthier travel modes.

There is a trend of increasing mobility. This reflects changing work, leisure and social patterns. CATCH actions will contribute to the growing demand for mobility as evidenced from stakeholders and policy analysis. Through this increased mobility, access to employment and education opportunities will be facilitated as well as social inclusion and networking. The potential health benefits relate to eg, the increased opportunities for work and social support, which is discussed below.

7.2.3 Physical activity

CATCH is likely to contribute to increasing physical activity in some sections of the CATCH population through initiatives, services and facilities that promote walking and cycling, and the prioritisation of the pedestrian and cyclist (tasks 2, 3 and 4). CATCH complements and reinforces other strategies and measures, eg the walking and cycling strategies.

Physical activity is a risk factor for coronary heart disease. Regular, moderate exercise (5 times a week for 30 minutes so slightly out of breath) has both short and long-term cardio-protective effects, including preventing obesity, strengthening the heart muscle and reducing blood pressure. It also has metabolic effects such as improving cholesterol and fibrinogen levels and insulin sensitivity (Morris & Hardman, 1997). Most recently concerns about the alarming trends in obesity have focused attention on the importance of physical activity. Physical activity is also known to have mental health benefits and can limit the progression of osteoporosis in women.

The CATCH area has an SMR of 196 for heart disease that is nearly twice the national rate. Action to address this burden of disease including preventative action is a priority at national and local levels.

7.2.4 Personal safety

The probable increase in personal safety for pedestrians and cyclists in the City centre is particularly related to task 3, the traffic restrictions and prioritisation of pedestrians and cyclists over motor vehicles in certain areas. The reduction in exposure to motor vehicles will potentially reduce the risks of accidents associated with walking and cycling in the City centre.

Pedestrian road deaths are highest in children, older people and poorer families (social class V). Cyclists are at risk at all ages. Reducing casualties from road traffic accidents in children and in disadvantaged groups are indicators for 'Transport 2010' and 'Tackling Health Inequalities'. 
7.2.5 Healthier travel behaviour

It is highly probable that CATCH will facilitate a net gain in travellers switching to healthier travel modes, however this is likely to be on a small scale. Tasks 1-4 may contribute to some car journeys being converted to bus, walking, and cycling journeys as well as some multi-occupant car journeys through the establishment of car clubs/sharing schemes. Conversely there may also be some walking journeys that are converted to shuttle bus journeys. It is recognised, however, that motivational and behavioural changes have not been very successful in the past (Towner et al, 1993; BMA, 1997) so the package of measures at policy and structural levels as well as targeted at individuals will help to maximise their effect. For sustainable changes to travel behaviour, evidence from the literature (eg Lex, 1999; Stokes, 1996; Curtis & Cary, 1997; Steg & Vlek, 1996) and supported in many areas from the CATCH baseline surveys suggests several factors need to be tackled simultaneously:

- stops need to be within easy walking distance,
- access to free parking (if multi-travel mode),
- competitive public transport fares,
- competitive travel time,
- frequent service (to reduce travel time, convenience),
- safety on public transport,
- reliability,
- convenience,
- safe cycle paths,
- cycles loans/cycle lock-ups,
- restricted access to cars,
- information about transport effects and alternatives,
- integration (if multi-travel mode)

The impacts of the change in travel behaviour on health depend on the relative changes in travel modes, and there were insufficient data from the project on this. Travel behaviour impacts indirectly on health by acting on the causal mechanisms for various diseases, eg physical activity and heart disease, air pollutants and respiratory and heart disease.

7.2.6 Health inequalities

The importance of the assessment of health inequalities cannot be underestimated. Whilst health status as measured, eg by life expectancy at birth has increased over the past 30 years, the gap between life expectancy for some groups eg, social class I and V is getting wider. For example, in 1997-99 the difference in life expectancy between 'professional' and 'unskilled' people was, for women, 5.7 years and, for men, 7.4 years. Between 1972-76 and 1992-96 the gap between these social classes widened from 5.5 years to 9.5 years and then narrowed again by 1997-99. The impacts of CATCH on the 5 ward area whilst generally positive for the population as a whole, may have less benefits for certain population sub-groups. Health inequalities are relative measurements. The benefits of CATCH for some groups over others means there may be a widening of the inequalities between the groups although the impacts may have been assessed as health gains for all groups.

The mobility needs for older people and people with disabilities are different from the general population, eg evidence from stakeholders indicated that pedestrianised areas which restrict vehicular access for people with mobility impairments further...
restricts mobility. It was also unclear whether the shuttle buses would have disabled access. Similarly whilst the walking measures such as improved routes, networks and paths may benefit some, cycling measures are less universally applicable.

People on low incomes were also felt to be potentially disadvantaged if the fares policy introduced for the shuttle service was prohibitive. Evidence from the literature indicates that mobility may be affected by the relative differences in travel costs.

BME groups in the CATCH area, approximately 15% of the CATCH population, were also assessed as less likely to benefit from eg the CATCH information services, which need to consider diversity needs such as translation and interpretation services.

Evidence from the profiling data indicates a high percentage of the economically active population in the CATCH wards already walks or cycles to work; 23.5% compared with 10.6% for Liverpool. This suggests there may be less scope for increasing the proportion of the CATCH population that walk to work as their primary transport mode. There may be greater opportunities to convert car journeys to a healthier travel mode with working populations on the periphery of the City centre.
7.3 Potential Health Impacts: Socio-economic environment

7.3.1 The potential health impacts on socio-economic factors due to CATCH are summarised in table 7.2.

Table 7.2 Socio-economic factors: Summary of potential health impacts

<table>
<thead>
<tr>
<th>Potential Health Impacts</th>
<th>Direction/Scale</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CATCH 5-ward Population</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase in social support (Tasks 2, 3, 4)</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td>Enhancing social networks by increasing mobility contributes to increases in social support (stress 'buffers') short term: improves physical and emotional well being; longer term: reduces risk of heart disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Enhances local economy (Tasks 2, 3, 4)</td>
<td>+</td>
<td>Possible</td>
</tr>
<tr>
<td>Contributes to reduced vehicle access in City centre, restricted movement of goods, but improves traffic flow around City centre. Enhances access to jobs for workforce from additional bus service, public transport corridor. Enhanced local economy stimulates job creation, increasing employment. Employment is 'health enhancing', associated with reduced risk of premature mortality (3 excess deaths for every 2000 unemployed men), physical and psychological ill health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase in access to people and places (employment, education) (Tasks 2, 3, 4)</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td>Increased access due to additional/enhanced public transport services; reduced access to certain areas by motor vehicles.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Health Inequalities within CATCH</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Older people and disabled people will benefit least from networking and social support as their mobility will be least enhanced compared with the CATCH population as a whole</td>
<td>-</td>
<td>Probable</td>
</tr>
<tr>
<td>• People on low incomes may benefit less from City centre shuttle service if pricing policy prohibits use. This has access and networking implications</td>
<td>-</td>
<td>Possible</td>
</tr>
<tr>
<td>• BME groups may benefit less from information service if diversity needs not provided for eg translation, interpretation service. This has access and networking implications</td>
<td>-</td>
<td>Possible</td>
</tr>
<tr>
<td><strong>Health Inequalities between CATCH wards and Liverpool</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Working populations coming into the City centre may particularly benefit from City centre circular route.</td>
<td>-</td>
<td>Probable</td>
</tr>
</tbody>
</table>
7.3.2 Social support

There is evidence from stakeholders and the literature that indicates CATCH will probably contribute to increasing social support within the 5-ward area; however this will be on a small scale. It is likely to achieve this by enhancing mobility. Restricting traffic may also contribute to increased social contacts and enhanced community ties.

Various epidemiological studies (Berkman & Syme, 1979; House et al, 1988; Stewart-Brown, 1998) show that social support - the extent and support of personal networks - can protect against premature mortality, prevent illness, and aid recovery. Social support works either directly by promoting well being, or indirectly by buffering the adverse effects of stressors. Low levels of social support have been linked to increased mortality rates from all causes: people with few social contacts may be at more than twice the risk of those with many contacts. Evidence indicates that lack of social support can increase mortality from heart disease by up to four times (Greenwood et al, 1996). In addition depression and lack of social support have been shown from systematic reviews to be independently associated with increased risk of coronary heart disease (Hemingway & Marmot, 1999). Social networks, integral to social support, are a vital part of social capital, described as the 'glue that holds societies together' (Grootaert, 1998). However in addition to these personal interactions are the links with institutions, and the distribution of power or social control. The World Bank has described this as the 'missing link' in social and economic development.

7.3.3 Local economy

There is some evidence from the literature indicating that the local economy may be enhanced as a result of the CATCH measures introduced. Whilst there will be restricted vehicle access in the City, congestion is likely to be reduced and the traffic flow around the City will be improved.

Evaluation of congestion measures by businesses in London and elsewhere indicated that whilst there was a restriction in vehicle access in the City the majority of those surveyed identified wider economic factors as affecting business performance. This supports the SACTRA report on transport and the economy whichlinks economic growth with traffic growth and not road traffic growth.

The health effects of the economy are mediated through employment: a vibrant economy is essential to creating and maintaining jobs, as well as resourcing public services. There is a wealth of evidence showing the causal relationship between unemployment and health, but also work and health. The health effects of unemployment have been reported in many studies. An effect is found even when social class and behavioural factors such as smoking are taken into account. Unemployment tends to affect both physical and mental health. The British Medical Association (1998) reported that male unemployment causes three excess deaths for every 2000 unemployed men. The Acheson Report (1998) found that unemployed people had lower levels of psychological well being, ranging from depression and anxiety to self-harm and suicide. Gerhsuny (1994) and Bartley et al (1999) showed that improvements in psychological health were not immediate on their return to employment. A recent review of a number of studies showed a higher prevalence of ill health and excess mortality for both men and women who are unemployed (Bartley et al, 1999). Interestingly, Gallie et al (1994) found that unemployed people whose social networks largely consisted of other unemployed
people found it 'more difficult to escape from unemployment itself.' Unemployment also has an indirect affect on health via health determinants - it affects family income levels, which affects nutrition and housing, as well as being associated with risk-taking behaviour.

7.3.4 Access to people and places
CATCH will contribute to enhancing access to people and places, including education and employment, through the additional public transport services, but also from information and support with travel plans.

Access impacts indirectly on health by acting on the disease causal mechanisms, eg access to jobs affects employment which has various health effects. Evidence from the literature and document analysis (SEU, 2003) indicates that:

- 2 out of 5 job seekers say lack of transport is a barrier to getting a job.
- 1 in 4 say the cost of transport is a problem in getting to interviews
- 1 in 6 not applied for a job because of transport problems (16–25 year olds 1 in 4)
- 1 in 10 turned down a job
- People with a driving licence are twice as likely to get a job than those without

7.3.5 Health inequalities
As indicated above older people and people with disabilities will benefit least from the enhanced mobility that CATCH provides, and so will also not benefit from the associated social networking that this facilitates. This applies to BME groups and people on low incomes who also may benefit less from enhanced mobility.
### 7.4 Potential Health Impacts: Physical environment

**7.4.1** The potential health impacts on physical environment factors due to CATCH are summarised in table 7.3.

<table>
<thead>
<tr>
<th>Potential Health Impacts</th>
<th>Direction/Scale</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CATCH 5-ward Population</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Reductions in rate of road traffic growth and congestion (Tasks 2, 3, 4)</td>
<td>++</td>
<td>Probable</td>
</tr>
<tr>
<td>Reduction in rate of growth (predicted 1.052 in 2005) and congestion of road traffic by promotion of healthier transport modes, change in travel behaviour, restricted vehicle access, change in traffic flows</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Improvements in Air Quality (Tasks 1-4)</td>
<td>+++</td>
<td>Probable</td>
</tr>
<tr>
<td>Reductions in general road traffic-generated and bus-generated air pollutants (Task 1): NOx, PMs, CO, VOCs</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reductions in NOx to bring within NAQS</strong></td>
<td>+++</td>
<td>Probable</td>
</tr>
<tr>
<td>Prevent ‘sensitising’ asthmatics, people with Chronic Obstructive Pulmonary Disease reducing risks of reduced lung function and morbidity (WHO, 2003)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reductions in ground level O3 generated</strong> (resulting from NOx photochemical oxidation in the presence of VOCs)</td>
<td>+++</td>
<td>Probable</td>
</tr>
<tr>
<td>Reductions in risk of deaths brought forward eg asthmatics (+ 0.6% per 10 ug m⁻³ 8-hour mean O3 concentration (above 100 ug threshold) m⁻³) (COMEAP, 1998).</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reduction in O3 ‘scavenged’ by NOx as less NOx</strong></td>
<td>-</td>
<td>Speculative</td>
</tr>
<tr>
<td><strong>Reductions in PMs</strong></td>
<td>++</td>
<td>Probable</td>
</tr>
<tr>
<td>Reductions in risk of deaths brought forward (+ 0.75% for a 10 ug m⁻³ increase in PM concentrations (no threshold)) (COMEAP, 1998).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Inequalities</td>
<td>++</td>
<td>Probable</td>
</tr>
<tr>
<td>CATCH will contribute to reducing the health inequalities experienced in the 5 wards due to road-traffic generated air pollution.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groups most vulnerable to poor air quality: Children, pregnant women, people with existing heart or respiratory disease, older people, ‘responders’ (people who are susceptible to allergic responses from pollutants)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Reductions in outdoor air pollutants will help prevent lung damage in the future.
7.4.2 Road traffic
CATCH may contribute to reducing the rate of growth of road traffic within the City centre as well as reducing congestion. It will achieve this by reducing motor vehicle use and access, changing traffic flows around the City and by the promotion of healthier transport modes - walking, cycling, public transport.

Evidence from the initial evaluation of congestion measures in London showed:
- 20% reduction in total traffic in the City charging zone
- 16% reduction of traffic circulating in the charging zone
- traffic in the inner ring road at pre-charging levels
- increase in speeds of buses and cars in charging zone

There are various health-related benefits associated with reduced vehicle volumes including reductions in RTA casualties, reductions in road traffic-generated air pollutants, reductions in noise levels. However, it was unclear from project data the extent of the reduction in traffic growth from CATCH. The health benefits from improvements in air quality are described below.

7.4.3 Air quality
Evidence from the documentary analysis and stakeholders indicates that CATCH is likely to have a net reduction in road traffic generated air pollutant emissions. This is the most significant of CATCH's health impacts by virtue of the potential scale, and also their latency with both short and long term health effects. The reduction in emissions is due to the reductions in traffic (as described above) as well as lower emission levels from 10% of the bus fleet operating in the City centre. Specific air pollutant reductions are expected in:
- NOx
- PMs
- CO
- VOCs/HCs

The strict limit values that buses and other heavy vehicles must comply with by 2005 and 2009 (EC, 1999), reflects that they make up the largest share of NOx and PM emissions. The technological measures applied to the buses will contribute to achieving these new limit values. However the literature indicates that new technologies have in some cases inadvertently generated new pollutants in attempts to reduce others. It is suggested that the generation of ultra fine particles and the growing evidence of their health effects should be monitored. As a new service the new hybrid bus shuttle may potentially generate pollutants; however in the absence of data on the extent of these anticipated emissions it is assumed that these will be negligible with the electric mode operating in the City centre.

*Nitrogen Dioxide*
Reductions in NOx will contribute to bringing NO2 concentrations within NAQS in the City centre. This in turn will have various beneficial health effects, both direct and indirect. The literature (WHO, 2003; WHO, 2000; WHO, 1999) indicates the main adverse health effects (decrease in lung function) from exposure to low levels of NO2 (380–560 µg/m3; 0.2–0.3 ppm) are on people with pre-existing respiratory conditions (chronic bronchitis, COPD, asthma). Healthy individuals are rarely affected at these levels, although exercise involving oral inhalation can exacerbate the response as the nasal cavity removes approximately 40% of NO2. This also has the potential to affect medication and hospitalisation rates. In the longer term
reductions in NO₂ may also protect against lung damage in children. It has been suggested that there are complex interactions between NO₂ and PMs, which facilitate PM absorption. Similarly NOx in the presence of VOCs and sunlight generate ozone.

**Ozone**
The reductions in NOx and VOCs will contribute to reductions in the generation of ground level ozone. In the presence of high levels of NOx, such as urban or City centres, O₃ is scavenged, and so often has low concentrations here but higher concentrations in suburban or rural areas. The reduction in NOx in the City centre therefore could potentially increase O₃ here; this is highly speculative but it may be appropriate to monitor concentrations in the City centre. Evidence from the literature shows that O₃ is directly responsible for adverse health effects over short and long term exposure periods. In the short term both healthy and asthmatic individuals were affected; this was exacerbated when they exercised (increased inhalation). Although current guidelines give a threshold of 100 ug/m³ with an increase in deaths (0.6%) brought forward for each additional 10 ug/m³, recent evidence suggests this should be revised to remove any threshold and also to issue complementary guidelines concerning physical activity when O₃ levels are above current guideline levels. In addition to the short term health effects of increased asthma incidence, reduced lung function, and premature mortality (some evidence indicated within a day of exposure), long term effects include damage to lung function growth and increases in lung cancer and total mortality (in association with PMs). Increased hospitalisation and medication use for respiratory morbidity was also associated with O₃ exposure.

**Particulates**
It is highly probable that total particulate emissions will reduce with the CATCH measures. This refers specifically to reductions in coarse particles or PM₁₀. It is less clear whether the concentrations of particulates smaller than this will be reduced by the technological measures introduced. As such it is strongly recommended that CATCH monitor PM₂.₅ as well as PM₁₀ emissions from the retrofitted buses. PM₁₀ has a different mechanism of action than fine or ultra fine particles (PM₂.₅ or less) and also may have different composition, e.g. kerbside PM₁₀ is mainly mineral based where as PM₂.₅ is carbon based. Whilst there is strong evidence for short and long term respiratory health effects of PM₁₀, there is now also evidence of the cardiovascular effects of PM₂.₅. This has led to recent calls for a new guideline for PM₂.₅ (WHO, 2003). As previously mentioned the short-term respiratory effects include cough, respiratory symptoms, and reduced lung function with an associated increase in bronchodilator medication use and respiratory hospital admissions. Longer-term effects include increased total mortality (an increase of 0.75% for each additional 10 ug/m³) and mortality from lung cancer, COPD, reduced lung function and other chronic conditions. People with pre-existing heart and respiratory conditions are most vulnerable, as are people from lower socio-economic groups. This suggests that the CATCH population will particularly benefit from the reductions in PMs.

### Health inequalities
The reduction in traffic generated air pollution will particularly benefit the CATCH population. Reductions in NOx, where concentrations are greatest near road networks, and PMs, which effect poorer populations and those with pre-existing conditions, contribute to reducing risk factors in the area. However because of the
nature of air pollutants, reductions will also benefit other areas of Liverpool. Potentially lower levels of $O_3$ will have particular benefits for suburban areas.

7.5 Potential Health Impacts: Public services

7.5.1 The potential health impacts on public services due to CATCH are summarised in table 7.4.

<table>
<thead>
<tr>
<th>Potential Health Impacts</th>
<th>Direction/Scale</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CATCH 5-ward Population</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Reductions in demand for health services (Tasks 1-4)</td>
<td>+</td>
<td>Possible</td>
</tr>
<tr>
<td>Reduced risk of respiratory-related morbidity (reductions in hospital admissions, medication)</td>
<td>+</td>
<td>Possible</td>
</tr>
<tr>
<td>• Health service access (Tasks 1-4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some increase in access to health services where shuttle route passes. Increase in performance of emergency services as a result of reduced traffic congestion, eg, ambulance attendance times.</td>
<td>+</td>
<td>Possible</td>
</tr>
<tr>
<td>• Public transport (Tasks 1,2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enhanced public transport service and patronage. Support proliferation of electric and hybrid buses as standard.</td>
<td>+</td>
<td>Possible</td>
</tr>
</tbody>
</table>

7.5.2 Health services

It is possible that there will be a reduction in respiratory and circulatory hospital admissions due to reductions in traffic-generated air pollutants, however the scale of this due to CATCH is expected to be small. These would most likely be reductions in emergency medical admissions, which would help Hospital Trusts, and PCTs meet performance targets. It is not possible to estimate the extent of this without estimates of reductions in ambient pollutant concentrations due to CATCH. In the UK, exposure to particulates is estimated to be responsible for 10,500 hospital admissions (brought forward and additional) for respiratory diseases per year (COMEAP, 1998); similarly 500-9,900 hospital admissions are due to ozone exposure (COMEAP, 1998). There is also likely to be a reduction in medication use (eg bronchodilators), which could also be potentially estimated. The increase in physical activity may also have small-scale immediate benefits to primary health services, eg helping with diabetes management and managing some mild mental health problems. There also needs to be awareness of potential implications of accidental injuries associated with cycling in particular, the implications for services in treating these injuries, and measures taken to reduce them, eg the use of safety equipment (helmets).
7.5.3 **Access to health services**
There may be some increase in access to health services, eg along the shuttle bus route. However older people, people with disabilities and others who may not be able to make use of this service will not benefit from this increase in access to health services. Evidence from the documentary analysis (SEU, 2003) shows that:

- 31% of people without a car have difficulties travelling to their local hospital compared to 17% with a car
- 7% say they have missed, turned down or chosen not to seek medical help because of transport problems.

In addition emergency services including ambulances may benefit from CATCH by the reductions in congestion and vehicle access and use in the City centre which will help with performance targets such as attendance times.

7.5.4 **Transport policy and services**
As a demonstration project CATCH has the opportunity to evaluate the effects of a comprehensive package of sustainable, green public transport interventions: new technologies and alternatively powered public transport vehicles, pedestrian/cyclist priority areas, services and facilities, restricted vehicle access and use. Depending on the evaluated effectiveness of the interventions, there is the potential of having a much wider uptake of these measures within and beyond Liverpool, Naples and Suceava.

Associated with the introduction of London congestion charging the following effects in public transport were evaluated:

- 12% per day increase in bus patronage
- 19% increase in buses
- a reduction in waiting time for buses
8.1 Conclusion

8.1.1 CATCH is assessed as potentially contributing to improving health in the 5 ward City centre area of Liverpool. It will achieve this through impacts primarily on the following health determinants/health risk factors:

- Reductions in traffic generated air pollutants - N0x, PMs, VOCs and indirectly \( O_3 \)
- Increases in physical activity - walking and cycling

The potential positive impacts on health outcomes result from the reductions in risks associated with respiratory and cardiovascular morbidity and mortality, which health data for the CATCH population indicate are well above both Liverpool and regional averages. For example the CATCH area has an SMR of 261 for mortality from respiratory disease; this is 181 for Liverpool. It is possible to estimate the health effects from project change data, eg changes in ambient pollutant concentrations due to CATCH.

8.1.2 CATCH will also potentially impact positively on other health determinants, eg mobility and social support, personal safety and access, although the scale of these impacts is small.

8.1.3 However although CATCH benefits the 5 ward population overall, some population groups are likely to benefit more than others. This differential distribution of impacts may actually widen health inequalities between some groups and the population as a whole, eg older people, people with disabilities, BME groups and people on low incomes. Health inequalities are a concern locally and nationally. Whilst health is generally improving in the population, for example as measured by life expectancy, for certain groups, eg high income and low income groups, the gap between them is increasing.

8.1.4 There were no major risks identified to the successful implementation of CATCH; it links very well with local, national and international policies. However the project will undoubtedly benefit from political and community support. There are also various opportunities for CATCH, eg other sustainable transport projects that could help maximise CATCH outputs.

8.2 Recommendations

8.2.1 Increasing healthier travel behaviour

- Target populations for direct support from CATCH to promote healthy travel behaviour - for example, communities on City centre periphery, University students living in the CATCH zone

- Link with existing initiatives in Liverpool to provide indirect CATCH support - for example, health sector (Green transport plans, physical activity action plan), schools (school transport plans, Healthy School awards), the voluntary sector (community transport, car sharing schemes) and other existing neighbourhood specific-community development projects (Alleygating)
• Adopt evidence-based community development approaches in work with communities - for example, methods used in Alleygating scheme by HAZ/Safer Merseyside Partnership, School Nutrition Action Groups working with families

• Identify political/community leaders to act as CATCH 'Champions'

8.2.2 Increasing personal safety
• Through CATCH, promote the reduction of speed limits within the City centre zone to 20 m.p.h. (HDA, 2003)

• Through CATCH, promote the use of safety equipment, such as cycle helmets (WHO, 2000)

8.2.3 Increasing mobility
• Explore the feasibility of introducing additional routes for the City centre shuttle that for example, cater for people with mobility impairments in the City centre zone

• Ensure the needs of people with mobility impairments can be met with the development of pedestrian priority areas, parking restrictions

• Consider a radical fares policy for the new shuttle service, for example free for certain routes (GMPTE)

• Ensure travel information and services meet the diversity needs of the community, for example in appropriate community languages

8.2.4 Increasing access
• Map access to primary care facilities along new shuttle route/s and promote in literature

• Map access of new shuttle route to neighbourhood centres or 'nodes' and promote in literature

8.2.5 Reducing road traffic
• Liase with key agencies concerning the enforcement of the pedestrian priority zones, parking restrictions and vehicle access restrictions

• Liase with key NHS agencies (Hospital Trusts, PCTs) concerning developments effecting travel and transport, for example Strategic Service Development Plans, Green Transport Plans

8.2.6 Reducing and monitoring air pollutants
• Widen the monitoring spectrum of CATCH buses to include PM$_{2.5}$ and the monitoring conditions, for example, different bus speeds

• Monitor emissions from hybrids as well as retrofitted buses

• Through CATCH, explore feasibility of developing a local Air Quality Alert System to inform professionals and the public
GLOSSARY

AQMA - Air Quality Management Area
BMEs - Black and Minority Ethnic groups
CATCH - Clean Accessible Transport for Community Health
CHD - Coronary Heart Disease
CO - Carbon Monoxide
COPD - Chronic Obstructive Pulmonary Disease
HIA - Health Impact Assessment
HCs - Hydrocarbons
IMD - Index of Multiple Deprivation
NAQS - National Air Quality Strategy
N0x - Nitrogen Oxides
03 - Ozone
PM - Particulate Matter
PCTs - Primary Care Trusts
RTAs - Road Traffic Accidents
SMR - Standardised Mortality Ratios
VOCs - Volatile Organic Compounds
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World Health Organisation Air Quality Guidelines. WHO: Copenhagen. 2000b


APPENDIX 3

Question Schedule 1 for Community Stakeholder Focus Groups and Interviews

BEFORE YOU START...
Facilitators welcome everyone, and introduce yourself and ask everyone to introduce themselves; at the workshops ask them to say a little bit about why they have come along. Explain the purpose of the focus group/interview: to get their views on living in Liverpool and based on their knowledge and experience, how the CATCH project might affect this. Explain facilitator’s role, the discussion group procedure and time, agenda/themes for discussion, and small group’s rules of ‘politeness’ – all have a say/no right or wrong, interested in range of experiences and opinions. Confirm confidentiality/Chatham House rules - nothing is attributable to any individual. Mention tape recorder (if being used). Ask to complete consent form.

THEME 1 - 'What is health?'
Mind mapping session on what ‘health’ means

What kinds of things do we think of when we talk about health.

Facilitator’s prompt: WHO definition of health (1946):

“...a state of complete physical, mental, spiritual and social wellbeing and not merely the absence of disease and infirmity”

Give following examples:

**PHYSICAL**
Biological functioning of the body

**MENTAL**
Ability to think clearly and coherently

**SPIRITUAL**
Religious beliefs, personal creeds / principles

**SOCIAL**
Ability to make and maintain relationships with other people

**EMOTIONAL**
Ability to recognise emotions and to express appropriately. Coping with stress, tension, depression and anxiety.
Introduce Rainbow model
5 minutes

THEME 2 - 'What it is like living and working in Liverpool City Centre?'
Tell me about the area. What are the good things (and why) about living/working in Liverpool? What are the bad things (and why)?

Facilitator note: Refer to matrices 1, 2 and 3 and ask FG/interviewee to comment on these (if they haven’t already).

What do you think affects these things, either positively or negatively?
15 minutes maximum

THEME 3 - 'What is the well being and health of people living and working in Liverpool City Centre currently like?'
How would you describe the health and well being of people in Liverpool?

Facilitator note: Refer to Theme 1 (different dimensions of health and ill health/well being continuum) and ask FG/interviewee to complete matrix 4.

Are there any people - groups or individuals - in particular who have better or worse health/wellbeing in Liverpool?
Facilitator’s prompt:
- Older people
- Young children
- Young people
- Men
- Women
- Parents
- Black and Minority Ethnic groups
- People with disabilities
Complete matrix 5

Referring back to matrices 1-3, what do you think affects health and well being?
Complete matrix 4.

15 minutes maximum
THEME 4 - 'What are your views about the CATCH project?'
Facilitator: go over details of the CATCH project circulated before the FG/interview.

Referring back to matrices 1-3 what do you think the effects of each Task of CATCH will be on these?

Facilitator's note: go through each task separately. Complete matrix 1-3.

20 minutes maximum

THEME 5 - 'What will the effects be on the well being and health of people in Liverpool City Centre?'
Referring back to matrix 4 and health and well being in Liverpool, what do you think will be the effects of each Task of CATCH project on this? Complete matrix 4.

Referring back to matrix 5 how do you think these Tasks will affect the health, wellbeing and quality of life of different groups of people? Complete matrix 5.

- Older people
- Young children
- Young people
- Men
- Women
- Parents
- Black and Minority Ethnic groups
- People with disabilities

Prioritising
What do you think are the most positive impacts from the changes? Matrices 1-5
What do you think are the most negative impacts from those changes? Matrices 1-5
Rank in order of importance
What changes would you like to see in the strategy proposals? Why?

20 minutes maximum.
At the workshop feedback from themes 4 & 5.

Thank you for talking with us.
### MATRIX 1

<table>
<thead>
<tr>
<th>Health determinants</th>
<th>Good things (&amp; why)</th>
<th>Bad things (&amp; why)</th>
<th>Positive effects of CATCH (Tasks 1-4)</th>
<th>Negative effects of CATCH (Tasks 1-4)</th>
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<td>Safety (inc. RTAs)</td>
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<td>Local economy</td>
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## MATRIX 2

### PHYSICAL ENVIRONMENT

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<th>Negative effects CATCH (Tasks 1-4)</th>
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<td>Noise</td>
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<td>Cleanliness</td>
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# MATRIX 3

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<th>Bad things (&amp; why)</th>
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<th>Negative effects CATCH (Tasks 1-4)</th>
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<td>Transport planners</td>
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<td>Highways services</td>
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<td>Police, traffic officers</td>
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## MATRIX 4

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<th>Bad aspects (&amp; why)</th>
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<th>Negative effects CATCH (Tasks 1-4)</th>
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<td>Emotional health &amp; well being</td>
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<tr>
<td>Spiritual health &amp; well being</td>
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<td>Lifestyle</td>
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<td>Population Sub-groups</td>
<td>Better Health</td>
<td>Worse Health</td>
<td>Positive Effects of CATCH (Tasks 1-4)</td>
<td>Negative Effects of CATCH (Tasks 1-4)</td>
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<td>-----------------------</td>
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<td>Older people</td>
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<td>Young children</td>
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<td>Young people</td>
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<tr>
<td>Women</td>
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<tr>
<td>Parents</td>
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<td>BMEs</td>
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<tr>
<td>People with disabilities</td>
<td></td>
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</tr>
</tbody>
</table>
APPENDIX 4

Population data

BME definitions
This process of collapsing ethnic variables has been undertaken as follows:


- ‘Chinese: British’ is comprised of ‘Chinese’ and ‘Chinese or Other Ethnic Group’.


Country of Birth
Table A4.1 Country of Birth

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage born in UK</th>
<th>Percentage born in Ireland</th>
<th>Percentage born in other EU state</th>
<th>Percentage born elsewhere</th>
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<tbody>
<tr>
<td>England</td>
<td>90.7</td>
<td>0.9</td>
<td>1.4</td>
<td>6.9</td>
</tr>
<tr>
<td>North West</td>
<td>94.9</td>
<td>0.8</td>
<td>0.8</td>
<td>3.5</td>
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<tr>
<td>Merseyside</td>
<td>96.7</td>
<td>0.7</td>
<td>0.6</td>
<td>2.0</td>
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<tr>
<td>Liverpool</td>
<td>95.3</td>
<td>0.8</td>
<td>0.7</td>
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<tr>
<td>Abercromby</td>
<td>78.9</td>
<td>1.1</td>
<td>3.3</td>
<td>11.6</td>
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<tr>
<td>Everton</td>
<td>89.8</td>
<td>1.2</td>
<td>1.5</td>
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<tr>
<td>Granby</td>
<td>78.4</td>
<td>0.8</td>
<td>1.1</td>
<td>16.7</td>
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<tr>
<td>Smithdown</td>
<td>83.1</td>
<td>1.2</td>
<td>2.1</td>
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<tr>
<td>Vauxhall</td>
<td>96.4</td>
<td>0.5</td>
<td>0.3</td>
<td>1.2</td>
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<tr>
<td><strong>5 Ward Average</strong></td>
<td><strong>85.3</strong></td>
<td><strong>0.9</strong></td>
<td><strong>1.7</strong></td>
<td><strong>8.5</strong></td>
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</table>
Socio-economic data

Index of Multiple Deprivation

A variety of indicators have been produced for each dimension of deprivation for all English wards, and these have been gained through accessing a variety of information sources, including Department of Social Security benefits data and University Colleges Admissions Service (UCAS) data. Through using various statistical techniques, it is possible to provide a score for each ward with respect to each of the six dimensions given above. This allows us to describe each type of deprivation within a particular geographical area, and to compare this across other wards.

Consequently all English wards can be ranked relative to each other for each of the dimensions. Given that there are 8,414 wards in England, a rank of 1 is assigned to the most deprived ward and a rank of 8,414 is assigned to be the least deprived ward.

The overall Index of Multiple Deprivation (IMD) is produced by combining information from all six dimensions of deprivation through a system of weighting data from each dimension of deprivation. The IMD 2000 score is the combined sum of the weighted dimension rank, and it allows comparison between different geographical areas for relative multiple deprivation.

The rank of employment and income scale is produced through a count of the sheer numbers of people experiencing income and employment deprivation, and then ranking those totals.

The average of ward ranks is a population weighted average of the combined ranks for the wards in a district. It is a useful measure in that it summarises the district taken as a whole, including both deprived and less deprived wards. All the wards in a district need to be included to obtain such an average, as each ward contributes to the character of that district. This measure is calculated by averaging all of the ward ranks in each district. The ward ranks are population weighted within a district to take account of the fact of variations in ward size.

Extent is the proportion of a district’s population living in wards that rank within the most deprived 10% of wards in the country. It aims to portray how widespread high levels of deprivation are in a district. It only includes districts containing wards that fall within the top 10% of the most deprived wards in England, so some districts will not have an overall score for this measure. A rank of 158 indicates a district with no score.

Local Concentration is a way of identifying districts’ ‘hot spots’ of deprivation. It defines the ‘hot spots’ by reference to a percentage of the district’s population. This is the mean of the population weighted rank of a district’s most deprived wards that capture exactly 10% of the district’s population.

The district with a rank of 1 is the most deprived, and the district with a rank of 354 the least deprived.

Table A 4.2 illustrates a selection of deprivation data for some North West local authorities. It clearly shows strong differences in relative deprivation across the North West. Certain areas can be described as indicating pockets of affluence (eg
Congleton, Fylde and Ribble Valley) within a generally deprived region of England, having relatively low levels of deprivation. Other districts (eg Lancaster and Chorley) are in the middle range of deprivation. Liverpool, however, has a scale of deprivation that is marginally worse than Manchester within the North West, being second worst (out of 354 districts) for income and employment. Manchester is the third worst for both employment and income.

Table A4.2 District Level Deprivation in the North West

<table>
<thead>
<tr>
<th>Local Authority</th>
<th>Rank of Employment Scale</th>
<th>Rank of Income Scale</th>
<th>Rank of Average of Ward Scores</th>
<th>Rank of Average of Ward Ranks</th>
<th>Extent Rank</th>
<th>Local Concentration Rank</th>
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<tr>
<td>Barrow-in-Furness</td>
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<td>164</td>
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APPENDIX 5

Background to Agenda 21

Certain basic principles have guided international and national policies for managing air pollution in recent years. The UN General Assembly established the World Commission on Environment and Development, whose report *Our Common Future* was presented by the UN General Assembly and endorsed by it. This report has been highly influential in bringing environmental issues into the global arena, and expressing concepts influential in air quality management. The report of the Rio Summit (ie *Agenda 21 document*) proclaimed key principles in relation to achieving sustainable development, safeguarding environmental protection and utilising environmental impact assessment as a national tool when assessing proposed activities likely to have a significant adverse environmental impact. The *Agenda 21 document* also supports a number of environmental management principles on which some government policies, including air quality management, are based. These include the following:

**Precautionary principle:** where there is a clear possibility of damaging environmental consequences, action should be taken to protect the environment while awaiting full scientific proof that the environment will be damaged by the proposal.

**‘Polluter pays’ principle:** the full costs of pollution (including monitoring, management, clean up and supervision) should be met by the organisation responsible for the sources of the pollution.

World Health Organisation (W.H.O.) Policy Developments for Air Quality

The WHO’s air quality guidelines were first published as *Air Quality Guidelines for Europe* in 1987. They were based upon evidence from epidemiological and toxicological literature published in Europe and North America. Although they did not consider the effects of exposure to different ambient air particles within developing countries, they became used extensively across the world.

In order to make the *Air Quality Guidelines for Europe* truly globally applicable, a task force group meeting was convened in 1997. This led to the publication of *Air Quality Guidelines*, which have drawn attention to air pollution’s role in constituting a major environmental health problem, which affects both developed and developing countries. Increasing amounts of potentially harmful gases and particles being emitted into the atmosphere not only damage human health, but also the resources necessary for long-term sustainable development of the planet.

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3 *Air Quality Guidelines for Europe*, WHO, 1987

4 *Air Quality Guidelines*, WHO, 1997
Air pollutants are generally classified into suspended particulate matter (ie dusts, fumes, mists and smokes), gaseous pollutants (gases and vapours) and odours. Modern techniques for measuring the mass concentration of particles in air make use of size-specific sampling devices. Thus the mass of particles less than 10 $\mu$m can be used (PM$_{10}$) as an index of the mass concentration of particles that can penetrate into the human thorax. The mass concentration of particles of less than 2.5 $\mu$m diameter (PM$_{2.5}$) is a way of measuring the total concentration of chemically distinct groups of particles that are emitted, or formed within, the ambient air as very small particles.

**Air Quality Guidelines**

The *Air Quality Guidelines* focus upon those gases and particulate matter that have been accepted as posing a threat to health. They emphasise the need to carefully monitor the concentrations of polluting gases, as well as particle size distribution, concentration and composition before an acceptable estimate of the effects can be produced. They also aim to assist countries produce their own national air quality standards, whilst taking into account socio-economic and cultural constraints. In this respect, they seek to provide a basis for protecting public health from the negative effects of air pollution, and for eliminating (or reducing) air pollutants hazardous to human health.

Furthermore, the Guidelines recognise that many factors affect the level of exposure to air pollutants which can account for substantial differences between the concentration of pollutants measured at central areas, and those within the breathing zone of communities. They also highlight the fact that many of these factors can be modelled, and that such models can be used for estimating dosages of air pollutants associated with ambient air conditions.

Evaluating the impact upon health of air pollution is an important aspect of the Guidelines. A database of time series studies (based upon epidemiological studies undertaken in the 1980s and 1990s) considers a single day as a unit of analysis, and relates the daily occurrence of events such as deaths or hospital admissions to daily average concentrations of pollutants whilst taking careful account of factors such as season, temperature and day of the week. Making use of powerful statistical techniques have related the daily average concentration of pollutants to their effects. The Guidelines indicate that clear statistical associations have been demonstrated between daily average concentrations of particles, ozone, sulphur dioxide, airborne acidity, nitrogen dioxide and carbon monoxide. Despite these associations not being statistically significant in all studies, when considering the body of evidence as a whole, the consistency is striking.

Altitude, temperature and humidity vary significantly, and these factors can significantly affect how air pollution effects human health. At increased altitude, the partial pressure of oxygen is reduced, and so the rate of inhalation increases. This leads directly to an increased intake of particles. Similarly the age structure of populations has a significant impact: older people tend to show increased susceptibility to air pollution, and very young people may also be at risk. Such factors may render some individuals more susceptible to the effects of air pollution. Diseases that produce narrowing of the airways, and a reduction in the areas of gas-exchange surface of the lungs, can also make people more susceptible.

**Air Quality Guidelines: Need for a Regulatory Body**
The *Guidelines* were not intended to act as standards. In moving from guidelines to standards, prevailing exposure levels, as well as environmental, social, economic and cultural conditions in a nation/region need to be taken into account. Air quality standards should be adopted by a regulatory body able to enforce them. Important factors to consider when producing air quality standards include:

- The nature of the pollution effects;
- Whether they represent adverse health effects; and
- Whether special populations are at risk.

The *Air Quality Guidelines* also highlight the role of legislation, identification of authorities responsible for enforcing emission standards and penalties as necessary components of an effective air quality management strategy. They call for these elements to be delivered both locally and nationally. There is also a recognition of the role of cost-benefit analysis in formally weighing the costs of reducing air pollution against the benefits produced. However, although the costs of abatement procedures may be fairly easy to measure, it is likely to be much more difficult to assign monetary values to the benefits that are produced. Although some aspects of reduced morbidity (e.g., reduction in use of hospital facilities) may be easier to cost, others (e.g., reduction in premature deaths) may be much more difficult to quantify. The *Guidelines*, therefore, call for non-monetary factors to be considered when creating national air quality standards. These factors include the technical capacity of a country to achieve and maintain an air quality within the desired standards, the social implications of adopting certain standards to ensure equity of costs and benefits within the population, and environmental costs and benefits.

**Air Quality Guidelines: Monitoring and Assessment**

The *Guidelines* provide further pointers in relation to monitoring and assessment. Monitoring involves not merely collecting data, but also providing necessary information to scientists, policy makers and planners to enable them to make informed decisions on managing and improving the environment. However, no monitoring programme can comprehensively quantify patterns of air pollution in both space and time. Consequently monitoring should be used in conjunction with other objective assessment techniques, including modelling, emission measurement, interpolation and mapping. Similarly, reliance on modelling alone is not recommended, as this needs to be validated by real-world monitoring data. Emission measurements will usually only be available for large industrial sources. In effect, all three assessment tools (monitoring, modelling and emission assessments) should be regarded as complementary components in any integrated approach to exposure assessment.

In relation to creating a successful air quality management programme, the *Guidelines* argue that air quality objectives are more easily achieved if interconnected government policies (e.g., transport, energy, planning, environment) are compatible, and if mechanisms exist for co-ordinating responses to issues which cross different areas of government policy. The integration of air quality policy with health, energy, transport and other policy areas has been adopted in various developed countries.

The WHO *Guidelines* called for a framework for a political, regulatory and administrative approach to guarantee a consistent and transparent derivation of air
quality standards. In order to ensure a firm basis for decision-making on risk-reducing measures, it argues that such a framework needed to consider:

- Legal aspects;
- Potential of air pollution to cause adverse effects on health;
- Exposure-responsive relationships of pollutants and pollutant mixtures; and
- The acceptability of risk.

**Air Quality and Health**

More recently, another WHO document seeks to provide a new framework for strengthening WHO’s activities to help countries address the air pollution factor on the disease burden\(^5\). It presents an overall vision and highlights key areas of action to be undertaken by the WHO unit on Occupational and Environmental Health (OEH).

Its overall objectives are:

- To foster knowledge and understanding of the global, regional and local disease burden of air pollution;
- To develop and update health-based air quality guidelines for existing pollutants;
- To establish proactive partnerships and co-ordination mechanisms that promote improvement of air quality;
- To support the infrastructure and development, teaching and training for health risk assessment and management; and
- To strengthen networking.

The *Strategy document* identifies WHO’s role in relation to:

| 1. The evidence base;                       |
| 2. Intervention support;                    |
| 3. Capacity building; and                   |

**The evidence base**

This involves consolidating the scientific evidence of health effects through reviewing scientific results regarding exposure to, and health effects of, air pollution in vulnerable sub-populations. It also involves collecting and publishing evidence on the impacts of air quality on child health, including age specific vulnerability and its significance to risk management. A further key role is to stimulate the collection of regional and national data for disease burden assessments by applying internationally accepted methodologies.

**Intervention support**

This involves strengthening the air quality component of developmental and intervention projects at the country, regional and global level, as well as building proactive partnerships with governments, public institutions, scientific bodies, international and non-governmental organisations, the private sector and local communities (eg Healthy Cities; Healthy Schools).

WHO’s duties include helping countries prevent, mitigate and reduce the burden of disease through both long-term and short-term exposure to air pollution by

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\(^5\) WHO Strategy on Air Quality and Health, Department for Protection of the Human Environment (PHE), WHO, 2001
organising workshops for air quality management, with a focus on reducing the
disease burden. Other duties include raising awareness for, and developing
proactive partnerships with, stakeholders on priority issues concerning air quality
and health. WHO must also support countries in being prepared for emergency
situations with regard to air pollution by offering guidance on emergency
responses to air pollution episodes.

Capacity building
WHO recognises that training, capacity building and support to national
programmes are in great demand in many countries. WHO’s role, therefore, is to
organise regional and national training events, as well as to develop training
manuals on air quality and health for developing countries: student textbooks,
teachers’ guides and case studies.

Networking for information exchange
This involves the promotion of networking with partners having appropriate
knowledge and expertise. The network collects data for burden of disease
assessments, and work as an information dissemination channel at the regional,
national and local level.

Air Pollution and Health Effects
The *Strategy document* highlights the key air pollutants with regard to their
relevance to human health:

*Suspended particulate matter (SPM)*
There is considerable evidence for significant associations between SPM
concentrations and mortality and morbidity rates. Health effects depend on particle
size and concentration, and vary with daily fluctuations in PM$_{10}$ and PM$_{2.5}$ levels.
They include acute effects such as increased daily mortality, increased hospital
admission rates for worsening of respiratory disease, changes in the prevalence of
bronchodilator use and cough, and lessening of lung function (ie peak flow
reductions). Fewer studies refer to long term effects of SPM on mortality and
respiratory morbidity. However, it is the long-term impact of exposure to SPM
which dominates the disease burden. Current studies do not show that there is a
threshold below which no effects occur.

It is interesting to note the marked disparity between particulate matter
concentrations within the urban and rural environments of the developed world
(see Table 1 below$^6$), and the health impact of this disparity in terms of global
annual deaths (see Table 2 below$^7$). Nonetheless, 60% of the total global
exposure of particulate matter occurs in the rural areas of developing countries.

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$^6$ Health and Environment in Sustainable Development: Five Years after the Earth Summit, adapted from
Smith, 1996 cited in *Strategy Document*

$^7$ ibid
Appendix 5 Table 1 Particulate concentrations and exposures in typical environmental settings

<table>
<thead>
<tr>
<th>Region</th>
<th>Concentration (µg/m³)</th>
<th>Exposure (% of global total)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Indoor</td>
<td>Outdoor</td>
</tr>
<tr>
<td>Developed: Urban</td>
<td>100</td>
<td>70</td>
</tr>
<tr>
<td>Developed: Rural</td>
<td>80</td>
<td>40</td>
</tr>
<tr>
<td>Developing: Urban</td>
<td>250</td>
<td>280</td>
</tr>
<tr>
<td>Developing: Rural</td>
<td>400</td>
<td>70</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Appendix 5 Table 2 Estimated global annual deaths due to indoor ambient particulate matters exposure in the mid-90s

<table>
<thead>
<tr>
<th>Region</th>
<th>Indoor</th>
<th>Outdoor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deaths (thousands)</td>
<td>Percentage of total PM related deaths</td>
</tr>
<tr>
<td>Developed: Urban</td>
<td>252</td>
<td>8.4</td>
</tr>
<tr>
<td>Developed: Rural</td>
<td>28</td>
<td>0.9</td>
</tr>
<tr>
<td>Developing: Urban</td>
<td>644</td>
<td>21.5</td>
</tr>
<tr>
<td>Developing: Rural</td>
<td>1, 876</td>
<td>62.5</td>
</tr>
<tr>
<td>Total</td>
<td>2, 800</td>
<td>93.3</td>
</tr>
</tbody>
</table>

Sulphur Dioxide (SO₂)
Time-series studies have shown associations between SO₂ and daily mortality and morbidity. Cross-sectional studies with asthmatics (a highly susceptible group) found significant, non-threshold relationships between SO₂ exposure and a reduction in the forced expiratory volume.

Nitrogen Dioxide (NO₂)
Weak associations are found between short-term NO₂ exposure due to gas cooking and a reduction in the forced expiratory volume in children. This association is not consistently found in women exposed to NO₂. Various outdoor studies have shown that children with long-term exposure show more respiratory symptoms, reduced lung function and greater incidence of chronic cough, bronchitis and conjunctivitis. However, there is insufficient evidence for a causal relationship between NO₂ and observed health effects.
Carbon Monoxide (CO)
At high concentrations, CO is toxic and causes many deaths, especially due to accidents. Potential CO health effects include hypoxia, neurological deficits, neurobehavioural changes and increases in daily mortality and hospital admissions or cardiovascular diseases. Some studies have shown small, statistically significant relationships between CO and daily mortality. Various studies indicate that the association between ambient CO and mortality and hospital admissions due to cardiovascular diseases continues even at very low CO levels, which indicate that there is no threshold for the onset of these effects.

Ozone (O₃)
Short-term acute effects of ozone concentrations include poorer pulmonary function, increased airway responsiveness and inflammation, aggravation of pre-existing respiratory diseases such as asthma, increases in daily hospital admissions and emergency room visits for respiratory distress, and excess mortality. A linear relationship has been established between exposure to ozone, and the percent change in respiratory symptom worsening among both adults and asthmatics.

Lead (Pb)
There are a variety of potential effects of lead in both adults and children, which include central nervous problems, cognitive effects, higher blood pressure and a lowering in levels of childhood intelligence. There is considerable debate around the potential for low levels of lead exposure to cause mental deficits.

European Policy Development on Air Quality
The issues of air quality has attracted much attention in Europe during recent years. The European Commission’s aim has been to develop an overall strategy through the setting of long-term air quality objectives. A series of Directives have been introduced to control levels of certain pollutants, as well as to monitor their concentrations in the air.

Ambient Air Quality and Management
In 1996, the Environment Council adopted Framework Directive 96/62/EC⁸ on ambient air quality assessment and management. This Directive covers the revision of previously existing legislation, and the introduction of new air quality standards for previously unregulated air pollutants, as well as setting the timetable for the development of so-called ‘daughter directives’ on a range of pollutants. The list of atmospheric pollutants to be considered includes sulphur dioxide, nitrogen dioxide, particulate matter, lead and ozone (ie pollutants already governed by existing ambient air quality objectives) and benzene, carbon monoxide, poly-aromatic hydrocarbons, cadmium, arsenic, nickel and mercury.

A Community-wide procedure for the exchange of information and data in the European Community was established by the Council Decision 97/101/EC⁹. The decision introduced a reciprocal exchange of information and data relating to the networks and stations set up in the Member States to measure air pollution and

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⁹ Council Decision 97/101/EC Official Journal L 035, 05/02/97 P. 0014-0022
the air quality measurements taken by those stations. The information exchange relates to the pollutants given above from Directive 96/62/EC.

Daughter Directives
The Framework Directive was followed by daughter directives, which will set the numerical limit values, or in the case of ozone, target values for each of the identified pollutants. Besides setting air quality limit and alert thresholds, the objectives of the daughter directives are to harmonise monitoring strategies, measuring methods, calibration and quality assessment methods to arrive at comparable measurements throughout the EU and to provide for good public information. The development of the daughter legislation is being supported by expert working groups in preparing their position papers that the Commission uses as a basis to draft legislation. The working groups consist of technical experts from the Commission, including the Community’s Joint Research Centre in Ispra, Member States, industry and environmental NGOs and are supported as appropriate by the European Environment Agency (EEA), the World Health Organisation (WHO), the United Nations Economic Commission for Europe (UN/ECE) and consultants involved in cost-benefit analysis (CBA) studies, among others.

The Framework Directive, as well as its Daughter Directives, requires the assessment of the ambient air quality existing in Member States on the basis of common methods and criteria. In order to facilitate this process, the Commission has prepared a Guidance report on Preliminary Assessment under EC Air Quality Directives. To the same end, the EC has also produced Guidance on Assessment under the EU Air Quality Directives.

First Daughter Directive
The first Daughter Directive relating to limit values for NO$_2$, SO$_2$, lead and PM$_{10}$ in ambient air came into force in July 1999. Member States were given two years to transpose the Directive and set up their monitoring strategies. They must also ensure that up-to-date information on ambient concentrations of SO$_2$, NO$_2$, particulate matter and lead is routinely made available to the public.

The health limit values for SO$_2$ and PM$_{10}$ must be adhered to by 2005. The other health limit values for NO$_2$ and lead must be met by 2010. Member States are also required to prepare attainment programmes indicating how the limit values will be met on time for those areas where attainments by "business as usual" cannot be presumed. These programmes must be made directly available to the public, and must also be sent to the Commission.

Second Daughter Directive
The second Daughter Directive (2000/69/EC) relating to limit values for benzene and carbon monoxide in ambient air came into force in December 2000. This Directive establishes limit values for concentrations of benzene and carbon monoxide in ambient air, and requires assessing the concentrations of those
pollutants in ambient air on the basis of common methods and criteria, as well as obtaining adequate information on concentrations of benzene and carbon monoxide and ensuring that it is made available to the public. The limit value for carbon monoxide must be met by 2005. The limit value for benzene must be met by 2010 unless an extension is granted.

As with the first daughter Directive, Member States are required to prepare attainment programmes for those areas where attainments cannot be assumed without further changes. These programmes must be made directly available to the public and must also be sent to the Commission.

Third Daughter Directive
The third Daughter Directive relating to ozone (2002/3/EC\textsuperscript{13}) was adopted in February 2002. It must be transposed into national law in Member States by September 2003. The directive sets long-term objectives equivalent to the World Health Organisation’s new guideline values and target values for ozone in ambient air to be attained where possible by 2010. These targets follow Directive 2001/81/EC on national emission ceilings. Non-compliance requires Member States to work out reduction plans and programmes to be reported to the Commission and to be made available to the public, so that citizens can trace progress towards meeting the ozone standards. The directive includes also improved and more detailed requirements to monitor and assess ozone concentrations, and to inform citizens about the actual pollution load. It sets alert thresholds and requires Member States’ authorities to take short-term action if exceeded.

Fourth Daughter Directive
The Commission is presently preparing a proposal for a Directive that will cover the remaining pollutants listed in Council Directive 96/62/EC, i.e. arsenic, cadmium, nickel, mercury and polyaromatic hydrocarbons.

UK Policies related to Air Quality

The UK Air Quality Strategy (DEFRA)
The Air Quality Strategy\textsuperscript{14} sets objectives for eight main pollutants to protect health. Performance of these objectives will be monitored where people are regularly present and might be exposed to air pollution. They are based purely on the scientific evidence of how each pollutant affects human health.

Objectives for seven of the eight pollutants are prescribed in regulations as air quality objectives for the purposes of Local Air Quality Management (LAQM).

The Strategy also highlights important explanatory details as to why these objectives have been put in place.


\textsuperscript{14} The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Cm 4548, 2000
Appendix 5 Table 3 Objectives for protecting human health included in Regulations for LAQM

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Objective</th>
<th>Date for achieving objective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Concentration</td>
<td>Measured as</td>
</tr>
<tr>
<td>Benzene</td>
<td>5 ppb</td>
<td>Mean running annual</td>
</tr>
<tr>
<td>1,3 – butadiene</td>
<td>1 ppb</td>
<td>Running annual mean</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>10 ppm</td>
<td>Running 8 hour mean</td>
</tr>
<tr>
<td>Lead</td>
<td>0.5 µg/m³</td>
<td>Annual mean</td>
</tr>
<tr>
<td></td>
<td>0.25 µg/m³</td>
<td>Annual mean</td>
</tr>
<tr>
<td>Nitrogen Dioxide</td>
<td>105 ppb not to be exceeded &gt; 18 times / year</td>
<td>1 hour mean</td>
</tr>
<tr>
<td></td>
<td>21 ppb</td>
<td>annual mean</td>
</tr>
<tr>
<td>Particles (PM₁₀)</td>
<td>50 µg/m³ not to be exceeded &gt; 35 times / year</td>
<td>24 hour mean</td>
</tr>
<tr>
<td></td>
<td>40 µg/m³</td>
<td>annual mean</td>
</tr>
<tr>
<td>Sulphur Dioxide</td>
<td>132 ppb not to be exceeded &gt; 24 times / year</td>
<td>1 hour mean</td>
</tr>
<tr>
<td></td>
<td>47 ppb not to be exceeded &gt; 3 times / year</td>
<td>24 hour mean</td>
</tr>
<tr>
<td></td>
<td>100 ppb not to be exceeded &gt; 35 times / year</td>
<td>15 minute mean</td>
</tr>
</tbody>
</table>

(Note: Due to its transnational nature, ozone remains a national objective, but is not prescribed in regulation and is, therefore, outside the scope of LAQM.)
New Deal for Transport: Better for Everyone (White Paper)

The White Paper draws attention to emissions of CO\textsubscript{2} from road transport, which are the fastest growing contributor to climate change. A more integrated transport system would enable people to access different modes of transport, and UK government policy is to link this with the environment. A key tool for creating the New Deal for Transport is the creation of local transport plans, which are to integrate transport strategies for local needs, create local targets for improvements (including improvements in air quality, road safety, public transport and road traffic congestion) and greater use of traffic management. Additional specified methods include tackling bottle neck areas within transport networks that cause congestion, as well as creating new powers that will include road user charges and levies on parking to tackle traffic jams. An important development in this regard has been the creation of a new independent Commission for Integrated Transport to advise on integration at the national level, as well as act as a force for change.

In an effort to discourage people from driving cars, the White Paper aims to deliver cleaner, more attractive and reliable buses. This includes building Quality Partnerships between local authorities and bus operators, so that quicker services and higher quality vehicles can be developed. Similarly Quality Contracts will enable exclusive contracts for bus routes to ensure integrated networks. Part of the strategy concerning environmental protection includes a reduction in greenhouse gases, and the development of greener, more fuel-efficient vehicles through using tax incentives, as well as the Cleaner Vehicles Task Force. The motoring tax strategy aims to encourage people to buy more fuel efficient models, and to invest in regular maintenance and fuel saving technologies.

The White Paper highlights the fact that driving vehicles has considerable health disadvantages in comparison with walking or cycling. It cites important UK research\textsuperscript{15}, which concluded that up to 24,000 vulnerable people are estimated to die prematurely each year, and similar numbers admitted to hospital, due to exposure to air pollution. Consequently the White Paper carries a commitment to bringing about further controls on vehicle emissions. It recognises the legally binding target of reducing greenhouse gas emissions (following on from the Kyoto agreement), as well as its domestic aim of reducing CO\textsubscript{2} emissions in the UK to 20% below 1990 levels by 2010.

The White Paper estimates that European initiatives aimed at tightening vehicle and fuel standards have the potential to reduce busy central urban area road traffic NO\textsubscript{2} emissions by up to 67%, and particulate emissions by up to 70% below 1996 levels by 2010. Local action, therefore, which brings together user charges and complementary public transport packages directed at tackling congestion, and bus and freight Quality Partnerships directed at promoting cleaner buses and lorries, have the potential to create further significant savings. It asserts that further reductions in particulate emissions of up to 50% are also possible.

\textsuperscript{15} Quantification of the Effects of Air Pollution on Health in the UK, Committee on the Medical Effects of Air Pollutants, Department of Health, 1998
Health Policies relevant to ‘CATCH’

The Government’s priorities for improving the nation’s health were outlined during its first term in a series of statements, documents and White Papers. The public health White Paper Saving Lives: Our Healthier Nation (OHN) (1999) set out the Government’s intention to achieve better health for everyone, and especially the worst off, by setting targets in four priority areas (table 4).

Appendix 5 Table 4  Government priorities for health

<table>
<thead>
<tr>
<th>Priority Area</th>
<th>Target (2010)</th>
<th>Associated document</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer</td>
<td>Reduce death rate by 20% (&lt;75s)</td>
<td>The NHS Cancer Plan</td>
</tr>
<tr>
<td>Coronary Heart Disease &amp; Stroke</td>
<td>Reduce death rate by 40% (&lt;75s)</td>
<td>CHD National Service Framework</td>
</tr>
<tr>
<td>Accidents</td>
<td>Reduce death rate by 20%</td>
<td>Tomorrow’s Roads</td>
</tr>
<tr>
<td></td>
<td>Reduce serious injury by 10%</td>
<td></td>
</tr>
<tr>
<td>Mental Illness</td>
<td>Reduce death rate (suicide) by 20%</td>
<td>Mental Health National Service Framework</td>
</tr>
</tbody>
</table>

These four areas were selected because of their impact on the health of nation, in terms of both mortality and morbidity. Although the stated targets are in some ways arbitrary, achieving them could prevent an estimated 300,000 untimely and unnecessary deaths. The Government has committed considerable resources to these priority areas, in the form of increased funding and a number of specific initiatives. As might be expected, the majority of the initiatives are concentrated within the NHS, focusing particularly on improving the quality of, and access to, services. However, it has been recognised that there are also potent social, economic and environmental factors that contribute to poor health, and that agencies outside the NHS have a role in improving health. Within this context, there are also responsibilities for individuals in maintaining their own and their family’s health, in the decisions they make about their diet and lifestyle. The Government’s general approach was outlined in Saving Lives:

“...Health inequality can be reduced only by giving more people better education; creating employment so that people can achieve greater prosperity; building social capital by increasing social cohesion and reducing social stress by regenerating neighbourhoods and communities; and tackling those aspects of the workplace which are damaging to health.”

Cancer

One in three people will develop cancer in their lifetime, and one in four currently dies from the disease. Each year there are 200,000 new cases and 120,000 cancer deaths in the UK. The Government’s approach to cancer focuses on raising awareness, promoting healthier behaviour and reducing exposure to risk, principally through decreasing smoking and encouraging the adoption of a healthier diet. “Saving Lives” claims a 10% reduction in cancer death rates could be achieved via these means by 2010.

Coronary Heart Disease and Stroke

Cardiovascular disease is currently the cause of 40% of deaths in the UK, claiming the lives of 200,000 people each year, and resulting in disability for thousands more. The largest contributors to this toll are coronary heart disease (CHD) and
The Government’s approach to reducing these diseases focuses on individual behaviour, encouraging in particular: major changes in diet, with increased consumption of fruit, vegetables, and oily fish; reductions in tobacco smoking; avoiding excessive alcohol consumption; and physical activity and weight control.

The National Service Framework (NSF) for Coronary Heart Disease, published in 2000, set national standards for health promotion, disease prevention, diagnosis, treatment, rehabilitation and patient care with the aim of reducing variations in health care and improving service quality. The framework set 12 standards for the NHS, three of which, concerned with reducing heart disease in the population and preventing CHD in high risk patients, have some relevance for transport-related initiatives:

- The NHS and partner agencies should develop, implement and monitor policies that reduce the prevalence of coronary risk factors in the population, and reduce inequalities in risks of developing heart disease.
- General practitioners and primary care teams should identify all people with established cardiovascular disease and offer them comprehensive advice and appropriate treatment to reduce their risks.
- General practitioners and primary health care teams should identify all people at significant risk of cardiovascular disease but who have not developed symptoms and offer them appropriate advice and treatment to reduce their risks.

With these standards in mind, the NSF identifies lack of physical exercise as one of the principal remediable risk factors for developing CHD. It follows US Department of Health recommendations that moderate exercise (e.g. brisk walking) should be undertaken for 30 minutes on at least five days each week. Successful population interventions to promote such physical activity tend to be those that encourage walking as an informal exercise, and that fit into the daily routine, such as:

- promoting moderate intensity physical activity that can be carried out as part of daily life
- promoting cycling and walking as modes of transport
- implementing “green” transport plans in NHS facilities and other workplaces
- creating safe routes to school
- improving community access to green spaces and community recreation facilities
- training primary care staff in counselling skills to promote physical activity

Accidents

Accidents of all kinds claim 10,000 lives each year in the UK, and they are the most common cause of death in children and young adults. The Governments’ principal means of reducing accidents is to make the environment safer. Although accidents can occur anywhere, the majority occurs at home, work, and school as well as on the roads. As described in earlier sections, there are several objectives of the road safety strategy:

- careful planning of traffic flows
- traffic calming measures
- giving greater priority to pedestrians and cyclists
designing safer routes to school
- adopting speed management policies
- encouraging the design of vehicles which offer better protection
to the occupants and others involved in collisions

Mental Health
Mental health influences peoples’ ability to perceive, think, and communicate, and hence how they function within society. Common mental illnesses, such as anxiety and depression, affect over 15% of the adult population, and are a leading cause of illness, distress and disability. Psychotic illness, which affects 0.4% of the population, can be severely and chronically disabling for sufferers and extremely stressful for their families. Mental illness is not, however, a common cause of death in the UK: 3,000 people commit suicide each year, not all of who are mentally ill.

The National Service Framework on Mental Health identifies mental health promotion as one of its seven standards, urging health and social services to promote mental health and combat discrimination within local communities. Social stress, reflected, for example, in the extent to which an individual has little control over their job, increases the risk of illnesses such as coronary heart disease and depression. Similarly the degree of social cohesion, the strength of social networks in a community and the nature of people’s work may all affect their risk of developing depressive illness. The Government’s response is a commitment to build social capital by increasing social cohesion and reducing social stress through the regeneration of neighbourhoods and communities. It also recognises that exercise, relaxation and stress management have a beneficial effect on mental health, as does maintaining social contacts.

Respiratory Health
Respiratory disease represents a significant proportion of ill health and mortality both nationally and locally, as outlined in the health profile. Explicit within Government health policies such as The New NHS (DoH, 1998), The NHS Plan (DoH, 2000) and Shifting the Balance of Power (DoH, 2000; DoH, 2001) is the need to improve health and health care by working in collaboration with health service providers, the public and patients, and partners. In addition, respiratory illness is one of the indicators monitored in the ‘Better Quality of Life’ strategy.

Health Inequalities
Following on from the Independent Inquiry into Health Inequalities report (Acheson et al, 1998) and the NHS Plan’s targets to reduce health inequalities, the Government have consulted on a delivery plan, Tackling Health Inequalities (DoH, 2001). This very clearly spelt out the role of all Government departments in tackling the wider determinants of health inequalities, eg through the Neighbourhood Renewal strategy. Within the monitoring framework, the dataset of health inequality indicators includes:
- Lifestyle factors - eg, physical activity, psychosocial
- Wider determinants - eg, transport (KSIs from RTAs, access difficulties), employment (relative rates between geographical areas, different population groups)
- Health outcomes - eg, mortality, morbidity/SI from cancer, CHD, mental health, accidents; mortality and morbidity of vulnerable groups (older people and children)