

## **TRANSPORT AND HEALTH**

The four West Yorkshire Health Authorities, the five West Yorkshire Local Authorities and the Passenger Transport Executive have joined together to form a West Yorkshire Transport and Health Collaborative Group. This Group has commissioned two studies looking at the linkages between transport policy and public health in West Yorkshire.

These are:

- **Effectiveness and Potential of Transport Interventions in West Yorkshire**  
(prepared by the Institute for Transport Studies, University of Leeds)
- **Health Impact Assessment of Transport in West Yorkshire**

The Executive Summary of the report on the first study and the interim report on the second study are reproduced below.

It is intended that the findings of these reports will lead to a better understanding of the relationship between transport and health, guide the workings of the Group and lead to joint working on projects to improve health.

### **EFFECTIVENESS AND POTENTIAL OF TRANSPORT INTERVENTIONS IN WEST YORKSHIRE**

This report examines the effects of transport measures in terms of a number of relevant public health impacts. A wide range of transport measures were assessed against the following relevant public health impacts:

- changes in numbers of injury accidents;
- changes in levels of emissions which could lead to changes in levels of the National Air Quality Strategy pollutants;
- changes in noise and vibration;
- changes in the amounts of cycling and walking;
- changes in levels of accessibility to relevant facilities;
- changes in informal social contacts and sense of community;
- changes in levels of stress and anxiety.

The measures reviewed were in five broad categories:

- land use measures;
- infrastructure measures;
- management measures;
- information measures;
- pricing measures.

A number of assumptions had to be made about the measures and only indicative assessments were made.

The full impacts of land use measures are difficult to evaluate because many of the effects are not direct and rely on intermediate mechanisms such as changes in mode. The effects of most of the measures on the indicators are likely to be mixed.

Infrastructure measures can have beneficial effects on injury accidents. Investment in public transport, if significant enough to cause mode shift, can reduce emissions and noise/vibration. Public transport infrastructure measures, generally speaking, increase accessibility and reduce stress and anxiety, but the effects of other infrastructure measures are more mixed.

Some management measures had definite effects on injury accidents, but the effects of most measures were much more mixed, with the design of schemes to manage traffic being crucial to their effects.

Most information provision measures had little effect on injury accidents, emissions, noise/vibration and cycling and walking, except where they were pursued much more proactively than is normally the case. The provision of information could have beneficial effects on accessibility and stress and anxiety.

Pricing measures such as urban road user charging and workplace parking levies were thought to be the most effective measures in terms of reducing car use, but many of these measures have yet to be tried in this country. The effects on accessibility of these measures were much more mixed, but the effects of public transport fare and service improvements were much more generally beneficial.

The elements of the West Yorkshire Transport Strategy were reviewed, drawing upon the more general assessments. Many of these measures had beneficial aspects as far as the chosen indicators of public health were concerned, but the benefits of the major road schemes were much more mixed than many of the other measures.

While the strategy does offer improvements for all road users, there is an element of inconsistency in this approach in that the major road schemes, in offering improvements for drivers, are liable to undermine attempts to persuade drivers into using alternatives to the car.

The road user charging proposals for Leeds form an interesting new development and suggest a more radical approach to restraining the private car, in some areas and at some times. They are conditional, however, on Government funding for a range of major schemes, most notably the Supertram proposals. If road pricing goes ahead in Leeds it could be one of the most exciting developments in urban transport policy in many years and could have a significant beneficial effect on many of the public health impacts identified.

Understandably, the Local Transport Plan does not explicitly address public health issues, but was written with a wider range of objectives in mind (many of which overlap with public health concerns). There is a case for saying that there should be more explicit emphasis on the effects of measures on public health concerns, partly because we now know more about how serious some of these factors are, in particular the low levels of physical activity. For example, transport planners have tended to emphasise the traffic reduction benefits of more walking and cycling, rather than benefits of more people taking more exercise more often. A greater emphasis on the public health benefits of measures would also include consideration of the effects in terms of stress/anxiety, social contacts/sense of community and accessibility.

It is also clear that there is a requirement for a greater level of monitoring of the impact of schemes and policies so that they can be evaluated and to allow the impact of proposed schemes to be assessed. The public health effects which require more

monitoring include:

- levels of physical activity;
- respiratory conditions;
- stress and anxiety;
- social contacts and sense of community;
- accessibility.

These should be considered by road user group, especially non-car users, and by socio-economic group, because we know that inequalities in health are greater in less affluent socio-economic groups. Some of this monitoring will require the development of new techniques and approaches.

A number of alternative policies for West Yorkshire were suggested in the report including:

- a wider application of road user charging;
- workplace parking levies;
- clear zones for city and town centres where only low emission vehicles are permitted;
- more radical reallocation of road capacity to public transport, walking and cycling;
- guided bus instead of the proposed Supertram scheme in Leeds;
- a car scrappage incentive scheme to take the worst polluters off the roads;
- a more organised and comprehensive park and ride system for built up areas;
- a curtailment of the major road proposals;
- paying people to cycle.

Assessment of less developed proposals such as these is difficult, but a number of these measures were thought to have beneficial public health impacts.

Generally speaking, it was found that there was often little evidence of the impacts of transport measures in terms of the public health indicators selected. This clearly has implications for the monitoring of measures in the future, but this is a difficult area, with real life transport measures often having wide ranging (in time and space) impacts which are difficult to predict and which take place in a changing world and an evolving policy context.

## HEALTH IMPACT ASSESSMENT OF TRANSPORT IN WEST YORKSHIRE

### *Introduction*

It is now accepted that the “way we travel is making us a less healthy nation” (DETR Integrated Transport White Paper). The above seven public health impacts identified direct and indirect effects. Direct effects such as crash deaths and injuries and the impacts of vehicle-related pollution on respiratory disease are clear and significant. Indirect effects such as little physical activity, the restriction of access to services (including shops necessary for a healthy diet), fear of traffic relating to isolation, stress linking to noise and vibration levels are also significant but more difficult to measure.

The impact of transport is unequal on the general population. Children and others without the use of a vehicle are badly affected by the dominance in road planning for car use while older people and those with pre-existing disease are more at risk from the effects of motor vehicle related air pollution.

This paper attempts to quantify three of these impacts of transport on health: accidents, air pollution and physical activity. This does not imply these are the most important, only that they are measurable.

Further details of the way in which these figures have been reached are available from the West Yorkshire Transport and Health Collaborative Group.

### *Health Impact of Transport in West Yorkshire*

Overall, death rates in West Yorkshire are higher than average for England, Table 1 and 2.

<b>Deaths</b>		<b>Bradford</b>	<b>Calderdale &amp; Kirklees</b>	<b>Leeds</b>	<b>Wakefield</b>	<b>West Yorkshire</b>
All causes 1997	Male	2349	2925	3602	1620	10496
	Female	2589	3241	3787	1691	11308
	Total	4938	6166	7389	3311	21804
IHD 1996	Total	1219	1575	1740	889	5423 (24.8%)
CVD 1996	Total	569	725	710	318	2322 (10.6%)

*Table 1. Deaths from all causes and selected causes related to transport.*

Source: ONS (1999) Key population and vital statistics 1997: local and health authority areas; University of Surrey (1997) Public Health Common Data Set.

<b>Underlying cause</b>	<b>Male</b>	<b>Female</b>
All causes	106	101
Diseases of the circulatory system	106	101
Hypertensive disease	108	87
Ischaemic heart disease	109	108
Cerebrovascular disease	104	98
Diseases of the respiratory system	111	107
Chronic obstructive pulmonary disease and allied conditions	117	123
Asthma	92	75
Diabetes mellitus	97	78
Cancer of the colon	95	91
Motor vehicle traffic accidents	101	98
Motor vehicle traffic accidents with injury to pedal cyclist	78	167
Motor vehicle traffic accident with injury to pedestrian	121	171

*Table 2. Standardised mortality ratios in West Yorkshire for diseases linked to transport.*

Source: ONS mortality statistics DH1 no.30: General

### **Crashes**

The impact of crashes on health are:

- injuries and deaths;
- psychological trauma;
- restriction of activity resulting from fear of road traffic.

	<b>Pedestrians</b>		<b>Pedal cycle</b>	<b>Powered two-wheelers</b>	<b>Car users</b>	<b>Total<sup>1</sup></b>
	Children	Adult				
Deaths	8	36	7	11	37	106
Injury	970	1060	595	607	10081	14381

*Table 3. Casualties by road user type in West Yorkshire (1998)*

Source: DETR Road Accidents GB 1998: The Casualty Report (1999).

<sup>1</sup>: total includes goods vehicle, bus, coach and other vehicle users and pedestrians whose age was not reported.

Overall, death rates from road crashes are similar to national levels, see table 2, except

for pedestrian deaths. These are small number of deaths and so are likely to vary considerably from year to year.

Some studies have estimated what percentage of those injured in crashes will experience some degree of longer term psychological trauma, although the exact nature of this is unclear. It is not possible to estimate from routinely collected data what the extent of the impact of traffic is in terms of fear generated and activities foregone, let alone what this might mean for health service use.

### ***Air Pollution***

The COMEAP quantification of health effects of air pollution (DH, 1997) used here is an authoritative attempt at estimating the size of the health impact of pollutants in this country for three pollutants: sulphur dioxide, particulates and ozone. Two of these (particulates and ozone) are to a significant extent vehicle related, while sulphur dioxide is, generally, not, except for some urban areas where sulphur-containing diesel is used to a considerable extent.

Quantification of the effect of transport related air pollution on health requires a further step than those taken by COMEAP – estimating the proportion of air pollution from vehicles. It is possible to identify the total emission percentage from various sources (e.g. vehicles, stationary power plants etc), but generally this will underestimate the exposure of people to vehicle related pollutants as the ambient concentrations in areas of high population densities will be dependent on vehicles to a greater extent. Furthermore as ozone is a secondary pollutant, estimates of the production of ozone precursors have been used instead.

<b>Health outcome</b>	<b>Transport related events</b>
All cause deaths	145-255 (with ozone threshold) 246-457 (no ozone threshold)
All respiratory admissions including nitrogen dioxide	274-413 (with ozone threshold) 361-587 (no ozone threshold)
excluding nitrogen dioxide	119-258 (with ozone threshold) 206-432 (with no ozone threshold)

*Table 4. Health outcomes attributable to transport related air pollution*

The authors of the COMEAP report excluded the contribution of nitrogen dioxide from their final quantifications on the grounds that it is uncertain whether this is an independent effect or due to other pollutants. If this were the case this would lead to double counting of some respiratory admissions.

This estimates the short-term impact of transport related air pollution, not long-term. The COMEAP report estimates that in addition there is a one-year loss in life expectancy per lifelong exposure to 25ug/m<sup>3</sup> PM<sub>10</sub>. This is close to the annual average in much of West Yorkshire, and vehicles are responsible for around 23% of emissions.

Hospital admissions are a small part of the health impact and

*“For every hospital admission for lower respiratory disease there are about 60 cases who consult their GP but are not admitted. Many more episodes of asthma and other lower respiratory problems such as bronchitis do not lead to a consultation at all. Admissions therefore represent the tip of a pyramid of severity.”*

The Photochemical Oxidant Review Group.

**Physical activity**

Walking and cycling are suitable ways of getting an appropriate level of physical activity. They can be sufficiently vigorous, are easily incorporated into daily routines, can be cheap or free and are appropriate for most people, including older people who are at greatest risk of developing diseases such as coronary heart disease. Estimates of the potential health impact of active transport depends on estimates of the impact of physical inactivity and estimates of the potential of walking or cycling to change these. As there is no local data, national information is used, Table 5.

	Inner London		Mining and industrial		Urban		Mature		Prosperous		Rural	
	M	F	M	F	M	F	M	F	M	F	M	F
Physical activity level	M	F	M	F	M	F	M	F	M	F	M	F
Low	46	44	36	42	36	42	31	42	31	41	31	39
Medium	22	32	26	33	26	33	30	33	29	34	28	36
High	32	23	38	25	38	25	39	25	40	25	40	24

*Table 5. Percentage of males and females undertaking different levels of physical activity, by Health Authority area type.*

Source: (1999) Health Survey for England: Cardiovascular disease 1998

NB Health authorities in West Yorkshire all fall into the Mining and Industrial or Urban groups, where the percentages of people falling into the low category are higher than in other types, apart from Inner London.

From the Health Survey for England the contribution of physical inactivity to the occurrence of coronary heart disease is about 46%, i.e. nearly half of all deaths from CHD. This compares the rate of death at levels of physical activity seen now with theoretical rates if all the population were active to the recommended level of at least 30 minutes of brisk walking five times a week. This is about 2,500 deaths annually in West Yorkshire. Physical activity includes more than cycling and walking; the latter contributes to about 21% for men and 23% for women of total physical activity levels. It is not known how much physical inactivity contributes to a range of conditions such as obesity, diabetes, musculoskeletal problems or mental ill health.

So physical inactivity in West Yorkshire has a significant health impact on coronary heart disease. There is a considerable amount of evidence available that the activity levels possible through using one’s legs as a form of transport through cycling or walking as part of daily life are capable of delivering health benefits. However levels of cycling and walking have been declining so reversing this trend is crucial to ensuring that transport promotes health rather than continues to damage it.

### ***Social Impacts of Transport***

This is difficult to measure directly, but the 1999 Annual Health Report for Calderdale and Kirklees (Calderdale and Kirklees Health Authority, 1999) identifies “accessible public transport” indicators. These are:

- mode of transport to work in rush hour;
- percentage of GPs, dentists, pharmacists, health clinics, local food shops and post offices within 500 metres of public transport routes with one service every 30 minutes.

In Kirklees, 98% of post offices were sited within 500m of bus routes, except in South Huddersfield where this drops to 84%. The mean distance there is 230m, compared to 50m in the less rural rest of Kirklees.

### ***Actions that can be taken to address Transport Related Health Impacts***

Hamer (1999) identified a number of steps that could be taken to integrate local transport and health policy making, and this document can be seen as forming one part of this process. This document provides evidence for the need to address danger, physically active transport (walking and cycling), air pollution and access to promote the health of local populations.

As part of this process, health services and professionals should examine their own contribution to traffic. The NHS is the largest employer in Britain. Overall, health service related transport accounts for about 5% of all traffic, and a much greater percentage in the vicinity of large hospitals. The contribution of health service related traffic is thus considerable in absolute terms, as well as being significant as an example. The NHS should tackle its transport needs as seen in the recent National Service Framework for coronary heart disease. This sets, as an organisational and health promotion milestone for all health and local authorities, Primary Care Groups/Trusts and NHS Trusts, the development of “green” transport plans by April 2002 (DH, 2000).

“Green” transport plans within the NHS are becoming more common. Ensuring sites are accessible from public transport, which is in turn accessible for those with mobility problems, will be a key element to this. The importance of an active lifestyle for health discussed above gives greater emphasis for the promotion of cycling and walking as part of health related green transport plans. To ensure maximum effectiveness, development of travel plans across health and local authority areas should be co-ordinated so that issues such as travel between sites, provision of information and cost-effectiveness of low or zero emission vehicles can be ensured.

### ***Conclusions.***

The measurable health impacts of transport are substantial in West Yorkshire:

- around 100 deaths and 14,000 injuries per year from crashes;
- between 119 and 432 new or brought-forward respiratory admissions and between 145 and 457 deaths brought forward by air pollution from vehicles annually in West Yorkshire;
- about one year loss of life expectancy per lifelong exposure to particulate air pollution at levels similar to those in West Yorkshire;
- about 60 people for each admission for lower respiratory disease may consult their

GP and an unknown number increase their self-medication;

- the theoretical loss of life from coronary heart disease resulting from lack of physical activity is about 2,500 deaths per year. Walking and cycling form a significant part of current levels of activity, and there is potential to increase this. It should be noted that this quantification does not include the benefits of increasing physical activity in other areas, such as diabetes, hypertension or overweight.

Given the above impact of physical inactivity, which is a considerable underestimate, it is clear that physical activity is a major health issue that should be promoted. This does not include other public health impacts that cannot as yet be quantified.

Action to address these transport related health impacts requires co-ordinated efforts in many spheres. It is important for health professionals to engage in this in a number of ways. Firstly, by addressing the promotion of physical activity as part of population and individual programmes. Secondly, by engaging and supporting other professionals working directly on transport policy locally and regionally. Thirdly, by addressing health related transport to ensure that it promotes health and can be used as an example of good practice.