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# URBAN PLANNING AND HUMAN HEALTH IN THE EUROPEAN CITY

## Report to the World Health Organisation

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(ISOCARP)

### Research Team

Didier Vancutsem, Project Director

David Gee

Chris Gossop

Ulla Hoyer

Dorota Jarosinska

Pierre Laconte

Manfred Schrenk

### Students

Herbert Hemis

Roman Seidl

### Editor

James Colman

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## INTRODUCTION

In England in 1875, the passing of the Public Health Act was probably the first effective response by a national government to the growing demand for decent standards of health and hygiene for workers in the newly-industrialized urban areas of that country. If there was a link between health and urban planning it was not immediately recognized or explored: rather was the focus on more fundamental issues such as the structural stability of houses, the prevention of fire, and the provision of adequate water supplies, sanitation and ventilation. The improvement of building standards rather than estate layout or urban design was the immediate target of the health reformers of the day.

A few enlightened industrialists in Britain, Germany and elsewhere had a different but complementary agenda. Their central concern was to maximize productivity and profit; and for that to be achieved it was vital that their workers could enjoy good health and reasonable living conditions close to the workplace. Cadbury in Bournville, Krupp in Essen, and Lever in Port Sunlight were three such entrepreneurs who translated ideas into reality by building small 'garden villages' for their employees. Almost by accident, good health and good urban planning became bed-fellows.

Today, there is international acceptance of the general proposition that the provision of basic health care, potable water, fresh air, safe buildings, and proper waste management facilities are rights, not privileges - especially for city dwellers. When things go wrong, urban populations are usually the first to suffer. Individuals as well as communities - perhaps even entire neighbourhoods or the city itself - can pay a high price for failures in the supply and delivery of health services and the municipal infrastructure, which support them. Recognition of this reality has given birth to the concept of environmental health - a condition, which (like personal health) can be observed, diagnosed and treated in accordance with agreed protocols. The important point to be made here is that the environment is seen as having attributes, which can be managed through social intervention with the aim of enhancing the overall well-being and "health" of the entire system.

It is mainly in the cities where this process of environmental management has been adopted by governments. It is in the cities where public and environmental health standards are commonly set and maintained at the highest possible levels, commensurate with local resources. And it is within the field of city and municipal governance that we find an increasing involvement in the wider and more complex field of activities, which goes under the generic title of 'urban planning'.

As the client for this present study, WHO is building on earlier work by the Organisation itself (as well as by others) whose purpose has been to explore the links between these two sectors of official activity - taking the European city as the focus. In this enterprise, WHO can be seen as re-visiting the late nineteenth-century discovery connecting worker health, productivity, and lifestyle. That discovery remains fresh today; but its dimensions and implications have expanded enormously to embrace contemporary processes and values across many disciplines, professions, and sectors of government.

Driving this continuing exploratory adventure are a number of questions. The present study comprises the first stage of a much larger and longer WHO/EC project whose overall aim is to provide policy advice on the environmental health challenges of urban planning in the European city. Underlying priority questions for WHO can be simply expressed:

*For the European city, what is the present state of knowledge regarding the impacts of the urban planning and development process on the health and well-being of urban dwellers and urban environments? Does the city planning process recognize the need for overlap with health planning - and vice versa? How can the 'health impacts' of urban planning decisions be identified and modified to ensure that community benefits are maximized?*

These questions are not easily answered - especially in this short overview study. Accordingly, the focus has been on presenting an overview of selected recent studies, and of those matters, which fall within the purview of urban planners and which at the same time carry implications for the health of city dwellers. It was clear from the outset that the theme is far more complex than might appear at first glance. No two cities are identical. City planning and governance systems vary widely. Within European cities, significant differences of climate and geography (both of which have health implications) are evident, along with the statistical complexities of demography and socio-economic make-up.

When the professions engaged in urban planning and urban health are compared, the picture becomes even more complex. Modern urban planning practice is largely concerned with the design and maintenance of the built environment, with practitioners often working in a highly politicised decision-making context. Health professionals have an entirely different agenda, strongly influenced by the Hippocratic imperative of helping the sick, the infirm, the disadvantaged.

Whilst both professions serve the public interest, their respective sources of praxis and theory differ greatly. It is therefore not surprising that in the structure of the modern city bureaucracy, each sector tends to stand alone and to go its own way - even though each aspires to improving the overall well-being of the citizenry at both the individual and community levels.

It is this common goal, which links the two professions. It is a goal whose achievement in the typical city administration would appear to be more a matter of accident than design. The research suggests that in the typical European city there is considerable scope for building new bridges between the two professions. In particular it would seem that if municipal agendas and staffing arrangements could be reshaped to take into account the common ground, the potential public benefits could be significant.

It is hoped that through this present study, WHO can stimulate fresh initiatives in this important sector of public administration.

## EXECUTIVE SUMMARY

Chapter 1 is a forceful reminder of the dimensions of the current *problematique*, with evidence pointing to a 2020 scenario in which 80% of Europe's population will be living in urban areas in which environmental health challenges will be at their highest levels ever. Responding to those challenges will require increasing involvement of urban planners as the health implications arising from decisions on mobility, the built and natural environment, urban sprawl, land use management, and climate change are recognised and acted upon. The Chapter sets the context for the discussion in the following chapters by sketching the links between good health and the city planning process. Definitions of some key terms are offered.

Chapter 2 looks at the current EU policy context and the ambitious if not utopian challenges presented in the Leipzig Charter of 2007. From the European Commission came the seminal 2006 Thematic Strategy on the Urban Environment and the EU Sustainable Development Strategy. We are reminded that cities are where environmental problems tend to be concentrated, where economic forces are at their strongest, and where social and cultural attributes play a major part in shaping community aspirations and civic well-being. Finally, the chapter refers to the important work of the EU in the preparation and dissemination of Directives on key urban environmental management and health issues such as noise, air quality, solid and liquid waste, and sustainable transport.

Chapter 3 takes a closer look at issues uncovered in a selection of literature sources (as presented in the Appendix) with a particular emphasis on mainstream urban planning and urban design topics and their relationships to urban environmental health problems and opportunities. The first part of the chapter provides an overview of those urban planning elements, which can be seen as possible sources (or responses) to the health of urban communities. Topics covered include built environment features, which might contribute to negative health conditions such as a sedentary lifestyle or social isolation. Nature, green space, neighbourhood character, urban sprawl, noise, and health issues related to climate change are touched on before the chapter goes into more detail on specific themes such as transport and mobility, the influence of history on city growth in Europe, and components of the actual urban planning process which can be seen as either constraints or opportunities when it comes to planning healthier cities.

The second part of Chapter 3 consists of a discussion of the 'effects' or impacts on urban health which are generated by adverse environmental conditions such as a lack of active open space, poor air quality, transport pollution, poor quality building design and maintenance. On the positive side, the value of 'buffer zones' between conflicting land uses is noted and seen as a benefit whilst at the same time giving rise to possible adverse traffic conditions such as longer journeys to work.

A central theme which is touched on in this and other chapters is the proposition that the achievement of better standards of health in the city will require much higher levels of collaboration between agencies, a cooperative sharing of expertise and data, and an inter-disciplinary approach to policy-making and implementation.

Chapter 4 considers the complexities of the contemporary city planning process and the implications for environmental health planning of maintaining 'isolationist' positions amongst the various disciplines, professionals and sectoral agencies. An 'essential principle' is defined: one by which healthy urban planning becomes recognised as requiring interdisciplinary, interagency, and intersectoral collaboration.

The emerging practice of health impact assessment is discussed, along with comment on 'health by design' and the need for more robust efforts at tackling risk management and monitoring the consequences of remedial actions - especially in fields such as noise control, flood management, urban drainage systems, and contaminated land. Examples of good European practice are presented. A final note deals with the health benefits, which can flow from the adoption of mixed-use (as against segregated) land use zones in suitable areas.

Chapter 5 is a concise presentation of the key findings of the study. Current urban health conditions are summarised having regard to the core objectives of the study. The value of indicators in identifying problems and measuring achievements is discussed, a conclusion being that more work needs to be done both at the research level and in practice. Database development, coupled with a greater level of information exchange, is to be encouraged as a means of nourishing interdisciplinary collaboration.

Overall it can be concluded that if further progress in this sector of public policy is to be achieved, the WHO is seen as a crucially important player in the pan-European context in particular.

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## CHAPTER 1 - INTRODUCTION AND BACKGROUND

### 1.1 Urban planning and environmental health

Cities in Europe are currently facing major challenges. Today, over 60 percent of the European population live in urban areas with more than 50,000 inhabitants. By 2020, about 80% or more will be living in urban areas. The quality of the urban environment, and therefore the quality of urban health, are and will continue to be directly affected by urban planning decisions. In the cities - where jobs are created and where business and investment activities are undertaken - environmental health challenges will always be at their highest level.

### 1.2 Urban life and human health

Urban environments can obviously benefit human health where populations can meet their needs for hygiene, employment, and nutrition. At the same time, urban environments can also endanger health, either directly or indirectly. *Direct* risks occur when people are inadequately protected against disease caused, for example, by polluted air, soil or water. *Indirect* risks to health can occur through degradation of urban and hinterland resources, low-quality urban spaces, ecosystem disruptions, inadequate waste management, and poor transport. Poor management of urban environmental resources can contribute to global atmospheric, climatic, geological and marine changes - with consequent adverse economic, social and health impacts. The process is well illustrated by the worldwide climate change, which is being experienced today (IPCC, 2007<sup>1</sup>).

### 1.3 Health and planning of urban areas

Urban plans are key determinants of the shape of human settlements, the health and well-being of the inhabitants, and urban socio-economic conditions generally. It follows that planning decisions can systematically take account of the influence of the urban environment on human health. Urban planning practice can therefore be regarded as a central determinant of environmental health. Because cities are human creations as well as human habitats, human health is a central (if often un-stated) value in urban planning and governance. Urban planning priorities will therefore include both the enhancement of the quality of urban quality but also the provision of facilities and resources, which can protect and enhance human health.

Regrettably, this is often not the case because urban planning practice tends to be fragmented and planning for a great variety of urban purposes commonly lacks an integrated approach. Development planning often tends to be separated from daily governance as a direct consequence of sectoral approaches to these activities, and of functional and disciplinary specialization. In effect, there is a built-in resistance to intersectoral collaboration because of established specialist values and the interests of sectoral agencies and professional institutions (inter alia).

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<sup>1</sup> Intergovernmental Panel on Climate Change, Climate Change 2007 Fourth Assessment Report

## 1.4 Principles, concepts, terminology

Terms used in this report include “urban planning”, “sustainable city”, “environmental health” and “quality of life”.

**“Urban planning”** as used throughout this document refers to the process by which the use of land in cities is regulated in the public interest (European Sustainable Development and Health Series, WHO, 1999<sup>2</sup>). Governments throughout Europe have established systems intended to achieve this. The evolution of these systems within different cultural and institutional frameworks has led to variations in the terminology used to describe the process. The European Commission, through its Expert Group on the Urban Environment, has used the umbrella term “Spatial Planning” to describe the process. This term includes land-use planning, town and country planning, physical planning, urban and regional planning, territorial planning and space management systems. This document focuses primarily on urban issues and therefore uses “urban planning” as an umbrella term.

A **“sustainable city”** could be defined as a city whose population enjoys a high quality of life and which takes care not to transfer socioeconomic and environmental health problems and costs to other places or future generations (Girardet, 1992<sup>3</sup>). To achieve this goal, many people agree that new principles and processes of sustainable planning need to be created based on an intersectoral approach incorporating spatial and environmental aspects as well as health, social, cultural and economic aspects.

**“Environmental Health”** has several different meanings. One pertains to the state of the natural environment and characterizes its balance and integrity; therefore it refers to a “healthy environment” (European Sustainable Development and Health Series, WHO, 1999). In this context, sustainability primarily refers to natural resources such as air, water, soil, food supplies or forest products. The more common meaning given to environmental health in public health and governmental circles refers to the interactions between humans and all the factors in their physical and social environment. The objective of environmental health is a “healthful environment”, in which conditions protect and are conducive to human health. Between humankind and the environment there must exist an ecological balance in order to ensure well-being and survival of the species. It concerns the whole human person - not only his or her physical health but also mental health and the optimum social relations with the particular environmental context.

**Quality of Life** is a term appearing increasingly in Europe. According to different sources (Quality of Life Index, The Economist 2005<sup>4</sup>), the “Quality of Life” aspect in cities and towns in Europe remains unclear. Nevertheless it seems evident that quality of life is a measure of human well-being, or defines the situation in which people can live a healthy, enjoyable and pleasant life. It consists of two components: physical (health, protection) and psychological (stress, pleasure, emotion). Dimensions can be diverse and of different intensity but are always interconnected. Important factors like transport, mobility, green structures and landscapes (site-related factors) have a greater affect on the perception of quality of life than do other influences.

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<sup>2</sup> European Sustainable Development and Health Series, WHO, 1999

<sup>3</sup> Girardet, The Gaia Atlas of Cities, 1992

<sup>4</sup> Quality of Life Index, The Economist, 2005

## 1.5 Coverage and contents

This Report involves an overview of readily available knowledge on major urban planning and environmental health issues as identified in selections from the scientific literature, supported by evidence collected to date by the WHO and ISOCARP and placed in a European policy context. It includes:

\* Urban planning factors which are seen as causal elements in determining the quality of public health in urban areas - such as transport (e.g. congestion, pollution and stress); the built environment (density / building height / built form / choice of building materials); management of energy, water, waste; distribution and quality of public open space, parkland; and public services and utilities. [It is accepted that all these elements have both positive and negative attributes when it comes to evaluating their influence on human health].

\* The effects (from a health management perspective) of the above causal factors - taking into account such matters as air quality, noise, potential for spread of disease, security and safety, scope for encouraging physical exercise and healthy activities generally; plus intangible aspects such as the presence or absence of factors which contribute to personal well-being (e.g. beautiful surroundings and social interaction).

\* Discussion of the relationships between the above causes and effects and the potential for urban planning to ensure that outcomes are beneficial from a public health perspective.

\* Discussion of prospects for achieving improved public health through more appropriate design approaches (buildings, ensembles, urban space, utility networks and transport).

Where possible, case studies have been cited to illustrate the above points.

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## CHAPTER 2 - THE EUROPEAN CONTEXT

### 2.1 Urban planning and environmental health in the context of European Union (EU) policies

#### 2.1.1 Leipzig Charter 2007

The ambitious intent of the Charter is to “*overcome demographic and environmental problems, social inequality, social exclusion and the lack of low priced housing space in European cities by encouraging their strengths like the unique cultural and architectural qualities, strong forces of social inclusion and exceptional possibilities for economic development...*”<sup>5</sup>

EU cities should adopt the partnership model in their work with government at all levels and with civic and NGO bodies - especially in the preparation of integrated urban development programs, in SWOT analysis, and in defining concrete development objectives. Competition between cities should be reduced and replaced by a European city network within a set of strategic objectives covering

- The creation of high-quality urban public spaces and the protection of heritage (the *Baukultur* concept);
- The modernisation of infrastructure and the more efficient use of energy through better traffic management including linkages between all modes; improved design of buildings and facilities based on low energy consumption and low emissions; the development of new low-carbon industries and businesses; stronger controls over land supply and speculative development through spatial and urban planning to inhibit sprawl and encourage the creation of compact energy-efficient settlements; and utilising the newest communication and information technologies to improve education, employment, social service, health, safety and security and urban governance (all of which in turn go to improving quality of life and the attractiveness of the city as a location for business; and
- Enabling and assisting the development of proactive innovation and educational policies in order to capitalise on the great knowledge potential that the cities contain.

The Leipzig Charter has a second strand concerned with the support needs of deprived urban neighbourhoods and the problems of high unemployment rates and social exclusion. Policies for social integration and social housing should be used to create healthy, suitable and affordable housing. Participation of residents, and dialogue between political representatives, residents and the economic sector, are all seen as important ingredients in the process.

Under this second strand, the Leipzig Charter subsumes another set of strategies to overcome the obstacles blocking the achievement of sustainable urban development. These include the need to up-grade the physical environment (of urban areas) - requiring quality urban structures and modern and efficient infrastructure necessary to initiate economic activity and investment.

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<sup>5</sup> European Commission, The Leipzig Charter, 2007

In short, the Charter emphasizes that the utilization of European structural funds for substantial integrated urban development programmes should focus on specific difficulties and potentials in the Member States, thereby reinforcing (through training, research and knowledge sharing) the urban dimension of European policies such as the Lisbon Strategy 2000, where the origins of contemporary EU policies can be found.

Lisbon's strategic aim was to develop the EU *“to become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion”*<sup>6</sup>. Europe was to be prepared for the challenges of globalization by investing in research, information technology, education and human resources to create a highly flexible economy decoupled from the use of natural resources. The program was initially structured around two ‘pillars’ - economic and social - with a third (environmental) being added in Gothenburg in 2001.

In Gothenburg the ‘environmental pillar’ of the Lisbon Strategy was explored amidst concerns about sustainable development and the environmental dimensions of employment, economic reform and social cohesion<sup>7</sup>. The Council proposed that future agricultural policy should include among its objectives the achievement of sustainable development by way of greater encouragement for healthy, high-quality products, and environmentally sustainable production methods.

In parallel, a sustainable transport policy would rising traffic and congestion levels, noise and pollution whilst encouraging the use of environment-friendly modes of transport and the full internalisation of social and environmental costs. Greater use of rail, water and public passenger transport was to be pursued. Land use management policy would emphasize the need to promote more balanced regional development as recommended by the European Spatial Development Perspective.

### **2.1.2 Implementation of the Leipzig Charter**

During the 2008 French Presidency, urban development ministers discussed the topic of the “sustainable and cohesive city” in Marseille (November 2008) and decided that implementation of the Leipzig Charter favoured integrated sustainable urban development<sup>8</sup>. This would be achieved by the adoption of a multisectoral approach; by linking governance, environment, economy and social inclusion; and by combining global and local approaches, blending the very short term with the long term.

Accordingly, the ministers confirmed their commitments to the adoption of the Leipzig Charter, with particular emphasis on supporting deprived city neighbourhoods where the very future of such cities is at stake. They recommended a regular follow-up of the implementation of the Charter through meetings of ministers holding urban planning and development portfolios. Furthermore, they proposed to push for an improvement of knowledge about the city, to consider the key roles of architecture

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<sup>6</sup> European Commission, The Lisbon Strategy, 2000

<sup>7</sup> European Commission, The Gothenburg Strategy, 2001

<sup>8</sup> European Commission, Final Statement by the ministers in charge of urban environment, French Presidency, 2008

and urban design in the achievement of integrated and sustainable urban development, and to implement integrated urban development policies. Ministers favoured greater consistency between urban functions and the concurrent implementation of policies of local economic development, education of young people, urban planning development, and access to high quality transport (including public transport) for the benefit of residents of deprived neighbourhoods. They also decided to build a reference framework for the sustainable city, based on a Final Appendix to the final statement.

### **2.1.3 EU Sustainable development strategy: progress report**

The European Council (June 2006) adopted an ambitious and comprehensive renewed SDS for an enlarged EU. It builds on the Gothenburg strategy of 2001 and is the result of an extensive review process that started in 2004.

The renewed EU SDS offers a single, coherent strategy on how the EU will more effectively live up to its long-standing commitment to meet the challenges of sustainable development. It recognises the need to gradually change current unsustainable consumption and production patterns and move towards an effectively integrated approach to policy-making. It reaffirms the need for global solidarity and recognises the importance of stronger work with partners outside the EU, including those rapidly developing countries, which will have a significant impact on global sustainable development.

#### Outline

The overall aim of the EU Sustainable Development Strategy is to identify and develop actions to enable the EU to achieve a continuous long-term improvement of quality of life through the creation of sustainable communities able to manage and use resources efficiently, able to tap the ecological and social innovation potential of the economy and in the end able to ensure prosperity, environmental protection and social cohesion<sup>9</sup>.

The strategy sets overall objectives and concrete actions for the following seven key priority challenges for the coming period until 2010, many of which are predominantly environmental.

- Climate change and clean energy
- Sustainable transport
- Sustainable consumption & production
- Conservation and management of natural resources
- Public Health
- Social inclusion, demography and migration
- Global poverty and sustainable development challenges.

To improve synergies and reduce trade-offs, a more integrated approach to policy making is proposed, based on better regulation (impact assessments) and on the guiding principles for sustainable development (adopted by the European Council of

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<sup>9</sup> Council of the European Union, EU Sustainable Development Strategy, 2006

June 2005). The external dimension of sustainable development (e.g. global resource use, international development concerns) is factored into EU internal policy-making and through integration of SD considerations in EU's external policies.

The EU SDS seeks to be a strategy for the whole EU. It therefore proposes mechanisms for improving coordination with other levels of governments and calls upon business, NGOs and citizens to become more involved in working for sustainable development. An example of this is the launch of a process for voluntary peer reviews of national sustainable development strategies, aimed at improving the sharing of good practices.

Education, research and public finance are stressed as important instruments in facilitating the transition to a more sustainable production and consumption patterns. And because monitoring and follow-up are crucial for effective implementation, the renewed strategy contains a strong governance cycle. Every two years (started in 2007) the Commission is to produce a progress report on the implementation of the strategy. This report is to form the basis for discussion at the European Council, which will give guidance to the next steps in implementation.

## 2.2 EU Strategy Papers

The Sixth Environment Action Programme of the European Community entitled "*Environment 2010: Our Future, Our Choice*" covers the period from 22 July 2002 to 21 July 2012, in which the European Union defines the priorities and objectives of European environment policy up to 2010 and beyond, and describes the measures to be taken to help implement its sustainable development strategy.

The action programme developed seven thematic strategies covering **air pollution, the marine environment, sustainable use of resources, prevention and recycling of waste, sustainable use of pesticides, soil protection and urban environment**. In 2006 the European Union adopted the Sustainable Development Strategy, with a progress report in 2007. Some components of urban planning and environmental health are described in the thematic strategies on air pollution and urban environment, but are not discussed explicitly.

### 2.2.1 Thematic Strategy on the Urban Environment

The Thematic Strategy on the Urban Environment, adopted in January 2006, is an important future policy element of the European Commission. It describes the problems facing many urban areas within the European Union and recognises their widely divergent circumstances. It does not propose uniform binding measures - instead pointing to other ways in which cities' problems can be tackled. A Guidance related to the Thematic Strategy on the Urban Environment (EU, 2007<sup>10</sup>) aimed to assist municipal authorities in establishing systems for integrated environmental management and to improve environmental performance generally.

The Thematic Strategy recognises that most cities face environmental problems such as poor air quality, high traffic and congestion levels, high levels of ambient noise, a poor-quality built environment, derelict land, greenhouse gas emissions, urban sprawl,

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<sup>10</sup> European Commission, Thematic Strategy on the Urban Environment, 2007

excessive waste, and a lack of strong land-use planning instruments. Problems and their causes are interconnected; and only integrated inter-governmental policies and long-term strategic action plans will bring success. The Strategy proposes the following measures:

- **An *Integrated approach to the management of the urban environment***, to achieve a long-term vision for the city development: “clear defined objectives, targets, accepted responsibilities, procedures for monitoring progress, public consultation, review, audit and reporting”;
- ***Sustainable urban transport plans***: “Transport planning should take account of safety and security, access to goods and services, air pollution, noise, greenhouse gas emissions and energy consumption, land use, passenger and freight transportation, and all modes of transport”;
- ***Exchange of experience and best practices***, through networking and demonstration;
- ***Internet Portal for Local Authorities***;
- ***“Face-to-face” training for authorities***, “in the adoption of an integrated approach to management involving cross-sector cooperation and training on specific environmental legislation, effective public participation and encouraging changes in citizens’ behaviour”;
- ***Drawing on other community support and urban research programmes***.

The Thematic Strategy also proposed synergies with other policies on climate change, nature and biodiversity, and sustainable use of natural resources. The policy on environment and quality of life is significant in the context of this report because of its emphasis on reducing air pollution and noise through sustainable urban transport and improvements to health and reducing obesity. The Strategy involves an Urban Audit (published in 2007 and accessible on-line: <http://www.urbanaudit.org>.)

### 2.2.2 Green Paper - Towards a new culture for urban mobility

In this Paper, urban mobility is recognised as an important facilitator of growth and employment with a strong impact on sustainable development in the EU<sup>11</sup>. The Commission’s Green Paper on urban mobility explores if and how the EC can add value to actions already taken at local level. Several EU policies have already addressed urban transport issues in past years; and some legislative initiatives (if somewhat fragmented) have been developed.

Topics covered include ‘free-flowing’ towns and cities; greener towns and cities; smarter urban transport, accessible urban transport, and safe and secure urban transport. The Paper discusses the creation of a new urban mobility culture, where knowledge and data collection will play an important role. The conclusion covers financial resources.

### 2.2.3 Thematic strategy on air pollution

#### Air quality

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<sup>11</sup> European Commission, Green Paper - Towards a new culture of urban mobility, 2007



In order to attain "levels of air quality that do not give rise to significant negative impacts on, and risks to human health and environment", this Thematic Strategy supplements the current legislation. It establishes objectives for air pollution and proposes measures for achieving them by 2020. Existing legislation is improved, placing emphasis on the most harmful pollutants, and involving to a greater extent the sectors and policies which relate to air pollution<sup>12</sup>.

Health and environmental objectives and emission reduction targets are set for the main pollutants. These objectives will be delivered in stages, the aim being to protect EU citizens from exposure to particulate matter and ozone in air, and protect European ecosystems more effectively from acid rain, excess nutrient nitrogen, and ozone. A significant reduction in particulate matter and tropospheric ozone will bring public health benefits and will also generate benefits for ecosystems.

Compared to the 2000 picture, the Strategy sets specific long-term objectives (for 2020):

- 47% reduction in loss of life expectancy resulting from exposure to particulate matter;
- 10 % reduction in acute mortalities from exposure to ozone;
- Reduction in excess acid deposition of 74% and 39% in forest areas and surface freshwater areas respectively;
- 43% reduction in areas or ecosystems exposed to eutrophication.

To achieve these objectives, emissions of SO<sub>2</sub>, NO<sub>x</sub>, volatile organic compounds, ammonia and primary PM<sub>2.5</sub> (particles emitted directly into the air) will be significantly reduced. Implementing the Strategy will incur additional costs but these will be greatly exceeded by savings in health care and prevention, and in a substantial reduction in premature deaths. Environmentally, there should be favourable impacts as a result of reducing acid rain and nutrient nitrogen inputs resulting (among other things) in improved biodiversity protection.

The Strategy provides for revision of legislation on national emission ceilings. Subject to strict conditions, certain deadlines for the implementation of legislation, modernising data communication, and improving coherence with other environmental policies are extended.

More efficient energy use can help to reduce harmful emissions; hence new targets for the production of energy and electricity from renewable energy sources (including biofuels) are major factors in this connection. The Strategy covers the energy performance of small combustion plants and small heating installations, and also provides for examining how to reduce VOC emissions at filling stations.

### Transport emissions

The Strategy proposes further reduction of emissions from new passenger cars, vans, and heavy-duty vehicles. Improved vehicle approval procedures, differentiated charging, and special provisions for older vehicles are envisaged.

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<sup>12</sup> European Commission, Thematic Strategy on Air Pollution, 2005

The Commission plans to examine the impact of aviation on climate change in a forthcoming communication. Where shipping is concerned, the Strategy provides for the continuation of negotiations with the International Maritime Organisation, the promotion of shore-side electricity for ships in port, and the consideration of pollution issues in relation to funding through programmes such as Marco Polo.

In agriculture, the strategy promotes reductions in the use of nitrogen in animal feeds and fertilisers together with possible provisions for reducing ammonia emissions from agricultural sources and from farm modernisation in particular.

[Note: The Strategy was based on research carried out under the Clean Air For Europe (CAFE) programme and the following research programmes, and was adopted following a lengthy consultation process involving the European Parliament, Non-Governmental Organisations and industry and private individuals].

### **2.3 EU Directives relevant to urban environmental management and health**

#### EU Directive Noise:

Further to the Commission proposal for a Directive relating to the assessment and management of environmental noise (COM.2000.468) the European Parliament and Council have adopted Directive 2002/49/EC of 25 June 2002 whose main aim is to provide a common basis for tackling the noise problem across the EU. The underlying principles of this text are similar to those for other overarching environmental policy directives:

\* Monitoring the problems by requiring competent authorities in Member States to draw up *strategic noise maps* for major roads, railways, airports and agglomerations, using harmonised noise indicators - Lden - (day-evening-night equivalent level) and Lnight (night equivalent level). These maps will be used to assess the number of people annoyed and sleep-disturbed respectively throughout Europe.

\* Informing and consulting the public about noise exposure, its effects, and the measures considered to address noise in line with the principles of the Aarhus Convention.

\* Addressing local noise issues by requiring competent authorities to draw up action plans to reduce noise where necessary and maintain environmental noise quality where it is good. The Directive does not set any limit value, nor does it prescribe the measures to be used in the action plans. These remain at the discretion of the competent authorities.

\* Developing a strategy to reduce the number of people affected by noise in the longer term, and provide a framework for developing existing ECommunity policy on noise reduction at source. In this context the Commission has made a declaration in relation to the preparation of legislation relating to sources of noise.

#### EU Directive - Ambient Air Quality and Cleaner Air:

The new Directive 2008/50/EC of the European Parliament and Council of 21

May 2008 (2008/50/EC) of the European Parliament and Council of 21 May 2008 on ambient air quality and cleaner air for Europe came into force on 11 June 2008. This new Directive includes the following key elements:

- The merging of most existing legislation into a single directive (except for the 4th daughter directive) with no change to existing air quality objectives;
- New air quality objectives for PM<sub>2.5</sub> (fine particles) including limit value and exposure related objectives - exposure concentration obligation, and exposure reduction target;
- The possibility of discounting natural sources of pollution when assessing compliance against limit values;
- Allowing possible time extensions of 3 years (PM<sub>10</sub>) or up to 5 years (NO<sub>2</sub>, benzene) for complying with limit values, based on conditions and assessment by the EC.

The Commission adopted a proposal for a directive on ambient air quality at the same time as it adopted the thematic strategy on air pollution.

The Member States have 2 years to transpose the new Directive, during which time the existing legislation will continue to apply. Some provisions of the new Directive such as PM<sub>2.5</sub> monitoring requirements have to be implemented sooner. It is expected that the provisions enabling notifications of postponements or exemptions in respect of limit values for PM<sub>10</sub>, NO<sub>2</sub> or benzene will be applied before the end of the 2-year transposition deadline.

Other relevant EU directives or strategic documents of relevance to this study include

- EC Directive 91-271 EEC on urban waste water;
- EC Directive 2006-12-EC on waste water;
- Annex to sustainable urban transport plans;
- Sustainable urban transport plans;
- Thematic Strategy on Urban Environment;
- Guidance on Integrated Environmental Management;
- EC Directive 2002-49-EC on environmental noise;
- EC Directive 2008-50-EC on ambient air;
- EC Directive 2004-107-EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air;
- Commission Recommendation 2004-345-EC on enforcement in the field of road safety;
- EC Directive 2000-76-EC on the incineration of waste.

## 2.4 New roles and responsibilities for European local authorities

Cities are fundamental and decisive elements of European identity, culture and history. Cities determine the polycentric structure of Europe's territory, as well as being a social reality and a reflection of social and political choices. They are key players in a competitive global economy, and are major drivers of economic development and innovation. Their diversity in size, form and methods of governance is an asset that should be exploited. At the same time, this characteristic brings difficulties when it comes to designing planning and environmental processes, which can be universally applied.

Today's local authorities are facing new and daunting challenges in several fields, including *social cohesion*, the *environment* (climate change in particular), *competitiveness* in the context of globalisation, the global *energy* situation, and the current financial and *economic crises*. Local authorities are having to deal with tensions and risks of fragmentation of their territories. At the same time, they must search for excellence in their various programs, for ways of achieving integration of local and migrant populations, and for opportunities to show solidarity with their most vulnerable social groups.

The development of integrated urban development policies based on sustainable city models stands as a special priority target. In the immediate future this will be the main challenge and responsibility of local authorities throughout Europe.

The *Sustainable City* model is based on the connecting the three pillars *Environmental, Economic and Social*, and on the introduction and integration of multi-level and multi-sectoral governance structures. For health planning and the wider field of planning for healthy cities, this means devising new ways of responding to old problem whilst coping with the what might be described as an 'avalanche' of new problems, new laws, new policies and regulatory regimes.

Ideally, this new integrated approach to sustainable urban development will be based on finding harmonies and synergies within and between all public policies that affect the city, from the European to the municipal level. This will require new ways of organising territorial governance and partnerships between different levels of administration and other relevant stakeholders. In the environmental health field in particular it will require a loosening of the old 'silo' mentality within agencies and between professionals working across the entire urban health and planning spectrum.

## CHAPTER 3: Urban planning and environmental health - causes, effects, prospects

### 3.1 Urban planning elements as causes of environmental and health concerns

#### 3.1.1 Generally: an overview

##### Buildings, places, and health

There is growing recognition of the influence of the social, physical, and built environments on people's mental and physical health, and social well-being. Urban health inequalities reflect inequities in economic, social and living conditions. Features of the built environment, which contribute to sedentary lifestyles and harmful exposures are linked to obesity, chronic diseases, and injuries. Land use fragmentation and segregation can make it difficult for people to develop and sustain social support networks. Conversely, well-designed urban environments can provide a healthy setting that protects and promotes both the wellbeing of the inhabitants and environmental sustainability.

Connections between health and the design or form of residential environments have not yet been investigated thoroughly. However, several important aspects have been identified. These include housing quality; access to basic services, recreational facilities and green spaces; transport options, including cycling and walking; residential segregation; security from violence; environmental hazards; sprawling suburbs; and sustainability.

##### Nature and green space

Access to quality public spaces, to efficient public transport and walkable neighbourhoods can encourage physical activity, increase the likelihood of social interaction, improve people's quality of life and contribute to better air quality. There is a growing understanding that contact with nature can bring beneficial effects on stress and attention restoration, can improve children's behaviour, can reduce aggression and violence, and can influence the amount of physical activity. Green areas, perceived as more attractive than built environments, may act as an incentive for residents to be physically active.

Evidence from the Netherlands shows that children living in a 'green' environment, with fewer high-rise buildings and more outdoor sports facilities, are more active physically and show higher levels of concentration than those who are not so well placed. Views of nature have been associated with lower blood pressure, less anxiety among dental patients, decreased mortality among senior citizens, and faster recovery for patients in hospital.

In the urban planning field, recognition of biodiversity and distinctive urban ecosystems - perhaps associated with key environmental services such as drainage and flood mitigation - can help to deliver important social and health benefits. Benefits to human health are associated with biodiverse urban vegetation through improved air quality, alleviation of the 'heat island' effect, and sequestration of CO<sub>2</sub>.

## Neighbourhood character and quality of housing

At the neighbourhood level, the health of individuals and of the population generally is influenced by the nature of the locality and the opportunities it offers for healthy exercise, clean air, and social networking - all of which can help to combat obesity, chronic diseases, respiratory and mental health problems. Individual perceptions of the neighbourhood are also relevant, and should be considered in formulation of local public health policies. Walking and other outdoor activities can lead to more frequent social contacts, important for mental well-being. Resident perceptions of control over their housing conditions can be significant in the prevention of anxiety or depression, whilst deteriorating neighbourhood conditions can decrease the level of satisfaction with the physical environment and have a negative influence on perceptions of safety.

Housing conditions affect health and well-being. Low standard buildings, with poor energy performance and “fuel poverty”, bring thermal discomfort. Cold, poor ventilation and inadequate heating contribute to dampness, and damp and mouldy homes are linked to allergies, respiratory and skin problems whilst severe cold is the underlying cause of higher winter death, especially amongst the elderly. Inadequate housing is also a part of a mechanism through which poverty affects health and well-being, especially in vulnerable and marginalized population groups.

## Sprawl

As cities grow, people spend more time in cars - and the increasing use of cars contributes to air pollution, noise, urban congestion, traffic accidents, and less physical activity. The health and well-being of city dwellers can be enhanced by good design and quality in the urban transport systems; and effective urban public transport systems and safe walkable tracts need to be promoted. The ‘urban sprawl’ syndrome is associated with air pollution, traffic accidents, declining water quality, driving-related stress, and the loss of social capital. ‘Suburban sprawl’ is linked to obesity, high blood pressure, physical inactivity due to high car dependency, and other relevant factors such as inadequate access to recreational facilities.

## Noise and light pollution

Chronic exposure to noise is associated with sleep disturbance, increased risk of heart disease, hearing impairment and mental illness. In urban settings, effects of noise may be exacerbated by interaction with other environmental stressors such as air pollution and chemicals. Noise is a problem for one in three households in the UK, and has a major impact on the wellbeing of one in a hundred people. Problems tend to be worse in areas of deprivation, high density housing, and rented accommodation.

Urban light pollution, a symptom of unsustainable energy production and use, obscures the night sky, may be a nuisance, and can affect the behaviour of wildlife. Over 90% of the EU population lives in areas that are affected to some extent. On the other hand, lack of adequate daylight, and insufficient illumination, affects psychological well-being of adults; and the quality of natural lighting in schools may be associated with pupil motivation and effective learning time.

## Climate change and heat islands

Climate change is a new, complex challenge to public health in urban settings. Cities are more vulnerable because of high concentrations of people and their reliance on complex systems to deliver power, water, communications, transport and waste disposal. Climate change is likely to lead to an increase in the frequency of extremely hot days. Children, infants, older people, and those living in disadvantaged areas are especially susceptible to heat stress. Climate change may also exacerbate urban air pollution.

Urban heat islands can directly affect human well-being, and can accelerate chemical reactions that produce high ozone concentrations with a consequent increase in urban air pollution. The hottest zones in the city are those with the tallest buildings, the highest density of buildings without green spaces, and the most intense generation of heat from human sources. The urban heat island effect may also add to heat stress and to higher night-time temperatures, causing sleep disturbances.

## Inequity

Adverse environmental and health impacts of urbanisation and urban life generally are not equally distributed. The poorest people often experience the poorest quality environments. They tend to live in degraded or poorly maintained sectors of a city, and suffer from a lack of green space and public transport services, noisy roads, industrial pollution or proximity to contaminated sites. [In the UK in 2004, 20 % of the lowest income group lived in poor quality environments compared to 11 % of those in the highest income distribution group].

### **3.1.2 Environmental factors**

Human health and well-being are affected by a range of pollutants and other environmental factors. While no areas are totally immune, it is our cities and towns, which produce much of the pollution and where the worst effects tend to be concentrated. Indeed, there has been a growing realisation over many decades of the extent of this pollution and of the link between air, water, and soil quality and human health.

## Air quality

The pollution that affects air quality in our cities and towns stems largely from three main sources: industry, the burning of fossil fuels for heating or electricity generation, and transport. The contribution of industrial pollution varies greatly both between countries and between urban areas. Where industry is present its impacts will depend upon the nature of its production and the extent of reliance on fossil fuels and other factors such as topography and the prevailing wind direction.

The burning of fossil fuels in local power stations for electricity generation, and as a direct source of heat for dwellings, is a continuing source of pollution in some areas, although it is now largely a thing of the past in many European countries. There has been a switch to less polluting natural gas in many places, while power stations reliant on other fossil fuels have mostly been retrofitted with desulphurisation equipment and

devices able to remove nitrogen oxides in line with EU Directives. In the northern member states, in particular, there has been a heavy emphasis on energy efficiency and combined heat and power, which reduces the need to burn polluting fuels.

The widespread reductions in air pollution from these two sources have been countered by increases in emissions from road transport. Here the key pollutants include carbon monoxide, nitrogen oxides, ozone, sulphur dioxides and particulates (known as PM<sub>10</sub>, and the fine fraction - PM<sub>2.5</sub>). Exposure to anthropogenic particulate matter, especially PM<sub>2.5</sub>, which can penetrate the respiratory tract, is a serious public health concern in most European cities. The trend in most member states has been towards reductions in the levels of some of these pollutants, due largely to the compulsory fitting of catalytic converters to new petrol-fuelled cars. However, the growing volumes of traffic in most cities and towns have slowed the rate of improvement and in some cities, levels are rising again.

### Water quality; floods

The quality of water in urban rivers can leave much to be desired. While in many countries there have been clean-up campaigns focusing on industrial discharges and sewage treatment works, there remains much to do. A characteristic of many urban rivers is that they run through manmade channels or culverts, often surrounded by relatively impermeable surfaces. This means that the surface water can enter the river in sudden bursts causing major changes in flow rates, water temperature and chemical loads.

Because of the inherently high pollution from population centres, including that from industry and commerce, many urban rivers do not have the good chemical or biological quality that is characteristic of rivers flowing through rural areas. In some areas, these problems are worsened by ageing water and sewerage infrastructure and the leakage and flooding that can stem from this.

There are three related issues. The first is that of tighter water resources, the causes of which are population/household growth, rising per capita consumption and, increasingly, climate change. Problem areas include the southeast of England and the Spanish resort areas where there has been mass urbanisation and 'water hungry' tourist developments.

Second, many millions of properties are at risk of river or coastal flooding, with a high proportion of these being within towns and cities. The problem is likely to be exacerbated by climate change, which will bring higher sea levels, as well as greater winter rainfall in some parts of Europe. Third, there is a growing incidence of 'flash flooding' brought about by climate change. This can happen outside places traditionally thought of as flood risk areas, and it results from the sheer intensity of rainfall overwhelming the capacity of drainage systems.

### Ground and soil contamination

Ground contamination can be a major concern in many older cities and towns. It is often a legacy of long-passed industrial/infrastructure development, the result being that sites once occupied by heavy industry, by gasworks and by 'engineering' uses such



as railway yards can be badly polluted. Such chemicals can persist in the environment for decades or centuries and, over the long-term, leachate can threaten water supplies.

While there is much greater knowledge now about industrial emissions, and while significant projects are typically subject to environmental impact analysis (and integrated pollution prevention and control), there is a need for great vigilance given the complexity of the chemicals in use, the unknowns about their capacity to combine in the environment, and the potential health impacts of such 'cocktails'.

### Urban waste

Much the same applies to urban waste disposal. While there has been great progress made in the management of waste, systems are having to cope with an ever expanding range of discarded consumer products. For reasons of sustainability, the emphasis has switched to the reuse/recycling of products, requiring the ever more sophisticated handling of individual 'waste streams', while incineration brings with it the potential for generating electricity/heat. However, in many areas, there is a continuing reliance on landfill and an accompanying pollution risk if this is not properly managed.

### Environmental noise

Is yet another environmental hazard, which can have significant health effects in urban areas. Its sources include road, rail and air traffic, industries, construction and public works, and neighbourhood noise.

### **3.1.3 Transport and mobility**

The post-war era witnessed a shift in citizens' attitudes toward society in general and urban life in particular. French historian Marcel Gauchet has referred to this phenomenon as "mass individualism". Mass individualism is characterized by the increased consumption of positional goods - goods that position individuals in relation to others - notably freestanding, single-family houses and personal cars.

The historical reasons for this shift in consumer preferences originated in the United States. It was largely shaped through the common interests of three industrial sectors: the oil sector (which had practically disappeared following the replacement of petroleum lamps by electric lighting), the nascent automobile sector (which was championed by Henry Ford), and the various industries associated with highway construction and suburban development.

Together, these sectors became infinitely stronger - in political and economic terms - than the large railroad companies, which had been all-powerful at the beginning of the century but still had to finance their own infrastructure. By contrast road infrastructure and maintenance were from that period financed by the public sector and no longer by tolls as had been the case throughout history. Therefore personal investment in cars was encouraged even more than by the increased household income (coupling between household income and car ownership).

This may be seen as a primary cause of urban sprawl and its consequences for people and society generally - in terms of air and water quality, disturbances to urban and

neighbourhood fabric, distances travelled, and impacts on natural landscapes, open space, agriculture and bio-diversity. [GAUCHET, Marcel, *Le désenchantement du monde*, Paris : Gallimard 1985; and EEA Report *Urban Sprawl in Europe*, 2006].

#### **3.1.4 Built environment - historical context**

The regional focus of this report is the European built environment. It follows that the specific historical background in the development of European urban structure and space needs to be understood, even if only in outline. A comprehensive summary might reveal causal factors, which produced the immense variety of building styles, forms and materials, which are evident in European cities.

At the beginning, dense settlements functioned in part to protect their inhabitants from outside dangers such as nature and enemies. It was both safer and healthier, through density and fortification, to live in town than to live “extra-muros”.

As time passed, more effective and intensive commercial and industrial activity required new kinds of space and triggered the breaching or freeing of medieval fortresses and limited territorial extension. Society slowly learned how to reduce the adverse impacts of fires, catastrophes and epidemics through the application of hygienic practices in the planning and construction of urban neighbourhoods. Healthier urban living conditions were developed through safer construction materials, better lighting, natural inner and outer ventilation, and green pathways and parks.

Later still, urban planning itself became a professional activity through the growth of urban economies and capital-based development. Modification and amplification of the built environment, together with the colonization of new territories, provided creative challenges and responses to regional and local demands. At the same time, public health was becoming increasingly at risk due to severe industrial pollution and traffic congestion.

WW II brought bombing and destruction of historic towns, and added new categories to the built environment through mass production, mass construction, re-construction, and the urgent need to create new and healthy urban settings for all - in the shortest time possible. New materials and construction methods were applied; panel block housing estates arose everywhere.

Despite all the lessons learned from the past, and all the acquired “state of the art” knowledge about shaping liveable urban spaces and environments, the dream of unlimited economic growth and of a never-ending supply of natural resources, new mistakes continue to be made. Traffic, noise, speed, individual isolation, monotony, and highly concentrated services have given rise to unhealthy living conditions in today’s towns - all of which are associated with the phenomenon known as ‘urban sprawl.’

#### **3.1.5 Land use management; forms, principles and limits**

*Land use management* is not a clearly defined term. In addition to planning, there are many activities dealing with land use, which together might influence living conditions in certain areas. However, a common feature of all serious planning models is that

they seek to contribute to a positive and sustainable future (despite a general lack of evidence that complete success in this difficult yet noble field is actually achievable).

Formal spatial planning based on legal regulation usually involves a ‘top-down’ approach by public authorities at different spatial levels, ranging from national to regional to local scale. Theoretical goals include

- The allocation of all the spatial elements necessary to achieve the optimum development of a city/region/country; and/or
- Defining and allocating the optimum land use for each single piece of land in a given territory.

The underlying basis of the planning process is the natural environment and its carrying capacity. The resulting plans usually define what land-owners are permitted to do on their land. Such plans might appear to be strong and powerful instruments for steering spatial development and avoiding or solving spatial conflicts, but shortcomings exist.

- As the implementation of formal plans usually takes time it is practically impossible to keep them up-to-date and sensitive to current development pressures.
- Although spatial planning should always be an interdisciplinary, integrative task, which considers all relevant aspects, occasionally there are numerous sectoral plans and concepts which either complement and substantiate (or contradict) the formal territorial plans. It is not possible to see and foresee every aspect of development.
- Even within the same land use categories, possibilities are many. Housing can range from single-family-houses on large plots to very high-density-developments. Densities might be similar in some areas, but housing quality can vary significantly within such areas.
- Although planners and planning officials might do their best to make plans FOR the people in a top-down-approach, problems of integration and community involvement remain. Recognition of this has led to practices involving the people from the very beginning; planning is tending towards becoming more of a mediation process designed to develop future perspectives.

## **3.2 Effects arising from the above causal factors**

### **3.2.1 Generally**

Recent research (see Appendix) reveals that the impacts of the urban environment on health are profound and are likely to be modified in the face of future environmental challenges such as climate change. As discussed above at 3.1, causal elements include air pollution, noise, exposure to hazardous substances, and physical inactivity due to increasing dependence on car transportation, lack of safe, accessible open green areas and other walkable public spaces, as well as lifestyle and consumption patterns.

Overall, it seems clear that whilst particular factors relating to health in the urban environment remain important, the main challenge to understanding the full extent of the effects of urban living on health is a complex web of interactions between these individual factors.

#### Physical activity

A sedentary urban life increases the risk of obesity, chronic disease, and premature mortality, with the effects on physical functioning being greater in older adults. As the population is ageing, physically active living should be encouraged (e.g.) by providing safe, accessible green areas, which facilitate walking and social interaction. Physically inactive children are at risk of becoming inactive and obese adults. Lifestyle, consumption patterns (partly related to urban design) and obesity are linked.

Levels of physical activity are determined in part by relative ease of access to facilities, the quality of facilities, and perceptions of neighbourhood safety. In areas with high levels of graffiti, litter and dog mess, residents may be less likely to be physically active and more likely to be overweight. In eight European cities, people who live in areas with high green space provisions were three times more likely to be physically active and 40% less likely to be overweight or obese (than those living in areas with poor open space provisions).

#### Neighbourhood amenity

The social quality of a neighbourhood may depend largely on the quality of the physical environment, and perceptions of social and physical features of the neighbourhood are important for individual physical and mental health. Perceptions of excessive noise, heavy traffic, inadequate lighting, and limited access to public transportation were shown to increase the risk of physical impairment in older adults in the US. Perception of social nuisance in the neighbourhood can also increase the risk of obesity and poor self-rated health.

#### Mental health

The way in which urban living affects mental health and well-being is still poorly understood. Shifts in social networks and living arrangements, differences in social support, stressful life events, and familial liability are possible contributory factors. The mental health of the elderly is becoming an issue, especially for lower income groups. Chronic stress and easy access to harmful products create additional risks for substance abuse and dependency in the urban setting. Unfavourable community processes such as lack of social control and poor social capital are associated with anti-social adolescent behaviour and mental health.

The quality of the local neighbourhood environment, coupled with lack of space both within the home and outside, is linked to poor mental health. Children are at particular risk of poor health as a result of limited space and overcrowding. Various elements of an individual's housing situation are associated with depression, isolation, and anxiety, while other housing characteristics may have a positive influence on mental health.

## Air quality

Ambient air pollution from motor vehicles, industry, power stations and homes remains a major public health issue in urban areas. Almost 90% of European city dwellers where particulate matter is monitored are exposed to levels that exceed WHO standards. Average life expectancy is reduced by almost a year - and may reach two years in the most affected areas. WHO estimates that in the cities with population over 100,000 in the European Region, about 169 000 deaths per year could be prevented if PM levels were to be reduced to WHO standards. Many of the most affected cities are either old cities with narrow streets, often situated in valleys, or industrial cities with substantial traffic flows.

### **3.2.2 Environmental Factors**

#### Transport pollution

There is a worldwide consensus that road transport pollution has a significant adverse effect upon human health. There is particular concern about the effects of particulates (emissions from older diesel engines being an especial problem) and ozone. The effects include mortality, acute and chronic respiratory and cardiovascular impacts. Another widespread condition is that of asthma and here young children are particularly vulnerable. Recent research findings show that children living close to busy roads have an approximately 50% increased risk of experiencing respiratory illness, including asthma.

#### Water quality, flood events

Because of their indifferent water quality, many of our rivers and lakes are still not safe for swimming. In certain countries, the water supplied through the tap cannot be relied upon for drinking purposes.

Flooding can be a major concern, the effects of which are predicted to increase with climate change. Not only does flooding cause damage to property and pose major problems for government and the insurance industry: it can also impinge seriously upon the health and well-being of affected individuals, families and communities. Flood events, coupled with the blighting effect in areas that are at risk, can cause severe psychological distress as well as actual illness and death. They can affect the morale of whole communities for lengthy periods.

#### Brownfield land

An issue for many urban communities is the disused brown field land close to housing areas. Often this remains undeveloped and semi-derelict because of its known or perceived history of contamination, and the preference of builders for more straightforward sites. However the long-term presence of such land (and the fears that it can instil) can have a severe depressing effect upon local people, affecting their health and well-being. In some instances, people's health has been directly affected through the leaching of pollutants onto their land as can also happen close to waste landfill sites.

### Incineration and energy recovery

These have often been seen as alternatives to landfill for those parts of the waste stream where recycling is not appropriate. However, while there can be clear benefits in terms of electricity/heating supply, proposals have often proved controversial within local communities because of the fear of dioxin emissions. Such potential impacts (and the scope for mitigation) need to be very carefully assessed before such projects are allowed to proceed.

### Noise

Noise remains a major concern in many urban communities, particularly within high-density housing, rented accommodation and areas, which are close to major traffic routes. Symptoms reported range from annoyance at persistent environmental noise above 40 to 55 dBA Leq, to sleep disturbance and physical/mental illness at higher noise levels. As a general conclusion, noise is a cause of significant stress.

### **3.2.3 Transport and mobility**

The use of the private car as the dominant mode (“auto-mobility”) has entailed dramatic changes in both land use and individual travel behaviour.

Motorisation accompanies and encourages lower densities and longer urban trips. Whilst moving, the car takes about 18 times more space than a pedestrian, but it requires parking every time it does not move. Spaces used for recreation and amenity are under threat from the ever increasing demand for parking space. The main effect on people has been the decline in walking as a means of transport as muscle power gave way to fossil-fed horsepower. This has had consequences for personal mobility (increase of vehicle kilometres travelled) and on personal health (road accidents, pollution related respiratory diseases and obesity).

### **3.2.4. Built environment**

In viewing the built environment, it can be seen that the creation of ubiquitous and uniformly styled housing estates and architecture in many countries has been made possible in part by the introduction of new materials and building techniques which no longer make reference to local climatic conditions. Bright reflective facades and roofs are found everywhere (even in the European south). Inappropriate materials lead to heavy consumption of energy for cooling, insulation and ventilation. A consequence is that natural ventilation in the built urban environment is almost lost.

Within buildings themselves, bathrooms and kitchen areas and inner service rooms of office buildings, generate humidity and need artificial ventilation. Inefficient heating systems and irrational orientation of rooms and functional spaces give rise to increased energy consumption. Not only is maintenance expensive, but so is the cost of production of the materials used in such mechanical solutions.

Furthermore, the design of exotic landmark buildings such as museums, skyscrapers and other examples of “public” architecture often tends to ignore local ambience and identity. Common or public non built-on spaces between buildings are neglected and

lack ownership. Covered by dirt, decay, and graffiti, they seem almost on the edge of self-destruction. As these urban public spaces risk losing their local identity and ownership, so too is their value for public health endangered.

### 3.2.5 Land use management and public open space

The spatial separation of (potentially) conflicting land uses, (i.e. emitting and polluting uses) from living and renewal areas is one of the basic principles of land use-planning and zoning. As a major policy element in urban planning it is still widely used.

An increase in the ‘protection effect’ for sensitive areas is often achieved by increasing the buffer distance between potentially conflicting land uses, or by adopting technical measures such as the filtering of emissions directly at the source, or installing noise barriers. The last few decades have seen a separation of land uses driven by economic interests, especially in commercial and shopping developments but also in office development. Ever-larger structures, which are only accessible by car have been constructed outside former city limits, resulting in the transfer of transport and logistic costs to customers and forcing people into an unhealthy lifestyle of driving to work or shopping instead of walking.

The “spatial separation” approach has two significant disadvantages.

- It automatically generates traffic between the land uses - usually car traffic, which brings additional noise, emissions and other adverse impacts.
- There is the tendency to have mono-functional areas such as business districts and dormitory suburbs, which are only used during certain times of the day. This represents a waste of resources, given that the buildings and infrastructure are theoretically and physically available for 24 hours per day, every week, and therefore could be used much more efficiently with careful management.

The converse of this situation is that the creation of buffer-zones between (potentially) conflicting land uses can also be seen as offering valuable opportunities for establishing networks of natural green areas, parks and sports facilities as well as walking and cycle trails. Whilst there are many excellent examples of this approach, they are all too often seen as left-over or residual areas, without value, instead of being accepted as accessible public open spaces.

## CHAPTER 4: PROSPECTS FOR ACHIEVING IMPROVED PUBLIC HEALTH THROUGH BETTER PLANNING AND DESIGN

### 4.1 Planning for health - a new paradigm

The urban environment is a highly complex interactive socio-physical system, with competing expectations and priorities. To date, considerations of health and wellbeing have had insufficient influence on urban design and planning. Creating healthier cities requires new approaches to planning, giving greater prominence to health as well as recognition of a range of health-based objectives including

- opportunities for healthy lifestyles
- social cohesion and supportive social networks
- access to employment opportunities, high-quality facilities, and open space
- road safety, enhancement of personal security
- an attractive environment with acceptable noise levels and good air quality
- good water quality and sanitation,
- and reduction in emissions that threaten climate stability.

The achievement of physical, mental, and social well-being should ideally become a central goal of plans governing land use, transport, open space, housing and economic development in cities. This implies a fundamental shift in the philosophical underpinnings of the professions involved in pursuing such a goal.

Such a shift can be summarised as a recognition that the essential principle of *healthy urban planning* is interdisciplinary, interagency and intersectoral collaboration, with shared recognition of the problems and shared will to address them. There is a need for collaboration between public and environmental health professionals and planners, as well as between construction, civil engineering, and other relevant sectors. Those outside the health arena need to be aware of the impact of their actions on health, and those working within health need to understand the planning process and policy environment to provide relevant and timely input. The challenge, both for planning and public health, is to learn from each other and combine best practices.

### 4.2 Health impact assessment

Where a project's dimensions can be seen as having health implications they should be incorporated explicitly in the Environmental Impact Assessment (EIA). So far, EIAs include data on environmental problems that can affect health, but they typically do not consider health and wellbeing issues in a systematic manner, or recognize the complex interrelations between social and environmental factors. Health Impact Assessment (HIA) could allow an assessment of exposures and health risks, and also of the impacts on mental health and wellbeing.

In the UK, it is recommended that HIA should be incorporated explicitly in Sustainability Appraisals, Strategic Environmental Assessments and Environmental Impact Assessments.



HIA has been defined as a combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population (Lehto & Ritsatakis, 1999). The Gothenburg Consensus Paper of 1999 clarifies some of the main concepts and suggests a feasible approach to carrying out HIA at all levels. In this paper, it is mentioned that the HIA should include following elements:

- Consideration of evidence about the anticipated relationships between a policy, programme or project and the health of a population;
- Consideration of the opinions, experience and expectations of those who may be affected by the proposed policy, programme or project;
- Provision of more informed understanding by decision makers and the public regarding the effects of the policy, programme or project on health;
- Proposals for adjustments/options to maximize the positive and minimize the negative health impacts.

HIA should be an integral part of the policy process. The HIA process starts when there is a proposal or intention to continue or to make changes in an existing policy, or to launch a new policy or project. It should preferably be implemented early enough for any recommendations to be considered before critical choices are already made. The results of retrospective HIA are however, valuable in informing future prospective health impact assessments.

Initially, policies or programmes, which could have an impact on health need to be identified, together with the kind of impact (screening process). If further information is needed, a scoping process is carried out to determine what further work should be carried out, by whom and how. This work will be followed by reporting on the findings, appraisal of the adequacy of the report and finally by action to adjust the proposed policy, programme or project accordingly. The results of any of these stages may require reconsideration of previous stages. (from Gothenburg Consensus Paper, 1999)

More recently (2004), a Project Advisory Group produced the report *European Policy Health Impact Assessment* (EPHIA) for the European Community and its institutions. It provides a guide for HIA practitioners and commissioners and presents the features of the generic HIA methodology. It summarizes the EU Policy HIA project, describes the EPHIA methodology's underpinning concepts and principles, and provides a step-by-step explanation of purpose, procedures, methods, skills and outputs.

### Healthy by design

International and national initiatives to develop and promote healthy urban design are growing. The WHO work on 'healthy cities', city planning for health and sustainable development, social determinants for health equity in urban settings, or housing and health, provide a good base for implementing planning practices supportive of human

health and well-being. The Australian '*Healthy by Design: a planners' guide to environments for active living (Healthy by Design)*', and other national experiences (such as those of the UK, Ireland, or US), as well as a growing number of research projects on urban planning and health, should encourage the introduction of health-supporting planning practices.

### 4.3 Comprehensive spatial planning for the compact healthy city

Land-use relationships must take into account potential conflicts that may result from certain types of industry. Also areas need to be planned so as to maximise accessibility to workplaces and other facilities by means other than the car and, generally, to reduce the need for private motorised transport. Moves towards more compact forms of urban development are taking place in many places. Such strategies should aim to create cities that are simultaneously less carbon intensive and achieve better local air quality. The process of Strategic Environmental Assessment (SEA) should assist in developing such strategies.

As part of the EIA process, health impacts of proposed developments need to be fully assessed and approvals conditioned so that environmental standards and human health are fully safeguarded. To ensure public confidence, that is best done in consultation with affected local communities.

Regarding **air quality**, EU member states and local authorities should accelerate their monitoring of key pollutants to ascertain those locations where human health is particularly at risk. There is a consequential need to devise strategies to tackle these pollution 'hotspots', whether through managing traffic demand or other means. Designated low emission zones are one possible strategy. Planning decisions on development would then need to be made in the context of such measures.

It seems common sense (but this has not always been followed) that development should be restricted or appropriately controlled in **areas, which are flood-prone** or likely to become so because of climate change or other causes. Urban plans need to be framed with this in mind and decisions on individual proposals made on the same basis. At a strategic level, open land needs to be set aside within, or adjacent, to urban areas, to accommodate excess water at times of flooding. At normal times such areas would function as parks or other public open space.

At the project level, old engineering solutions to **drainage** should give way to sustainable drainage systems aimed at reducing future flood risk. The emerging discipline of water sensitive urban design will increasingly become a part of such an approach.

Where they have not already done so, local authorities should carry out **contaminated land surveys** of their disused land. Subject to these findings and any necessary remediation, such land should be brought into use for development or public open space. Existing **landfill sites** should be carefully monitored to ensure that pollutants remain in and any new sites designed and managed at standards necessary for safeguarding human health. Incinerators should employ the latest 'state-of-the-art' technology to ensure minimal risk to human health.

**Noise** need to be tackled comprehensively in development planning and at individual project level. Citywide planning should identify those areas where there are the greatest conflicts - such as along transport corridors - and propose remedial action where feasible. When new corridors are planned, the onus should be upon the transport provider to provide suitable remediation. Otherwise, new development projects should be carefully assessed for their likely noise generation and their vulnerability to existing sources of noise. These factors and the scope for minimising effects should be material considerations in planning decisions.

The healthy city of the future will be served by a **complete urban planning and mobility concept**, which will ideally include the following components:

- *Life styles favouring non-motorized transport clusters throughout a region, supported by fuel price increases.* Copenhagen is an example, with its high-density low-rise urban planning, its bicycle network (36% of commuters using bicycle, notwithstanding the Scandinavian climate), its combination of regional rail covering Copenhagen and Malmö, its driverless urban Metro, and its extended pedestrian streets. Among smaller cities, Freiburg (Germany) is exemplary with its urban development clusters and its synergy between low energy buildings and low energy transport.
- *Contributing to integrated mobility through effective tram/bus right-of-ways and innovative use of rented bicycles for short trips.* In Paris, the extensive use of bus right-of-ways (more recently also trams), protected by “banquettes” and passenger information about waiting times has triggered a strong revival of surface transport. The Paris bicycle rent “Velib” system, which provides close to 20,000 bikes dispersed around the city, is reported as having substantially modified individual life-styles in favour of non-motorized transport. Peripheral extensions and bicycle lanes remain to be implemented. Assessing the health effects of the switch from motorized transport to non-motorized bicycle transport might be a case for collaboration between mobility and health services.

#### The case of Munich

The city of Munich (pop.2.6 million) in Germany is a leading European example of the application of contemporary best practice in city planning. The Munich experience demonstrates the benefit of an interdisciplinary intersectoral approach, leading to success in the achievement of goals across environmental and health fields (amongst others). Notable features of the Munich experience include the following:

- Munich is a conurbation of urban communities consisting of the city itself and 185 lesser municipalities in eight administrative districts. A compact inner-city development strategy pursued by the city since World War 2 has succeeded in slowing down the suburbanisation process beyond the core.
- In 45 years of urban planning, Munich has evolved a model based on continuity rather than radical change, and marked by adaptation of the system and its aims according to the changes in the environment.

- After 3 earlier strategic plans (1963, 1975 and 1983) Munich was facing two new challenges: a saturation of spatial development, and an upward economic trend. In 1992 came the advent of “Perspective Munich”, a new tool for integrated urban development.
- Perspective Munich is a concept reflecting a cooperative planning culture and providing an evaluation standard for planning and projects in all areas of communal activity. Two main principles guide the Perspective: sustainability and urbanism.

Under the Perspective, local government is committed to safeguarding social harmony. One of the aims here is the encouragement of integration of curative and preventive care, and the promotion of health education in the neighbourhoods. Green areas are to be protected and enhanced. Traffic levels are to be reduced where possible, coupled with a change to more environment-friendly transport services including the Bike-Ride facilities.

#### Other successes

In 2003, WHO released the results of a study of 6 other European cities by the WHO City Action Group on Healthier Urban Planning. The project office in **Seixal (Portugal)** identified transport, mobility and accessibility as being fundamental to people’s health and well-being. In **Milan (Italy)** there was a collaborative program involving the Milano Technical University and the Milan Healthy City Office - working on evidence that implementing healthy city planning principles required an intersectoral approach to all sectors of public administration. **Gothenburg (Sweden)** has achieved an impressive integration of planning and health at all levels of operation, breaking down traditional institutional barriers; planners work alongside social workers, health professionals, the police and NGOs. In **Sandnes (Norway)** the project led to the municipality’s health planning process being integrated with the spatial development plan, with consequent benefits in policy consistence and political involvement. In **Belfast (Northern Ireland)** the healthy urban planning initiative succeeded in breaking down barriers to cross-agency collaboration. The Municipality of **Horsens (Denmark)** has a well-developed integrated approach to healthy urban planning - one in which health is a general and fundamental objective for all Municipal activities. A long-term objective, which emerged from this study was that health should be a central goal of plans governing land use, transport, open space, housing and economic development.

#### **4.4 A plea for de-segregating urban land uses**

Today, unhealthy pollution levels associated with particular land uses are not as great as they might have been some decades ago. The result is that in many situations there is no longer the need for large buffers between different uses, and activities such as office-work can potentially be carried out in residential surroundings.

Thus there is an opportunity to encourage the development of mixed-use zones in suitable areas, resulting in potentially shorter (commuting) distances and more possibilities for walking and cycling instead of using a car - thereby reducing emissions and supporting a healthier lifestyle.

As a corollary, the successful implementation of “walkable and bikeable cities” will also encourage the return of services, administration, cultural and shopping facilities into mixed-use living and working neighbourhoods. Creation of “ 24 hours a day” neighbourhoods - not governed by office-hours or night shifts - would mean that existing infrastructure could be used more efficiently, and people will find it easier to become involved in neighbourhood activities including sport and exercise.

For people to enjoy opportunities to become physically active, creative ways of improving access to facilities must be found. Often the sports facilities in schools are only used for a few hours during the day and rarely if at all during summer and holidays. Finding ways to enable these facilities to be used by more people, more of the time, could help neighbourhood improvement programs. Another prospect is the use of spaces planned but not yet developed (for example on brownfields) where sports or other activities can be permitted on a temporary basis.

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## CHAPTER 5 FINDINGS and CONCLUSIONS

### 5.1 Current environmental health/urban planning relationships in the European city

Urban planning has a substantial potential to positively affect physical, mental and social well-being, and to enhance social inclusion, thus contributing to better health. Well-designed built environments can support health by providing sufficient areas for physical activity, and consequent beneficial modification of sedentary lifestyles. Suitable residential accommodation, choice of recreational opportunities, and equitable distribution of services are beneficial for mental wellbeing, whilst social well-being can be enhanced by improved networks - especially within disadvantaged and vulnerable groups.

Green and natural spaces are vital for physical, mental and social wellbeing, bringing additional benefits to such minority groups. Good practice in promoting green areas for health (as exemplified by work in the UK and Ireland) should be encouraged and further promoted. However, to achieve maximum beneficial impact, initiatives to promote physical activity should be embedded in a supportive and congenial physical environment. This implies effort to remove major barriers to walking and outdoor physical activity and dealing with associated concerns such as personal safety, traffic, animals, and problems with litter in the neighbourhood.

Interventions to increase levels of physical activity should focus on modification of social, economic, and environmental factors at neighbourhood level in addition to interventions directed purely at the lifestyle of the individual. People should be consulted and involved in such initiatives, given the evidence that respect for place and an ability to control their own environment can bring direct and indirect health benefits to local communities.

Urban air pollution, noise, exposure to indoor and outdoor chemical and biological pollutants, and unfavourable housing conditions continue to have serious public health impacts in European cities. Health risks in many locations are also associated with inadequate supply and quality of water, poor sanitation conditions, and poor waste management. Impacts of flooding on public health in urban areas, already an issue in many places, may in future be exacerbated by climate change. Urban planning which facilitates more sustainable energy generation and consumption will bring not only economic benefits, but will improve housing conditions and contribute to better health through improved local air quality.

#### 5.1.1 Action plan for a cleaner healthier environment: air - water - land - waste - noise

Key findings are as follows:

- \* There is a need to plan comprehensively for healthier cities (which could simultaneously become more sustainable cities to counteract climate change). The procedures of Strategic Environmental Assessment (SEA) will assist in developing such plans. Improved planning for open space, biodiversity and

sustainable urban transport will all bring opportunities for carbon minimisation, physical exercise and healthier living.

- \* At the individual project level, the environmental impact of proposed developments needs to be fully assessed and any approvals conditioned so that environmental standards and human health are fully safeguarded.
- \* On air quality, there is a need for greater monitoring of conditions within Europe's urban areas with a view to preparing local action strategies including the designation of low emission zones in those locations where human health is particularly at risk.
- \* There should be strong prohibitions against development being carried out in areas that are subject to flooding, or which are likely to become so under climate change.
- \* At the project level, there should be an adoption of Sustainable Drainage Systems to minimise overall flooding.
- \* Disused urban land should be assessed for possible contamination with a view to remedial action where necessary, and the systematic conversion of such land into productive use.
- \* Existing landfill sites should be monitored to ensure that human health is properly safeguarded. New landfill sites (if needed) should be designed and managed to the highest standards possible.
- \* Noise emissions and conflicts should be assessed as a regular element in citywide planning, and appropriate strategies devised to tackle noise at its source. Where necessary, individual projects should be the subject of noise impact assessments.

### **5.1.2 Action plan for healthier cities**

Key findings are as follows:

- \* Personal identity, ownership of space, and wellbeing are conditions which have a close relationship to variety in accommodation and the construction of dwellings. Regional variations in building style and form help to promote ownership and neighbourhood loyalty with a flow-on to improved health. New models of ownership might help to save our complex environment and our health.
- \* As key criteria for healthy urban living conditions are progressively investigated and established, the built environment can be improved accordingly by ensuring that those criteria are fed into the urban planning process.
- \* At the level of individual building projects, health in the European city can be improved and enhanced by choosing climate-friendly construction materials; reducing external and internal noise impacts; adopting safe and benign construction materials and techniques; encouraging natural light and natural

ventilation in buildings; and advocating better communication between builders, users, planners, tenants, politicians and owners.

- \* Education designed to improve public understanding of the relationship between climate, construction and community well-being will help people accept responsibility for ownership of their environment and their health.
- \* Existing plans for dealing with climate change need to be reviewed as knowledge of this phenomenon improves. There is also a high probability that there are areas, which have been developed in recent decades, which have never been vulnerable to flooding or other natural disasters but which might now be regarded as endangered.

## 5.2. Information and data sources

### Generally

This short Euro-oriented study has revealed that at the time of writing the theme of 'healthy cities' is gaining momentum and political commitment to the point where it is now recognised as a legitimate field of professional endeavour and research across the relevant disciplines. However, apart from seminal initiatives of WHO and the EU (for example) the contributions to knowledge from the research community are intermittent and tend to be driven by the self-interest of the researchers rather than by a commonly accepted research agenda. Under the circumstances it is easy to accept that major information gaps remain to be filled and that the development of a coordinated research program is a long way off.

### Indicators

Current knowledge of causal pathways between urban planning and human health is incomplete. Nevertheless, there are many well documented associations (at both individual and community levels) between specific characteristics of urban environment and health. Some of these features may be considered as indicators, which can help focus local public health intervention strategies.

Several indicators or indices exist of the neighbourhood characteristics associated with physical, mental or social well-being. In the UK, indices of Multiple Deprivation define 'deprived areas', using a system which reflects employment, health, income, education and skills, barriers to services, crime and living environment, including air quality, distance from a waste disposal site, proportion of people living near the regulated industrial source, and proportion of people at significant risk of flooding.

Likewise, in the composite Carstairs Index of deprivation several neighbourhood variables are significantly associated with mortality and morbidity. Indicators of physical features of a neighbourhood, such as the US physical disorder index (PDI), associated with poor social function and control of the community and related health effects could further be explored for their application to European cities.



Further work is encouraged on composite indicators on housing and health, such as that on the WHO 'housing environment index', a composite measure of residential quality, strongly associated with the self-rated health status of the residents.

A number of environmental, social and health indicators already developed in Europe are focused on urban areas. These include (for example) environmental indicators from EEA, the WHO healthy cities indicators, the ECHI indicators (European Community Health Indicators), and Eurostat SDI (sustainable development indicators). The Eurostat 'Urban Audit' dataset is of particular interest, as it covers more than 336 variables in several domains (e.g. demography, environmental, social, economic, cultural, civic, etc.) for more than 250 European cities.

There are also specific initiatives to develop urban health indicators. At pan-European level, several of the indicators developed through the WHO coordinated ENHIS process (environmental health information system) focus on urban areas.

The existing indicator initiatives, both research-based and those applied in practice, should be thoroughly reviewed, while new indicators to describe, assess and monitor urban planning and health associations are designed. Availability, quality and scope of the existing databases need to be explored in this process.

Urban planning agencies and public health professionals should be able to monitor the actual effects of policies, and to base policy reviews as far as possible on evidence. In 'healthy urban planning', linking the public health and urban planning professions provides an opportunity to draw on both medical and environmental evidence and research. Further international cooperation and networking in research on health and urban planning and on measures/tools to describe and monitor these associations should be strengthened. The EU research framework programs may be a suitable platform.

In the pan-European context, WHO plays a crucial role. Expertise in working with indicators in organizations such as EEA and Eurostat should contribute to this process. The encouraging results of the WHO City Action Group on Healthy Urban Planning (2003) can be seen as pointing the way to new methodologies and approaches to the management of the common ground between health professionals, urbanists, city management and the non-government sector.

### Experience-sharing

Unless identified and reported by diligent researchers, success stories from cities and agencies tend to go un-noticed, and the knowledge and experience gained in one place will remain hidden from the eyes of workers in another place. Hence it is self-evident that case studies of successful practice in urban health management be disseminated as widely as possible by an organisation or research body with a mandate to act as a central collection point. Nomination of a suitable entity to undertake such a role would be a timely act, given the growing interest in the theme as noted above and elsewhere in this document.

### 5.3 Conclusions

Urban planning has a substantial potential to positively affect physical, mental and social well-being, and to enhance social inclusion, thus contributing to decreasing health inequalities. To achieve such a supportive urban environment, intersectoral collaboration needs to be actively promoted, in line with the conclusions of the WHO Thematic Strategy on Urban Environment. This should involve urban planners, public and environmental health professionals, other relevant sectors, and administration at different levels. Citizens should also be engaged in this process.

Given the complex nature of urban and human health interactions, and the often competing interests (social, economic and environmental), an integrated approach is an absolute requirement. Further work is needed to develop and improve methods and tools available for 'healthy urban planning', and for assessment and monitoring of projects and programs. Efforts at designing and testing indicators and indices on various aspects of urban health should continue to be encouraged, building - to the extent possible - on existing activity.

With particular reference to urban built environments, the following dimensions establish a suitable framework for action:

- The *regional* dimension, recognising and appreciating regional differences between cities in historical, climatic and cultural terms;
  - The *design* dimension, recognising the importance of diversity in the quality of built and green spaces in order to strengthen identity and loyalty to locale;
  - The *technical* dimension, by optimising access to, and use of natural resources through efficient ventilation, solar access, and health-oriented design;
  - The *social* dimension, by 'ownership' training for all stakeholders in order to overcome environmental neglect and develop responsibility for sharing health resources;
  - The *political* dimension, by encouraging if not requiring elected decision-makers to take a holistic position when it comes to dealing with matters whose dimensions involve an overlap between urban planning and urban health.
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# APPENDIX - SELECTED LITERATURE SOURCES

## 1. Introduction

There is a rapidly growing international literature devoted to the general theme of environmental health and urban planning. This chapter highlights key sources (books, articles, scientific papers) as a guide to further reading. Whilst citations are grouped under thematic sub-heads, it should be realised that many references cover more than one theme. For the sake of brevity, discussion is in summary format.

A supplementary WHO volume prepared by university researchers provides a more detailed and comprehensive coverage of the literature. Some overlap between the two documents will be evident. Readers searching for an up-to-date and complete list of readings on the subject are recommended to search the university bibliography in the first instance.

## 2. Urban planning elements as sources of environmental health concerns

### 2.1 Theory

- The WHO's Healthy Cities Program (HCP) is seminal (Kenzer, 1999). In the same year, WHO published *Healthy Cities and the City Planning Process* - a background document on historical links between health and urban planning. Early connections between planning and public health as a discipline were strong.
- Today, the prime determinants of health are seen to be social and economic (including living conditions) - both of which are influenced by urban planning. The HCP recognizes the diversity, complexity, and multiple needs of urban populations, and aims to develop and test policies, which help to improve living conditions and thus the health status of city dwellers. This approach survived until 2007 (s. Kjelstrom T et. al., 2007). The UK Royal Commission on Environmental Pollution (2007) tried to extend the focus to embrace 'softer' factors such as lifestyle and 'community'.
- The EEA's *Europe's environment: The fourth assessment* (European Environment Agency, 2007) discusses environment and health from a pan-European perspective; although statistically comprehensive and with an in-depth coverage of Europe within the last decade it is not specifically targeted on cities. Since 2005, EEA has published a *State of the Environment* Report covering a set of core environmental indicators but the data is only available in aggregated form at member state level.
- In a theoretical paper illustrated by two case studies, Brown (2003) emphasizes the need for experts in environmental health, the design professions, and the development industry to share information and expertise. He calls for integrated models and concepts to improve the quality of environmental information, and for environmental specialists to improve their understanding of urban policy, urban development, and decision-making processes. A shared understanding of the language, tools and processes that are common to development players is vital.
- De Hollander and Staatsen (2003) reported on environmental determinants of health in Europe and identified (inter alia) the importance of social environment and life-style. They argue that environmental health policy for deprived urban areas should be framed through a multi-disciplinary, multi-sectoral approach; and that environmental health science should itself embrace knowledge from the fields of urban planning, architecture, social psychology, epidemiology, public health and the environmental sciences.
- The absence of a commonly accepted multi-disciplinary framework for work in the field of environmental health is a theme, which also attracted Van Kamp et al. (2003) in their literature review on links between environmental quality and human well-being.
- Systematic case studies and meta-analysis are gaining importance as illustrated by work in Health Technology Assessment (HTA) and the methodology of Health Impact Assessment (HIA) developed by the WHO. Weaver et al. (2002) have described the results of applying systematic review methods in the field, examining in particular the Health Bulletin Wales classification of evidence and noting that there is little evidence on the relationship between HTA and planning as controlled trials are hardly possible. Their examination of medical, social science and built environment databases show that there is little overlap between (for example) medical and architectural/environmental databases, or between medical and social science databases. They recommend the use of multidisciplinary search strategies and 'extended evidence' type classifications that would have to be further refined. The Royal Commission on Environmental Pollution has reported (2007) an increase in requests for such evidence from planners and authorities, and recommends the use of Health Impact Assessment.

### 2.2 Environmental factors and children's health

- A Swedish report (2005) on environmental health focussed on children, given that Swedish health policy is becoming increasingly focussed on this group because of its vulnerability - especially in cities. In 2006, Thuvander and Victorin looked at a range of childhood health factors (including foetal development, the central nervous system, hormonal systems, cancer, and allergic diseases) and discussed these against environmental factors such as the indoor environment, air pollutants, metals, organic environmental pollutants, noise and high sound levels, ionizing and non-ionizing radiation. Findings of relevance to urban planning include the fact that children are highly sensitive to air pollution; and increased exposure to noise may lead to stress or impaired hearing.

### 2.3 Transport and mobility

- Krzyzanowski et al(2005) identify road transport as a significant contributor to air pollution in cities, with particular emphasis on European examples. Road transport is a main contributor to emissions of PM10, PM2.5, ultrafine particles, nitrogen dioxide, ozone, VOCs and the most important source of benzene, carbon monoxide and nitrogen oxides. Urban highways (with <100,000 vehicles per day and <5% heavy lorries) and so-called 'street canyons' are potent sources, especially within 150-250m. In street canyons the levels of all traffic-related pollutants are very high. Other 'hotspots' are diesel-served rail tracks and stations, ports and airports (which are responsible for approximately 10% of nitrogen dioxide and PM10 within a 10-km radius).

- Krzyzanowski et al quote other studies, which provide detail on fine PM emissions in urban areas, and evidence of increasing ozone level at urban background locations. They also cite an EC project comparing different traffic management regimes and air quality: examples include Paris, where separate bus lanes led to a reduced fallout of nitrogen oxides, carbon monoxide and PM10 ; and Berlin, where a 50% reduction in nitrogen dioxide resulted from a ban on lorries.

#### 2.4 Built environment and housing

- Mackenbach and Howden-Chapman (2002) found a direct link between health and housing conditions and an indirect link between health and the neighbourhood environment.
- According to Lavin et al, 2006, the Irish Institute for Public Health 2006 report on health and the built environment explores how the design, maintenance, environmental qualities and location of buildings (as well as open space and networks within the built environment) can influence health. The report provides a valuable overview of the subject and relevant literature, whilst recommending policy development in the fields of planning and housing to avoid health risks. It promotes the practice of Health impact Assessment as a means of evaluating policies, programmes or projects.
- WHO has undertaken a field survey on panel block housing estates in eastern Germany, Lithuania and Slovakia using self-reported data, which found (inter alia) that noise was the strongest factor influencing resident perception of health. It also showed that there is a strong association between an observer's perception of indoor climate and respiratory diseases.
- From 2002-2003 WHO initiated a housing and health survey in eight European cities on roughly 400 dwellings and 1000 inhabitants (in every city). Three groups of topics were investigated:
  - *population and health* - demography, time spent at home, self-rated health, body weight, prevalence of disease
  - *housing stock* - tenure, dwelling type, housing environment, satisfaction with the neighbourhood, general quality of life
  - *housing and health* - psychosocial benefits of home, mental impacts of inadequate housing, technical and design aspects (thermal comfort, indoor air quality, dampness, noise exposure, sanitary facilities, access, home accident risk) plus questions on the housing environment (supply of and access to green spaces, playgrounds, and the connection between residential quality and health).

Results were cross-tabulated and compared, with a general recommendation in support of the (self-evident?) finding that if poor quality housing could be improved the result would be a reduction in its negative effects on health.

#### 2.5 Land use management; public and green space

- Sjerp de Vries (2006) reviews literature on the health effects of nature and green spaces, especially in residential environments. Seven such effects were identified: reduction in stress levels; restoration of attentional fatigue; promotion of physical activity; enhancing positive social contacts; improved child health; improved adult well-being; and a general enhancement of the quality of life. Standards for the provision of green space in cities are discussed. The paper revealed a shortage of 'real-life' hard evidence linking these effects to actual open space provisions - perhaps providing an explanation as to why practical guidelines, if available, are seldom evidence-based.
- A study by Takono (2002) shows a significant relationship between the longevity of urban senior citizens and the availability of green areas within close walking distance. It revealed a correlation between health and the ability to remain a member of the local community. Availability of sunlight in dwellings was another correlating factor. Among six residential factors observed, the availability of walkable green spaces nearby was the most significant.
- Nakamura et. al (2004) investigated by means of regression analysis whether there is a relationship between child mortality and the availability of safe neighbourhood playing areas. Results showed that whilst mortality levels in preschool-age children are reduced, this is not the case in higher age groups. Factors such as increased safety facilities, footpaths, or law enforcement appeared to be ineffective. Only separated pedestrian areas achieved lower child pedestrian injury rates.

#### 2.6 Air quality

- WHO Air Quality Guidelines (final edition 2005) are based on urban case studies worldwide and present a comprehensive view on the subject of air pollution, with an emphasis on primary and secondary pollutants. Part 1 (Chapters 1-9) describes different pollutants and sources and their effects on human health, with quantitative comparisons between urban areas in various world regions. A key finding is that "*the main sources of air pollution levels in western cities are traffic-related.*" As sources, exhaust emissions are joined by evaporative fuel emissions or non-exhaust emissions of PM from road vehicles arising from factors such as wear of brake components and tyres, and the attrition of the road surface itself.
- According to WHO (2005) "*exposure is a more direct environmental health risk indicator than ambient air measurements, because all environment-related health effects are triggered through exposure. ... Policy interventions can be targeted to reduce current exposures and the potential for health events in the future.*" "*To reduce the health effects of air pollution, source abatement is certainly the long-term goal. Nevertheless, reducing exposure can serve as a cost-effective way of lessening the health effects. For example, minimizing exposures could involve changes in planning, such as traffic zoning or the siting of polluting industries. It could also entail making changes, such as improved ventilation in key microenvironments, and informing/educating susceptible populations in particular on ways to reduce their exposure (for example by staying indoors on days with high outdoor air pollution).*"
- Groups with a higher sensitivity to these effects include children and the elderly. Population groups with lower socioeconomic status have shown increased risk of mortality and morbidity following exposure. Higher susceptibility is also found in the least educated sections of the population and residents of deprived inner cities. In addition, people with lower socioeconomic status have more risk factors for the health effects of air pollution, for example airways diseases, active and passive smoking and type 2 diabetes. (WHO, 2005).
- The EEA (Environment Report 10/2005) identified air pollution (indoor and outdoor) as the factor with the greatest impact on health in Europe. Approximately 20 million Europeans suffer from respiratory problems every day caused by air pollution

(especially PM<sub>2.5</sub>) mainly in cities. The WHO data show that in Europe PM<sub>10</sub> levels had decreased by the end of last century but have tended to rise again - perhaps as a result of changing weather conditions.

- In 2002 Prague had the highest annual average concentration in Europe (a PM<sub>10</sub> reading of approximately 60 g/m<sup>3</sup> in 550 European urban areas the average concentration was 26,3 g/m<sup>3</sup> in urban background and 32 g/m<sup>3</sup> in streets). PM<sub>2.5</sub> and smaller fractions of PM are less frequent than PM<sub>10</sub> in European urban areas. Overall, the hemispheric background concentration of tropospheric ozone is increasing, and rising concentrations have been recorded for North American and European cities. The level of nitrogen dioxide may be significantly higher on urban kerbsides; whilst some heavily industrialized areas in Europe may still be experiencing high levels of sulfur dioxide.
- Martuzzi et al (2006) studied the health impact of PM<sub>10</sub> and ozone in 13 Italian cities, and found that concentrations > 20  $\mu\text{g}/\text{m}^3$  were attributable to 8220 deaths annually through long-term effects such as lung cancer and stroke, and 1372 deaths through short-term effects such as cardiovascular and respiratory diseases) each a year - representing 10,5 % of deaths for all causes.

## 2.7 Noise

- Of all environmental effects, noise affects the largest number of Europeans (EEA, 2005).
- Noise causes short-term adverse impacts on sleep, associated with modifications in autonomic functions (such as heart rate) and body movements. Impacts include chronic fatigue, sleepiness during daytime, annoyance, cardiovascular effects, hormonal responses, promoting mental health diseases and lost productivity at work and school.
- In the field of landscape design, Fang et al (2003) have investigated the effects of noise reduction of different tree plantation belts patterns. Their main finding was that “a tree belt is effective in noise reduction when both receiver and noise source height and tree belt visibility are low, the tree belt is high and wide, and the distance between the noise source and receiver was less than eight times that of the tree height.”

## 3. Projects, policies, indicators

### EU-URHIS

- The European Urban Health Indicator System (Euro-URHIS) was a two year programme to develop and test an indicator system to facilitate cross-EU comparisons and benchmarking as a basis for policymaking. Early results can be found on the URHIS website (<http://www.urhis.eu>).

### Urban Audit

- Urban Audit (s. European Commission, 2004) provides reliable and comparative indicators on the quality of life in European cities. It provides almost 300 statistical indicators for 258 cities across 27 European countries on 3 different spatial levels (city, larger urban zone and sub-city district) and covers demography, housing, health and crime, economic aspects, civic involvement, environment, land-use, travel and transport and culture and recreation. All data can be found on the web (<http://www.urbanaudit.org>). The site enables interactive selection and compare of date.

### State of European Cities

- Based on the results of the urban audit the European Commission produced an analysis of the Urban Audit data over a period of 12 months (ECOTEC, 2007). Health-related aspects are not a core topic.

### The International Society for Urban Health

- ISUH is an association of researchers, scholars, and professionals from various health sectors which published in 2008 an extensive report on the determinants of urban health as part of the WHO's Knowledge Network on Urban Settings (KNUS). The report concluded that investments in urban health can bring major economic returns.

### Report on socio-economic differences in health indicators in Europe

- This study (LÖGD, 2003) describes the links between socially disadvantaged groups and health. The groups are children, old people, single-parent families, unemployed young people, long-term unemployed, migrants, refugees, homeless people, alcohol addicts, consumers of hard drugs and prisoners. This work provides an understanding of how social disadvantage influences health at a country level (not specific to cities).

### Policies

- The most significant urban health project within the recent past has been the WHO Healthy Cities program which had its origins in the concept of sustainable development and Agenda 21 through the development of “city health programmes”. In 1997 the WHO Regional Office for Europe published “City planning for health and sustainable development” which covers the implementation of the WHO Healthy Cities Program with examples from four European cities and their city health plans.
- Later came the WHO City Action Group on healthy urban planning which encouraged collaboration between practitioners and academic advisers. In 2003 Barton et. al reported on the practical experiences of six European cities in implementing healthy urban planning according to the 2000 WHO Guide. Amongst its recommendations is a call for better collaboration between planning and health agencies and the public, private and voluntary sectors, and for ‘evidence -based’ planning for health. Human health should be seen as a key facet of sustainable development.
- In 2007 the Royal Commission on Environmental Pollution published an extensive report on the state of the urban environment in the UK covering all topics inter-connected with the issue. It gives specific recommendations on how and which policies should be applied to improve the situation of British cities (e.g. promoting Health Impact Assessment).

## 4. Climate change

- Climate change is becoming an increasingly important consideration in urban planning as extreme weather events such as heat-waves, cold-waves and floods bring environmental changes. The report “*Protecting Health in Europe from climate change*” (WHO Europe, 2008) reviews different health impacts associated with changing weather: risks to human life and habitats, food safety, vector-borne diseases, waterborne diseases, and respiratory diseases. Especially vulnerable groups include the elderly, ill, poor, children and infants.

- Urban planning can mitigate or influence these impacts through (for example) promoting modifications to infrastructure, channelizing of water flows, and flood mitigation works. Another recent example is the adoption of careful land and water management in Italy to inhibit the spread of tiger mosquito.
- The elderly in cities are especially vulnerable to heat waves. According to EEA Estimates, there were 35,000 heat induced deaths in Europe during the 2003 heat wave (EEA Report 10/2005). The fourth assessment (EEA, 2007) shows trends in heat wave frequency in the WHO European region (p.152). The need for protection led to the EU EuroHEAT Project, which was followed in turn by the Heat-Health Action Plans (WHO Europe, 2008). Urban planning is a core element in this plan (see p. 20f), because cities are heat islands.
- Suggestions as to how planning can help to reduce heat-sourced health impacts in urban areas include requiring the use of highly reflective building materials as solar radiation increases. Parklands and 'green' roofs can reduce urban temperatures, although to have a significant effect on climate, parks need to be at least one hectare in area. Chapter 2 deals with the physiological effects of heat on health. The establishment (in cities) of real-time surveillance and evaluation systems for measuring actions and reactions will be a forwards step in this sector of planning.

## 5. Deprivation; mental health; perception; related conditions

- Cummins et al (2005) examined the connection between neighbourhood indicators and self-rated health amongst a sample of 13,899 men and women above 16 in Scotland and England. They found a strong positive correlation between poor self-rated health and indicators such as a poor quality residential environment, low level of political engagement, high unemployment, low access to private transport, and low transport wealth. Associations were independent of sex, age, social class, and economic activity. Their work suggests a clear link between certain neighbourhood characteristics and self-rated health.
- Stafford and Marmot (2003) undertook a quantitative examination of the association between deprivation and health. The study examined the effects of neighbourhood deprivation on residents' health using a sample of 5,539 persons and using data (from the Whitehall II study) of the economic status (SES with Townsend index). Their results were compared with other studies. Findings included evidence that *"Individual and area deprivation were independently associated with poor self-rated health, poor mental health, and high waist/hip ratio"* and *"the effects on general and mental health of living in a deprived area appear to be larger for lower-status individuals. Additionally, low-status individuals living in deprived areas report more neighbourhood problems than high-status people living in similar areas."*
- Neighbourhood deprivation also featured in work by Mair and Mair (2003) who delivered an extensive overview of the history and common strategies on CPTED (Crime Prevention Through Environmental Design), and examined the link between negative health effects and crime and violence. Examples of studies arguing in favour of targeted design strategies are offered. They largely ignore claims that CPTED only leads to a transfer of crime to other neighbourhoods and that it does not offer ways to measure effectiveness. It might be concluded here that CPTED may be useful in planning safer and thus healthier environments but its effectiveness on a macro-level has yet to be proven.
- Martikainen et al. (2003) recorded the death of 252,000 men over 25 in Helsinki Metropolitan area (55 neighbourhoods) between 1991 and 1995 (based on the census data 1990) but found only a moderate correlation between area disadvantage and mortality. Other studies have revealed stronger links, but they have been carried out in cities with higher level of social segregation. They concluded that the relative homogeneity of Helsinki neighbourhoods helps to explain the absence of a strong correlation (between area quality and mortality). Elsewhere, studies have found that area disadvantages can contribute to higher mortality rates especially for younger males.
- Diez Roux et al. (2004) studied the links between cardiovascular risks, mortality and neighbourhood structure. Indicators such as education, occupation and income were used to assess neighbourhood quality. They found an association between neighbourhood disadvantage and the rate of cardiovascular death amongst elderly white residents, but there was no such link in the case of non-cardiovascular death. This suggests some correlation between environmental disadvantage and risk of cardiovascular death.
- Wei et al. (2005) investigated the influence of neighbourhood physical disorder on crime, firearm injuries and teen births. They used a 'physical disorder index' with five items: "the presence or absence of graffiti, beer or liquor cans or bottles, cigarette butts, litter or broken glass, and abandoned cars." The results showed a high correlation between this index and total crime, firearm injuries and homicides. Areas with a high index indicated lower social control.
- Laura Airey (2003) investigated neighbourhood incivilities and well-being in depth interviews with women in deprived areas in Edinburgh (Scotland). Her work is cognate with other studies, which reveal a connection between place and health but for the purposes of this present report her findings are of peripheral interest.
- Stafford et al. (2004) set out to investigate the association between perceptions of neighbourhood physical and social characteristics and three health outcomes (self-assessed health status, chronic conditions, and emotional distress). Hamilton, a medium-sized industrial city on Lake Ontario in Canada, was the target centre. Four different neighbourhoods with 1504 adults as interview partners were surveyed. Two important results emerged. *"Significant differences across the four neighbourhoods are apparent in self-assessed health status and emotional distress, but not in chronic conditions"* and *"Physical environmental problems were positively and significantly associated with poor physical and emotional health."* Generally their findings demonstrate the importance of neighbourhood perceptions. They suggest that perceptions of neighbourhood social and physical characteristics may be important determinants of individual health...and perceptions of the physical environment (like green space, traffic) seem more important than those of the social environment (like crime, amenities, e.g.). These results could be of importance for urban planners.
- Another study in Hamilton by Wakefield et al. (2001) examined perceived risks associated with air pollution and explored the links between social capital, place attachment, and action on this environmental issue. It appears that social capital is the primary contributor to the decision to take action.
- A study by Austin et al. (2002) analysed the relationship between subjective and objective indicators of neighbourhood conditions with the perception of safety in Louisville, Kentucky. Work included a short but interesting literature review on factors that influenced fear of crime and perceptions: demographic effects (gender, age and socio-economic status), victimization and

neighbourhood conditions. The latter correlated significantly with neighbourhood incivilities (defined as deteriorating buildings, trash and the presence of unsupervised youth).

- Van den Berg et al (2003) investigated the effects of neighbourhood environment on mental health. Their study entitled “*Environmental preference and restoration: (How) are they related?*”) examined people’s preferences for the built environment or the natural environment. Results suggested that natural environments have a stronger restorative effect than built environments. It could be concluded that greener cities provide for better restoration and satisfaction, implying healthier conditions for their inhabitants.
- Galea et al. (2005) analysed the results of a telephone survey in New York City in 2002 (n=1355) to assess the relationship between the built environment and depression (as experienced over a lifetime OR during the last six months). Questions relating to the internal condition of dwellings and to external neighbourhood conditions were asked. They found that persons living in neighbourhoods characterised by poorer features of the built environment were 29%-58% more likely to report past six month depression and 36%-64% more likely to report lifetime depression than respondents living in neighbourhoods characterised by better features of the built environment. Analysis and comparison of the internal and external conditions suggest that the state of the built environment is linked to mental health; but internal conditions (i.e. of the dwelling) are more likely to determine health quality than the external factors. Thus maintenance of the individual apartment (as a means of improving residential living conditions) seems to be more beneficial for mental health than maintenance or improvements to the external surrounding environment.
- Peen and Dekker (2004) discussed the question of statistical links between the risk of psychosis (especially schizophrenia) and urban living, and possible reasons for this correlation found in studies in Scandinavia and the Netherlands stating that that the risks are not a consequence of urban living conditions but rather of (urban) lifestyle.

#### 6. Physical activity; walking; cycling

- Hume et al. (2005) studied children's perceptions of their environments and important places and opportunities for physical activity. A qualitative survey of 147 10-year olds in Victoria (Australia) revealed an association between the perceived environment and children's physical activity.
- Kavanagh et al. (2005) published a study about the impacts of urban area disadvantage on physical activity in Melbourne (Australia). Their paper explores the variation and prevalence of physical activity in small areas (50 Census collector districts in Melbourne). These districts with a total of 2349 residents were examined by a cross sectional post survey covering physical activity (walking, cycling, jogging and swimming) and socio-economic status. For walking, cycling, and swimming, any variation between districts is independent of individual socioeconomic status and area level socioeconomic disadvantage. Residents of areas that are more socioeconomically disadvantaged are less likely to undertake physical activity, which is sufficiently active for health. The study does not identify the qualities of the local environment, which drive these differences; accordingly their work offers few if any recommendations of value to planners.
- Li et al. (2005) used multilevel modelling to measure the influence of built environment characteristics on walking activity in Portland (Oregon, USA). At the neighbourhood level they used parameters such as employment density, household density, number of street intersections, and areas of green space for recreation. At the individual level they used factors such as the number of recreational facilities deemed safe for walking. They found that the decision to walk is significantly affected by neighbourhood character. Areas of high employment and high housing density, with more street intersections and greater amounts of green and open space, are likely to increase urban mobility through walking.
- Burgoyne et al (2007) reported on an attempt in Ireland to increase walking activity (“Walking in a city neighbourhood, paving the way”). Their work showed that the physical and social environment has more influence on walking than other factors - such as attractive track signage. They cited other studies showing that community involvement and better health are linked; that social support is beneficial to health; and that social isolation leads to ill health. A positive correlation between social support and physical activity is evident. Single initiatives may not be successful; community based approaches may be more productive than traditional built environmental attributes.
- Foster et al. (2004) recorded the walking behaviour of more than 4000 adults in England (reported walking in past four weeks and particularly 150 minutes in this time). The study examined the connection between walking and the participants’ perceptions of the social and physical environment (such as accessibility to amenities, parks, green spaces). It concluded that environments which simultaneously encourage and facilitate safe, functional walking and access to walkable green spaces are necessary to the promotion of healthy physical activity.
- Cycling as a primary physical activity was studied by Lawlor et al in 2003. Environmental barriers to increased cycling and walking were examined, whilst recognising that both activities offer effective means of improving health. The UK national cycle network and its users were surveyed, a conclusion being that familiarity with access arrangements in the network led to increased bicycle use.
- Edwards and Tsouros (2006) examine initiatives taken by European cities to promote healthy activity through built facilities and social intervention - with a special interest in the disadvantaged. Such activity can be encouraged through environmental design and attention to design elements such as street layout, recreation facilities, transport, and the reduction of barriers such as fear about crime and socially negative attitudes to physical activity. They argue for more effective partnerships between the health care sector, transport and housing. Iranmanesh (2008) follows a similar direction by arguing that the enforcement of “pedestrianisation” would promote urban health.

#### 5 Obesity

- Evidence suggests that 130 million people in Europe are obese, and obesity has become a central theme in European health policy. Adverse health consequences are “hypertension, dislipidaemia and impaired insulin resistance (all major risk factors for health), major non-communicable diseases such as coronary heart disease, ischaemic stroke, type 2 diabetes, breast and colon cancer and osteoporosis, and psychosocial problems”(Schoeppe, Braubach, 2007).

- These realities gave rise to the WHO Europe's Study "*Tackling Obesity by Creating Healthy Residential Environments*" (Schoeppe and Braubach). This comprehensive study examined the context and prevalence of obesity by age and gender (especially in Germany). Literature on relationships between the residential environment and physical activity, and between the residential environment and obesity and the needs of specific groups (children, adolescents, older people, socially disadvantaged groups) was reviewed. Their work provides conclusive evidence that the availability of spaces for recreation, sport and exercise is vital for physical activity. Another conclusion is that "individual characteristics (especially age but also income and education) are the driving force for sports/physical exercise behaviour, which needs to be complemented and supported by the residential environment." Interventions to encourage and increase physical activity (e. g. creating footpaths, providing mixed land use, aesthetic design, access to open spaces) are discussed in the report's overview on the connections between physical activity, health and urban planning.

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