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Environment and health for European cities in the 21st century: making a difference

By: Laurence Carmichael, Francesca Racioppi, Thomas Calvert, Danielle Sinnett

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ABSTRACT

With more than 80% of the European population expected to live in urban areas by 2030, cities play a pivotal role in steering the transition towards a low-carbon society as well as in promoting and protecting health and well-being, and preventing and mitigating socioeconomic inequalities among urban dwellers. This publication reviews the key drivers for change in the European urban environment, highlights the burden of disease in European cities, and discusses opportunities and barriers to action. Taking into account the responsibilities of cities in relation to several policy areas that have a direct impact on health and the environment, it also proposes possible ways forward to strengthen support for cities that are committed to addressing environment and health challenges in their communities. Such support will be channelled through the development of new partnerships, facilitating the dialogue and exchange of knowledge between subnational and local authorities, national governments and international actors, while building on existing strategic partnerships and initiatives at all levels of governance.

Keywords

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ABBREVIATIONS

e-DPSEEA	Ecosystem-enriched Driver Pressure State Exposure Effect Action (model)
EEA	European Environment Agency
EHP	Environment and Health Process
EU	European Union
EU27	countries belonging to the EU between January 2007 and July 2013
EU28	countries belonging to the EU since July 2013
ICLEI	Local Governments for Sustainability
$PM_{2.5}$	fine particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
POLIS	European Cities and Regions Networking for Innovative Transport Solutions
SDG	Sustainable Development Goal
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UN Habitat	United Nations Human Settlements Programme
UNICEF	United Nations Children's Fund

FOREWORD

The history, values, culture, politics and economy of Europe are deeply rooted in and shaped by those of its cities. For millennia, European cities have played a major role in providing shelter, economic opportunities, education and services and in delivering innovation and adaptation to changes. From the mid-14th century, when the Black Death caused one of the most dramatic demographic changes in the history of Europe, through the industrial revolution of the late 18th century which led to an explosion of the urban population, and the relentless development of motorized transport in the second half of the 20th century, cities have coped with changes, often unpredictable, sudden and dramatic.

In the first two decades of the 21st century, European cities are facing new drivers of change that need to be governed: demographic changes, such as the rapid ageing of the population and the closely related surge in noncommunicable diseases as well as unprecedented migration movements; environmental changes, such as those related to climate change and the excessive exploitation of natural resources; and technological and economic changes, such as the digital revolution, the globalization of markets and a crisis in the employment situation which is being felt dramatically in numerous countries.

By 2030, eight out of 10 Europeans will be living in cities, which will result in new pressures being exerted on the environment on which our very existence depends. This could also lead to an increase in the burden of disease caused by environmental risks, which could be prevented and often even eliminated, with consequential impacts on socioeconomic inequalities and social justice, since the most vulnerable groups in the population pay a disproportionate price. Halting and reversing this downwards spiral is both possible and necessary. Cities are the key actors to lead this change, which is why they are central to the 2030 Agenda for Sustainable Development and its Goals, the WHO European policy for health and well-being, Health 2020, and the New Urban Agenda spearheaded by the United Nations Human Settlements Programme.

In the WHO European Region, new opportunities to foster and support action in cities are offered by the European Environment and Health Process, a unique intersectoral platform that, since 1989, has brought together ministries of health and the environment along with relevant international and nongovernmental organizations. By clearly identifying them as the key actors to address the environment and health challenges faced by their citizens, the Sixth Ministerial Conference on Environment and Health, held in Ostrava, Czech Republic, on 13–15 June 2017 reflected on the greater progress that could be made by fostering new alliances between cities and local authorities with national governments and relevant international actors, and decided to facilitate new partnerships and capitalize on existing initiatives, experiences and networks.

It is our hope that this publication will be a useful contribution towards the identification of practical and effective ways of promoting and accelerating cooperation, sharing knowledge and exchanging experience in relation to the environment and health across all levels of government and throughout the whole of the Region, to deliver health, well-being and prosperity sustainably to all.

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Executive summary

With more than 80% of the European population expected to live in urban areas by 2030, cities play a pivotal role in steering the transition towards a sustainable society as well as in promoting and protecting health and well-being, and preventing and mitigating socioeconomic inequalities among urban dwellers. Sustainable and healthy urban development is emerging as the focus of international and European Union (EU) policies, for instance through the 2030 Sustainable Development Agenda and its goals, the United Nations Human Settlements Programme (HABITAT) New Urban Agenda and the Urban Agenda for the EU. It is also at the core of the WHO European policy framework and strategy for health and well-being for the 21st century, Health 2020, which identifies the creation of resilient communities and environments as one of its priority areas to achieve the strategic objectives of reducing health inequalities and improving governance for health.

This publication reviews the key drivers for change in the European urban environment, highlights the environmental burden of disease in European cities and discusses the opportunities for and barriers to action. It also proposes possible ways to strengthen support to cities committed to addressing environment and health challenges in their communities through the development of collaboration, not only among cities but also across different levels of government, facilitating the dialogue and exchange of knowledge between subnational and local authorities and city networks, national governments and international actors, while building on existing strategic partnerships and initiatives at all levels of governance.

The urban dimension of health has emerged strongly in research in recent years: scientific evidence now links urban operations and health and well-being with environmental sustainability. Cities are critically responsible for managing both a web of resources (energy, materials and waste, ecological systems, water and food) and delivering healthy environments for ever growing urban populations. The relatively recent rise in urbanization and associated human activity has had positive economic and social benefits but has at the same time led to risks from air pollution, noise levels, waste, extreme weather events, sedentary behaviour and isolation which in turn contribute to the growing epidemic of noncommunicable diseases and mental health issues. Differences in the quality, availability and maintenance of urban infrastructures and services (such as housing, water and sanitation, the work environment, transport systems, green infrastructure and food shops) also means that there is a lack of social equality in health, resulting in some population groups being more affected by the state of the urban environment. In this context, and at a time when demographic trends underline the need to deal with ageing, noncommunicable diseases and the economic, social and political tensions of unprecedented levels of international and internal migration, many of the urban policy responses deployed to promote health and well-being and reduce health inequalities (for example, urban and transport planning, environmental health and social services) can benefit the environment, deliver economic savings and promote social justice.

The first section of this publication highlights some of the key evidence regarding the impact on health of urban environments, including through exposure to air pollutants, ambient noise, waste, water and extreme weather events. It also analyses the main drivers of change in the new millennium, emphasizing how the European demographic transition towards an ageing population and the related increases in noncommunicable diseases and population migration dynamics present cities with new challenges and the need to adapt rapidly to these changes. Finally, it summarizes the main recent developments in international policies, including in particular the 2030 Sustainable Development Agenda, the New Urban Agenda adopted by the UN Habitat III Conference and the EU Urban Agenda as well as the latest developments in how scientists are modelling and conceptualizing the complex interactions between urban activities, the physical and social environments and health.

The second section investigates the dynamic relationship between health and the natural resources on which cities depend, looking in particular at the growing mismatch between demand and supply in urban resources, particularly with respect to the flows of energy, materials and waste, water and ecological and food systems and health. It highlights examples of measures that can be taken to address this mismatch and summarizes the international policy response to the challenges highlighted.

The third section considers the pathways of interaction between the environmental, built and social environments and health, looking at aspects and policy domains such as integrated urban and transport planning and urban green spaces and the opportunities they offer to improve health and well-being (including mental health). It discusses the inequality dimension and how action on these policy domains may help to protect in particular the most vulnerable groups in the population. The section also presents an overview of the policy response available, emphasizing in particular the role of healthy urban planning and transport planning as key instruments to reshape the built environment and support healthier and environmentally sustainable choices by consumers and residents. The fourth section takes a closer look at aspects of governance at city level, discusses the trends in devolution of responsibility towards cities and local governments for an increasing number of policy

Source: www.istockphoto.com

and service areas of relevance to environment and health, such as local transport, air and water quality, waste management, housing, and the provision of services and welfare to vulnerable groups. This section highlights key features of governance that enable effective action to be taken, including inspirational leadership, inclusive and participatory decision-making and fiscal powers. It also recognizes the important role that networks of cities and subnational authorities sharing similar goals and interests play in facilitating the exchange of information and knowledge, learning and building from each other's experiences.

The fifth section draws conclusions from the previous sections, highlighting key messages and proposing some practical directions for work. It emphasizes the added value that could be expected from establishing new forms of collaboration that would not only connect cities and subnational authorities to other cities and subnational authorities, but also facilitate a greater exchange and dialogue with national and international levels of government. In turn, this could offer the potential to foster greater policy coherence across different levels of government, and to accelerate the dissemination of knowledge, capacities and support among relevant interested actors.

As well as performing local executive functions, cities can actively support the development of urban policies. For them to do so, however, they must be able to develop a cohesive city approach to policy formulation and implementation and to organize themselves. The structures and functions of local and regional governments across Europe vary widely but some commonalities exist, which reinforces the argument towards adopting a common urban approach to environment and health policies. The EU Urban Agenda already encourages urban areas to capitalize on the knowledge and capacity of specialist EU urban networks, such as the Committee of the Regions or EUROCITIES, as well as pan-European networks such as the Council of European Municipalities and Regions or global ones, such as Local Governments for Sustainability (ICLEI), to support vertical and horizontal policy integration. These networks have already developed invaluable strategies in priority areas such as air pollution, water and sanitation, energy, waste, urban spaces, mobility and climate change. In addition, they have taken action to tackle the integration of immigrant populations. The proposed development of new forms of partnership between cities and local authorities with national governments and relevant international organizations and actors presents an unprecedented opportunity for facilitating the implementation of selected goals and targets of the 2030 Sustainable Development Agenda and of Health 2020. A potential springboard to experiment with these new forms of partnership is offered by the WHO European Environment and Health Process, which since 1989 has supported advances in the European environment and health agenda through an intersectoral policy platform involving the ministries of health and environment of the 53 Member States in the WHO European Region, together with relevant international organizations and nongovernmental organizations.

Introduction

With more than 80% of the European population expected to live in urban areas by 2030, the urban environment is a key setting where different policies can be integrated and leveraged to promote and protect health and well-being from environmental threats, while preventing and mitigating socioeconomic inequalities. Policies related to housing, land use, transport, green spaces, water, sanitation and municipal waste management, as well as to adaptation to and mitigation of climate change, come together with opportunities for education, employment and health care services, leisure and security. In addition, cities play a pivotal role in steering the transition towards a low-carbon society, the uptake of cleaner technologies and shifts towards renewable energy sources.[1]

Urban development is already the focus of the work of the United Nations family (for example, the United Nations Human Settlements Programme (UN HABITAT) and the United Nations Economic Commission for Europe (UNECE) Committee on Housing and Land Management) and European Union (EU) institutions. United Nations Sustainable Development Goal (SDG) 11, Make cities and human settlements inclusive, safe, resilient and sustainable, provides a politically negotiated scope for the work with targets and indicators. Many other SDGs are also relevant at the city level.

In October 2016, the UN Habitat III Conference adopted the New Urban Agenda. This re-emphasizes the critical role cities play in achieving sustainable development, reiterating the commitment to the interlinked social, economic and environment principles and rethinking the way cities are built, managed and inhabited. The novel aspect of this New Urban Agenda, however, is the recognition that while national governments play a leading role "in the definition and implementation of inclusive and effective urban policies and legislation for sustainable urban development, subnational and local governments, as well as civil society and other relevant stakeholders have got an equally important contribution to make" (1) (Box 1).

Box 1. Habitat III and cities

The role of UN HABITAT is to promote socially and environmentally sustainable towns and cities, with the goal of providing adequate shelter for all. Habitat III's New Urban Agenda for the 21st century, to which equity and social justice are key, explicitly considers and addresses the risks and benefits to health from urban policies (2). "Habitat III will integrate equity to the development agenda: equity becomes an issue of social justice, ensures access to the public sphere, extends opportunities and increases the commons" (3).

The New Urban Agenda calls for subnational and local governments to be involved in the identification and implementation of inclusive and effective urban policies for sustainable urban development that can deliver SDGs (1). Implementing the New Urban Agenda requires urban rules and regulations both at national and subnational level that will help deliver quality urban settlements. The New Urban Agenda also encourages effective systems of municipal finance that can support redistribution of the urban value generated for greater equity.

The New Urban Agenda acknowledges the systemic nature of cities as a key driver to promote cross-sectoral and cross-institutional cooperation which will deliver compact cities, polycentric growth, mixed use streetscapes, prevention of sprawl and transit-oriented development. Urban and transport planning and urban design are at the core of the implementation of the New Urban Agenda. They also have a role in delivering equity through adequate provision of common goods.

Habitat III also emphasizes the link between sustainable development and health in cities and the integration of health into urban planning, governance and finance and is seen as a major tool for delivering the SDGs.

[1] The term "city" is used generically in this document. It refers to urban settlements of various size found in Europe, including towns, cities, metropolitan areas and city-regions.

Source: WHO/F. Racioppi

In Europe too, the EU Urban Agenda now promotes strong involvement by subnational levels of governance in tackling the complexity of urban challenges through policy integration and coordination, while acknowledging the existence of urban systems as well as the challenges in multilevel policy implementation. The EU Urban Agenda also aims to contribute directly to the implementation of SDG11. At pan-European level, the city dimension of sustainable development is being redefined. The WHO European policy framework and strategy for health and well-being for the 21st century, Health 2020 (4), clearly identifies the creation of resilient communities and environments as one of its priority areas in achieving the strategic objectives of reducing health inequalities and improving governance for health. The European Environment and Health Process (EHP), which since 1989 has provided an intersectoral policy platform to the Member States in the WHO European Region to address common environment and health challenges, has identified cities as a key priority for its work from 2017. The EHP has its institutional basis in national governments, yet it is European cities and subnational levels of government that are facing major environment and health challenges and opportunities, and many of the policies advocated by the EHP require leadership and implementation at the local level.

There is, therefore, the scope and necessity to define the possible space and means for political engagement, technical cooperation, exchange of knowledge and experience, development of new partnerships and cooperation between key public and private stakeholders and civil society. This document specifically supports the identification of a possible way forward to develop collaboration and partnerships between international actors, national governments and subnational and local levels of government within the EHP context. The document focuses on key messages and components of subnational and urban policies that could be leveraged to accelerate progress on environment and health matters at the subnational level; synthesizes the evidence base around the role of subnational and local authorities and cities for health, resilience and equity; identifies suitable areas for cooperation, highlighting the challenges and opportunities in ensuring coherence in policy and support across different levels of government; and proposes a possible way forward to enhance the contribution of the city level to the European environment and heath agenda.

New collaborations and partnerships between all levels of governance need to bring added value to the existing platforms, networks and initiatives spearheaded by subnational and local authorities. European cities have come together in well-developed platforms and networks, including the WHO Healthy Cities and Regions for Health networks, the EU Committee of the Regions, Local Governments for Sustainability (ICLEI), EUROCITIES, the Council of European Municipalities and Regions, European Cities and Regions Networking for Innovative Transport Solutions (POLIS) and a number of other configurations which provide fora for exchanging experiences and forging partnerships on themes of common interest. These networks and platforms represent important potential strategic partners which need to be actively engaged in the development of this theme and the identification of opportunities for collaboration.

1. Cities, environment and health: key drivers of change

> *We live in a century of unprecedented urban growth. For the first time in history, cities are home to more than half of humanity. By 2050, two out of every three people on earth will live in urban areas.*
>
> *With the right approach, urbanization can address inequality, economic stagnation, climate change and disasters. That will advance progress on the Sustainable Development Goals and the Paris Agreement on Climate Change.*
>
> *To realize a life of dignity for all, we need cities that are free of crime, pollution and poverty – cities where diversity is celebrated and the social fabric is strong (5).*
>
> **Secretary-General António Guterres**
>
> 26th Session of the Governing Council of UN-HABITAT
>
> 8 May 2017

In this context of unprecedented urban growth, this section will briefly identify the burden of disease in European cities and the key drivers of change in city environments and describe how public health thinking has modelled the synergy between human activities and the environment to understand their impact on health.

1.1 The burden of disease in European cities today

Cities have brought prosperity and progressive political, social, cultural and educational advancement through the years, and city living has been beneficial for health and well-being. In the 21st century, however, a series of new economic, social and environmental drivers mean that new health and environmental challenges need to be tackled in cities and towns. In the first place, what is the burden of disease in European cities today? Below are a few key figures which expose the critical state of urban health, linked to the impact of economic activities, movements and activities in cities, the way the built environment has developed, and not forgetting the new demographic trends.

1.1.1 Air pollution

Air pollution is the single largest environmental health risk in Europe and a major area of policy attention at the urban level, with emissions from transport, heating and industrial activities representing the main sources of exposure.

- Every year, ambient (outdoor) air pollution causes nearly 500 000 premature deaths, and household (indoor) air pollution from solid fuel combustion for heating and cooking is responsible for nearly 120 000 premature deaths (6).

- Almost 290 000 deaths in high-income countries and 190 000 deaths in middle-and low-income countries were attributable to ambient air pollution in the Region in 2012 (6).

- Worldwide, ischaemic heart disease and stroke are the most common causes of premature death attributable to ambient (outdoor) air pollution (72%); chronic obstructive pulmonary disease and lung cancer are next, based on data from 2012 (6).

- In European cities that monitor air pollution (over 1790 cities in 42 countries), annual urban levels of particulate matter less than 10 microns in diameter (PM_{10}) generally exceed the WHO guidelines value. The average annual level in cities in high-income European countries was 25 $\mu g/m^3$, as against 55 $\mu g/m^3$ in cities in low- and middle-income European countries (7).

- The economic cost of deaths and diseases from air pollution in the Region amounts to US$ 1.6 trillion, according to a study in 2015 by the WHO Regional Office for Europe and the Organisation for Economic Co-operation and Development (8). This figure is the equivalent of one tenth of the gross domestic product of the EU in 2013.

- City life exposes residents to relatively higher air pollution levels at close proximity to the source of the pollution (9).

1.1.2 Noise

Traffic noise is a key issue in urban settings, posing one of the top environmental health risks after air pollution. In urban areas of Europe, about 73 million citizens are exposed to average daily road traffic noise levels above 55 dB, while 52 million citizens are exposed to road traffic noise levels above 50 dB during the night. To give a perspective, the WHO guideline night-time limit to avoid adverse health effects is 40 dB(A) (10). An estimated 18% of citizens of the countries belonging to the EU since July 2013 (EU28) have reported being exposed to neighbourhood noise (11).

If all human settlements and all areas of human activity, including road networks, are included:

- the burden of disease from environmental noise is estimated at 61 000 disability-adjusted life-years for ischaemic heart disease in high-income European countries (12);

- over one million healthy life-years are lost per annum from traffic-related noise in western European countries (12);

- exposure to road noise in excess of the recommended threshold is estimated to affect over 125 million people in Europe (13).

1.1.3 Waste

With urbanization, waste management has become a critical issue for local authorities and one which has an impact on human health, with a particularly disproportionate impact on deprived communities living near waste disposal plants. Each person in the EU generated 477 kg of municipal waste in 2015. Of this, 44% was recycled or composted. Recycling and composting together accounted for 45% relative to waste generation (14).

- Totals produced per country vary considerably, ranging from 789 kg per capita in Denmark to 286 kg per capita in Poland. The variations reflect differences in consumption patterns and economic wealth, but also depend on how municipal waste is collected and managed (14).

- The landfilling rate compared with municipal waste generation in the countries belonging to the EU between January 2007 and July 2013 (EU27) dropped from 63.8% in 1995 to 25.3% in 2015. During the same period, the amount of waste recycled rose from 25 million tonnes (52 kg per capita) in 1995 to 69 million tonnes (137 kg per capita) in 2015. The share of municipal waste recycled overall rose from 11% to 29% (14).

- The recovery of organic material by composting grew by an average annual rate of 5.4% from 1995 to 2015 (14).

- Since 1995, the amount of municipal waste incinerated in the EU27 rose by 32 million tonnes or 100% and, by 2015, accounted for 64 million tonnes. Municipal waste incinerated in this period thus rose from 67 kg per capita to 128 kg per capita (14).

- Different studies have estimated that about 2% to 6% of the population are affected by exposure related to waste.

- The population living in the proximity of waste disposal plants tends to be more deprived than the general population.

- Excess risks of cancer, respiratory disease and adverse reproductive outcomes have been found in people living near landfills and old-generation incinerators, although the evidence is not conclusive. Emissions of CO^2 and air pollutants into the air have measurable health impacts, costed at between €4 and €63 per tonne of disposed waste, depending on the technology used.

- Waste and hazardous waste account for around one quarter of the approximately 250 000 contaminated sites in European Economic Area countries. This number is expected to grow (15).

1.1.4 Water and sanitation

Different levels of urban development in Europe mean that access to clean water, sanitation and hygiene remains an issue in many areas. In addition, some countries still need to take measures to treat wastewater; the lack of such measures can have an impact on the environment and human health.

- In 2015, an estimated 62 million people in the Region did not have access to adequate toilets or means of disposing of human faeces. More than half of these people lived in cities (16,17).

- In 2015, an estimated 14 million people in the Region did not have access to a basic water source for drinking. Three out of 10 of these people lived in urban areas (17).

- In high- and upper-middle income countries, about 30% and 60% of urban wastewater, respectively, is released into the environment without treatment. The quantity of wastewater produced in cities and its pollution load are increasing. Unsafely managed and untreated wastewater flows in urban contexts can adversely affect human health, the environment and the economy.

1.1.5 Housing

Research has demonstrated over the years that good quality housing is a key factor in physical, mental and environmental health and well-being and that poor housing can have damaging effects on health, with high costs to health systems.

- Every year, more than 100 000 deaths, many of which could have been prevented, occur in the Region due to inadequate housing conditions (18).

- Removing housing inadequacies in the EU would pay back €2 in one year for every €3 invested, through savings such as lower health care costs and better social outcomes (19).

- Unsafe home and community environments (including such things as poor lighting, slippery floors and loose rugs) may increase the risk of falls in the elderly, which could be reduced through effective intervention (20).

- Around 10% of lung cancer cases result from radon in the home, which can be prevented through appropriate design (21).

- A European study has found greater increases in overall mortality rates (given a specified fall in temperature) among populations with cooler homes (Eurowinter, 1997, cited in 22).

1.1.6 Green space

Urban green space is a necessary component for delivering healthy, sustainable and liveable cities. Interventions to increase or improve urban green space can deliver positive health, social and environmental outcomes for all population groups, particularly among lower socioeconomic groups. There are few, if any, other public health interventions that can achieve all of these: in particular, the impact on active lifestyles, mental well-being and social interaction is frequently highlighted as a key benefit (23).

- Green spaces in urban areas can benefit human health but also offer adaptation and resilience mechanisms in the era of climate change. Modelling studies for urban temperatures over the next 70 years project that in urban areas where the green cover is reduced by 10%, urban temperatures could increase by 8.2 °C above current levels. On the other hand, increasing the urban green cover by 10% could restrict the temperature increase to only 1 °C (24).

- A study across the whole population of the United Kingdom (England) has shown that those who lived closer to greener environments had 25% lower all-cause death rates, even after adjustments were made for the wider health impacts of poverty (24). Another study has concluded that every 10% increase in green space is associated with a reduction in diseases equivalent to an increase of five years of life expectancy (24).

- It is estimated that trees and shrubs remove 997 tons of air pollution in the form of ozone (O_3), 32 tons of carbon monoxide, 698 tons of nitrogen dioxide, 229 tons of PM_{10}, 153 tons of particulates less than 2.5 microns in diameter ($PM_{2.5}$) and 62 tons of sulfur dioxide per year, with an associated value of over £126 million (based on the estimated mean externality costs associated with pollutants and social damage costs in the United Kingdom published by the British government) (25).

1.1.7 Impact of climate change

Climate change may adversely affect cities and their infrastructures, particularly through the effects of extreme weather events. Floods can disrupt water and sewerage infrastructures and the integrity and functioning of transport services and infrastructures as well as of health care facilities. Heat waves may aggravate air pollution and disproportionately affect the most vulnerable groups of the population. This calls for investments to increase the resilience of cities to climate change.

- Climate change is predicted to have dramatic effects in the medium term on the health of the physically and economically vulnerable sections of the population. Projections suggest that heat-related mortality in Europe may increase by 2080 by between 60 000 and 165 000 deaths unless adaptation measures are undertaken (PESETA project, cited in 26).

- Elderly people are at particularly high risk from the effects of heatwaves because ageing impairs the body's physiological capacity to regulate its own temperature (thermoregulation). The increased risk of heat-related mortality is also important for chronically ill, very young and socially isolated people (27).

- Critical urban infrastructures, such as water supply and wastewater and sewage discharge systems, the energy supply and roads may be vulnerable to extreme weather events such as floods, creating a need to assess and strengthen their resilience in order to ensure uninterrupted service, particularly to health care facilities.

1.1.8 Mental health and city living

The way cities are designed and in which the residents move around them is important for health.

- In 2010, it was estimated that each year 38.2% of the EU population suffers a mental disorder (28).

- Most European studies point to higher risks of mental ill health in urban areas, particularly mood disorders (29). This effect may be largely mediated by sociodemographic variables. Urban populations undergo different risks from rural populations, a fact which should be understood when health care resources are planned.

- Living in European cities is associated with mood disorders, anxiety, psychotic disorders and substance abuse (30:163).

1.1.9 Road traffic injuries

In spite of significant improvements in many countries over the past decade, road traffic remains a major safety issue for European cities. There can be devastating consequences, in particular for young and vulnerable road users, cyclists and pedestrians,

with a disproportionate burden falling on those most vulnerable in society. Addressing road safety issues is an essential prerequisite for the promotion of more cycling and walking as integral components of sustainable urban transport policies.

- In 2013, road traffic crashes killed some 85 000 people in the 53 Member States in the Region, representing the leading cause of death for people in the group aged 5–29 years (31).

- Vulnerable road users are particularly exposed in urban areas, where they mix with motorized transport moving at higher speeds. Of the 85 000 people killed in road traffic crashes in 2013, 26% were pedestrians and 4% were cyclists (31).

1.1.10 Trends in obesity

Levels of obesity are rising in Europe, leading to chronic diseases. Heathy diets as a way to reduce obesity have been associated with a reduction in the prevalence of diabetes and cancer.

- It is estimated that 30–70% of adults in the EU are overweight, of whom 10–30% are obese. Levels of (self-reported) obesity are higher among people with lower education.

- In 2014, overweight and obesity were responsible for an estimated 10% of the total disease burden in western and central European countries (32).

1.1.11 Trends in ageing

European society is ageing, with the proportion of the population aged 65 years or older predicted to nearly double between 2010 and 2050 (33).

- In 2014, 46 000 people aged over 70 years died as a result of falls. It is estimated that 26% of these falls were attributable to the built environment (34).

- The old-age dependency ratio for the EU28 in 2015 was 28.8%, which indicates roughly four people of working age for every person older than 65 years. Between 2005 and 2015, the old-age dependency ratio increased from 24.7% to 28.8% (35).

- Depression in those aged over 65 years living in Europe is estimated at 2–15% (36).

1.2 Main drivers of change in European cities in the new millennium

Human activity is impacting the earth's environment at an unprecedented level and 70% of the world's economic activity now takes place in the world's 600 largest cities (37). Globally, cities represent 80% of GDP (2). The relatively recent rise in city living and associated human activities have led to huge impacts on the health and well-being of both people and the planet. To develop its New Urban Agenda, HABITAT III reiterated these extraordinary statistics: "Cities today occupy approximately only 2% of the total land, but make up 70% of global GDP, over 60% of global energy consumption, 70% of global greenhouse gas emissions and 70% of global waste." (1).

The major drivers of change in the European urban environment include the growing importance of cities for economic and social development, the increasing movement of people from rural to urban areas and between cities and countries, the need to tackle climate change and air pollution and the ageing of the population.

1.2.1 Cities and economic growth

National and city-level desire for economic growth is a major driver for change in cities, resulting in the redevelopment and regeneration of space for industry, commerce, leisure and residence, as well as the development of surrounding supportive infrastructures such as for transport and public spaces. Unless consideration is given to the subject of the environment and health, there is a risk that such developments will have a negative impact on both. For example, the loss of existing green open space or failure to provide infrastructure for active travel and public transport can adversely affect air pollution, levels of physical activity, mental well-being and climate change.

1.2.2 Cities and climate change

A critical policy driver comes from the environmental imperative to both mitigate and adapt to the impacts of climate change (26). While climate change is not the only threat to the environment, many of the actions that need to be taken to reduce the extent of climate change (mitigation activities) would also help to address other environmental and health issues. For example, a reduction in the use of fossil fuels and the preservation of urban green spaces (which can help to absorb carbon emissions) will also help to address positively issues such as air pollution, biodiversity, physical activity and mental well-being. Similarly, many of the actions that need to be taken to reduce the impact of the effects of climate change (adaptation activities) could have wider positive impacts. For example, measures taken to make critical urban infrastructure resilient to extreme weather events (droughts, torrential rains, floods) or ensure the energy efficiency of buildings can also help to increase the reliability and quality of public services provided by this infrastructure (public transport and drinking-water supplies) and could help to address some socioeconomic inequalities, such as fuel poverty. These are associated with the devolution of the relevant political responsibility to subnational and local authorities in many European countries (Box 2).

Box 2. Devolution of responsibility to local authorities: addressing air pollution in Paris

As part of its strategy to address air pollution, Paris introduced a ban in September 2015 on the most polluting trucks and heavy duty vehicles. Since 1 July 2016, the ban has been extended to cars registered before
1 January 1997 between 08:00 and 20:00 on work days (38). The legal basis of this measure is provided by a law on energy transition enacted in 2015, which allows municipalities to restrict the circulation of vehicles to improve air quality as a measure of public health.

The measure is accompanied by an offer of a 50% reduction on a subscription to the Autolib car-sharing scheme for electric cars and a prepaid bonus of €50, together with a one-year subscription to the Velib bicycle-sharing scheme and to public transport (the Navigo system). Alternatively, individuals may choose to receive €400 to buy a bicycle (including electric ones).

1.2.3 Changing demographics

Changing population demographics are also affecting European cities. Cities are often associated with young, working-age populations but demographic changes mean that a large number of European cities now have high old-age dependency ratios (39). This change will affect health needs in cities while also acting as a driver for further change, with calls for cities to ensure they are age-friendly by optimizing opportunities for health (active mobility), participation and security for people as they grow older (40).

The growing demand to care for the needs of elderly people has the potential to create opportunities for new services, products and jobs, although the increased public expenditure required to provide these services may be difficult to sustain if there is not a sufficiently large working population. The increase in the size of the economically inactive (yet still physically healthy) population aged over 65 years can, however, also be seen as an opportunity, as those who are no longer in paid employment can be engaged in formal or informal volunteering opportunities, which can have individual and community-level benefits for health and the environment (41).

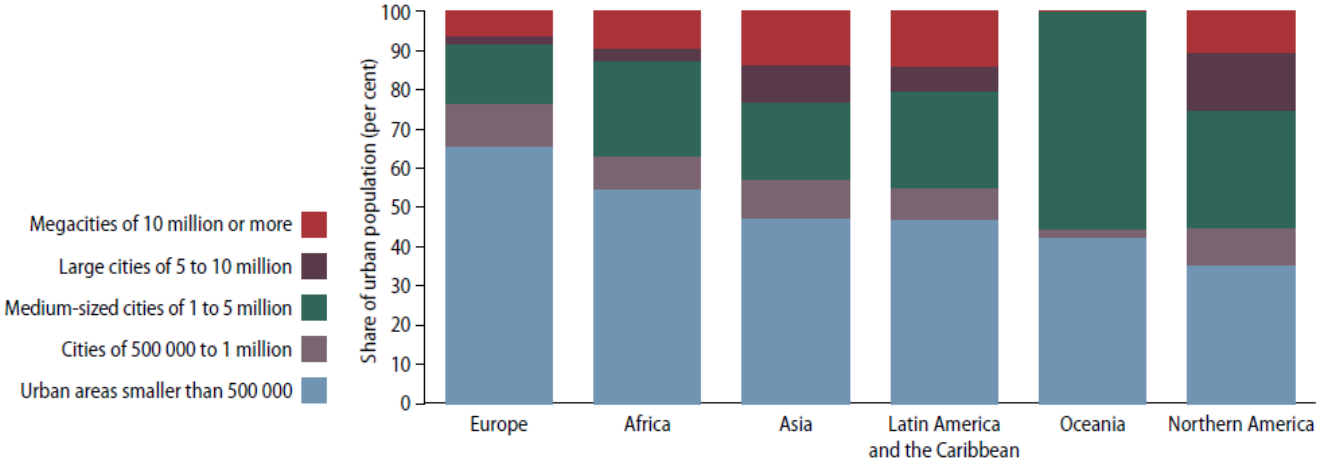
Cities are also being driven to change in response to the growing burden of diseases related to sedentary behaviour, for example by redesigning transport networks to prioritize active travel and, in response to the immediate and long-term impacts of climate change, by developing infrastructures to respond to problems of flooding and extreme heat. At the same time, city authorities need to remain aware of their possible vulnerability to outbreaks of communicable disease. For example, negligence in providing safely managed drinking-water and sanitation services in cities continues to result in significant outbreaks of water-related disease across the entire Region, with consequent important economic costs.

It is important to remember that the drivers described above, particularly those for economic and population change, will not affect all cities equally. While many European cities are growing, others will continue to experience post-industrial decline and its associated negative impacts on society and health (42).

Furthermore, while these drivers are common to cities across the globe, the European urban environment shows some distinctive features compared to other regions that need to be taken into account, since they offer windows of opportunities for action that may be different, or operate at a different scale. For example, Europe is characterized by having the largest proportion (65%) of the urban population living in cities with fewer than 500 000 inhabitants, and close to 95% living in cities with fewer than five million inhabitants (Fig. 1).

Fig. 1. Population distribution by city size across major areas of the world, 2014

Source: United Nations (43).



Source: WHO/F. Racioppi

This means that many European cities need to cater for the needs of relatively small communities. On the one hand, this may facilitate the organization of services and make it easier and more feasible to meet accessibility needs through walking and cycling and public transport. On the other hand, it may pose challenges in terms of economy of scale, the on-site availability of certain advanced technical competences (such as for environmental monitoring) or the fiscal basis to sustain investments in public infrastructure (such as in social housing). Another important characteristic shared by many European cities is that they have a history that can be traced back several centuries, if not millennia, and need to match the needs of contemporary urban life with the preservation of their important historical and cultural heritage. This often presents special challenges for architectural and urban space design. For example, cities that developed during the middle ages and renaissance are often characterized by historical areas with narrow streets that are at odds with the mass use of private motorized vehicles, leading to conflicts in the use and allocation of public spaces.

1.2.4 Smart cities, health and the environment

Technological advances have provided a major opportunity for improvements in cities that can benefit both health and the environment. The use of technology to improve life in cities is often described by the term “smart cities”, which has been defined as cities “in which the seams and structures of the various urban systems are made clear, simple, responsive and even malleable via contemporary technology and design” (44). Smart city initiatives can be used to improve the way that citizens experience and interact with their cities, enabling them to gain real-time information about the infrastructure around them (public transport, water and air quality) as well as allowing them to provide real-time feedback (on, for example, reporting problems with infrastructure). Smart cities can also use data and technology to improve their systems, for example using algorithms to ensure public service vehicles take the most efficient routes, or that energy resources are used efficiently.

Source: Statutory City of Ostrava, Czech Republic

Technology can also be used within rather than by cities to improve social connections and thus break down isolation and improve mental well-being. It has facilitated the expansion of the collaborative or sharing economy which can help to reduce consumption and waste (examples are car-sharing, sharing of food which would otherwise be wasted and sharing time and expertise through "time banks"). The collaborative economy can, however, be viewed as a threat to those working in the mainstream economy (45). For example, the advantages and disadvantages of peer-to-peer platforms that facilitate the provision of on-demand transport services or short-term accommodation are being debated in many cities. On the one hand these developments may meet a consumer demand and provide income to disadvantaged groups of the population, but on the other hand they may result in substandard employment conditions and create turbulence in the formal employment market. There is a need to define a level playing field which embraces and governs the new opportunities created by communications technology.

1.2.5 Promoting the healthy people healthy planet agenda in cities

It is also important to recognize the potential for synergies between action for the environment or health and economic growth. The introduction of energy efficiency measures, for example, can lead to financial savings (46); measures to encourage the use of public transport and active travel can lead to reduced travel times in congested cities and to the creation of new job opportunities (Box 3); and interventions that improve population health, especially mental health, can reduce the number of days taken off work and thus help to improve economic productivity (47).

Box 3. Estimating the potential for the creation of green and healthy jobs related to cycling

There are considerable health and economic benefits from active transport. These benefits outweigh the comparatively low cost of measures to promote cycling and walking. In addition, up to 435 000 additional jobs might be created if 56 major European cities had the same modal share of cycling as Copenhagen, according to a recent study carried out in the framework of the Transport Health and Environment Pan-European Programme. The types of job associated with cycling vary, and different jobs require different skill sets. They range from designing and manufacturing bicycles to providing different types of service that require various levels of technical expertise, as well as to jobs in administration and construction. Further, the data collected demonstrated that more cycling leads not only to more jobs but also the creation of various services, which in turn result in new types of cycling-related job.

Investing in cycling helps to encourage and facilitate it and to contribute to the development of a more cycling-friendly transport culture. As cycling increases, the larger number of cyclists will need more bicycles, more cycling accessories and more maintenance and repair services. The more bicycle trips there are in a city, the more cycling infrastructure will be needed, and an increase in the popularity of cycling will also encourage entrepreneurs to set up related businesses and to develop additional services. Another important finding of the study was that there is great potential for cycling-related jobs outside cities, particularly in relation to tourism. In Austria and France, for example, the share of cycling-related jobs related to tourism is estimated to be 70% and 47%, respectively (48).

In order to achieve improvements in the environment, a health and inequalities/equity reassessment is needed of city living, resource management, urban and transport planning policies, urban form and infrastructure, integration of health in all policies, financial incentives and of how the city level can, above all, contribute to reducing inequalities in health. Cities must be able to interact with international governance and policies in these fields. Altogether, "over 60% of decisions taken at the European level have a direct impact on municipalities, provinces, and regions and 70% to 80% of public investments in Europe are made by local and regional authorities" (49). International institutions are now taking a greater interest in the urban dimension of global challenges in the field of the environment and health and are proving to be formidable drivers of policy for local leaders and decision-makers.

1.3 International policy drivers for environment and health

Aside from the economic and demographic drivers, other policy drivers are seeking to use current threats to the environment and health to galvanize positive change. At the global level, cities themselves are an intrinsic component of national and international systems which have an impact on the functions, specializations and opportunities in cities (50). International and national policy-makers now recognize the importance of a more sophisticated and complex model of governance requiring multisectoral collaboration, vertical policy integration and multi-actor collaboration in the areas of environment and health. Thus to help unlock the full potential of the urban environment, a restructuring of multilevel governance is necessary to promote policy integration. Without it, as the new EU Urban Agenda (Box 4) identifies, policies can lead to contradictory consequences and are less effective.

Box 4. The EU Urban Agenda

The 2016 EU Urban Agenda, championed by the Netherlands during its EU presidency, aims to strengthen the urban dimension of European policies, to create better regulations and to promote the exchange of knowledge while respecting subsidiarity (the EU has no formal competences over urban policy) and the polycentric nature of subnational governance in Europe. It focuses on sectors relevant to the environment, health and equity, with pilot partnerships established to address four of these themes: air quality, housing, inclusion of migrants and refugees, and urban poverty over the next two to three years (51). It promotes vertical and horizontal coordination of policies, impact assessment and knowledge exchange. A major objective is to contribute to SDG11.

The EU Urban Agenda is an extension of the Dutch Agenda Stad, which focuses on the overlapping areas of economy, liveability and innovation (52). The Agenda Stad identifies opportunities and challenges in urban areas that require collaboration between the national government, cities and other stakeholders, acknowledging that these are often complex, radical and transitional challenges that do not fit into existing policy frames. The response to these opportunities and challenges are city deals – cooperation arrangements between different levels of government, business, civil society and other stakeholders.

The United Nations SDGs, in particular SDG11, can be seen as an overarching framework for policy to improve the environment and health in cities (53). SDG11 is not, however, the only SDG with an urban dimension. The 17 SDGs and 169 targets aim to eradicate poverty and inequality, create inclusive economic growth, preserve the planet and improve population health. Many have an environmental and health dimension that, as well as addressing climate change, holds potential for significant public health improvements, particularly in cities.

In the WHO European Region, the European Healthy Cities Network consists of nearly 100 cities and towns from 30 countries around the Region that are committed to health and sustainable development (Box 5) (54). In addition, since 1993, the Regions for Health Network has helped regions to accelerate the delivery of improved population health. This aims to become a cutting-edge network ready to capture and disseminate effective approaches, policies and strategies that improve population health at the regional level of governance (55).

Box 5. WHO Healthy Cities Project and Health in All Policies

The WHO Healthy Cities Project is a global movement to engage local governments in health development through a process of political commitment, institutional change, capacity-building, partnership-based planning and innovative projects (54).

The following two strategic goals, taken from Health 2020, encapsulate the overarching aim of the current phase of the Healthy Cities Network and reinforce the commitment of the Network to promote health in all policies:

(i) to improve health for all and reduce health inequities
(ii) improve leadership and participatory governance for health.

Health in All Policies is an international movement encouraging policy-makers at all geographical levels to ensure joined-up work between health and non-health departments, so that policies that support good health becomes everybody's business (56).

In parallel with pan-European activity by cities on health, pan-European initiatives on the environment focus particularly on climate change, including the Paris Agreement (57) and the EU Strategy on Adaptation to Climate Change (58). Cities Signatories to the Covenant of Mayors for Climate and Energy have pledged action to support the implementation of the EU target for a 40% reduction in greenhouse gas by 2030, as well as the adoption of a joint approach to mitigating and adapting to the effects of climate change (59). In addition, the 7th Environmental Action Programme to 2020, which aims to help the EU address international environmental and climate challenges more effectively, has acknowledged the city dimension and introduced a priority objective to make cities in the EU more sustainable (60).

1.4 Modelling the synergy between urban activities, the environment and health

It is of key importance to understand the pressures from drivers of change in societies on the natural and built environment, the resulting state of the environment and the impact on human health.

Cities are seen as urban metabolisms (50), complex systems of flow management and the result of resource allocation, distribution and deployment through time. Scientific models now use the systems approach to describe and explain the synergies between the environment, human activities and human health, making the connections among society, the economy, the environment and health and well-being and highlighting the importance of biodiversity in both human and planetary health. One of the latest models developed by public health research is described in Box 6.

Source: Moravian-Silesian Region

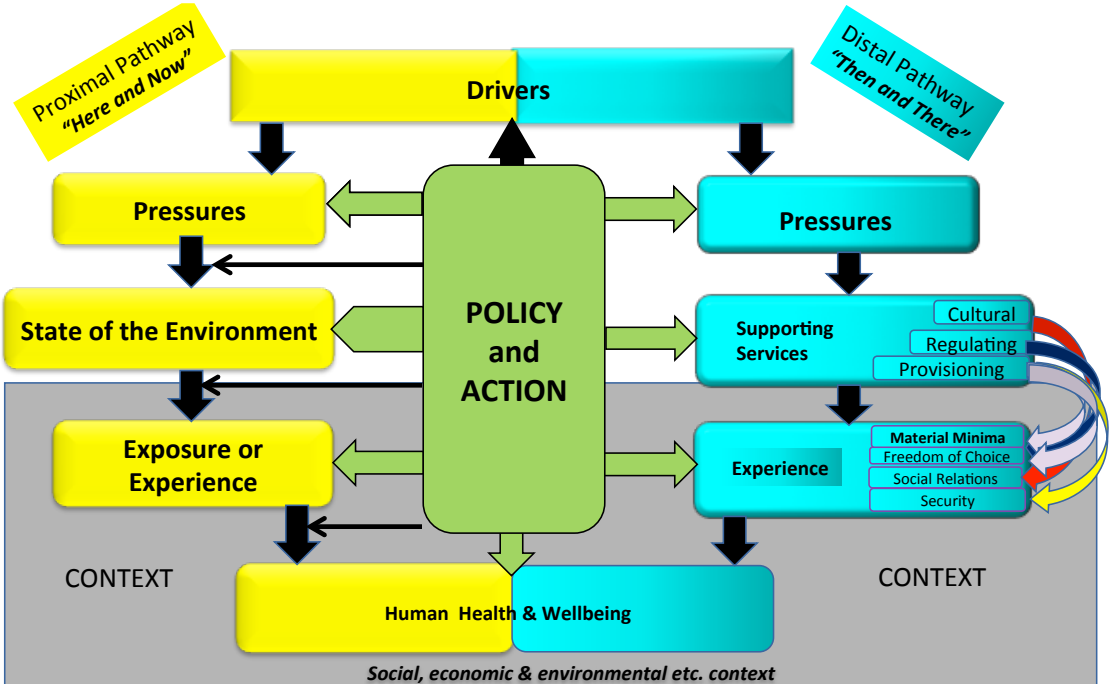
Box 6. Conceptualizing the relations between the environment and health: the ecosystem-enriched drivers, pressures, state, exposure, effects, actions framework

The ecosystems-enriched drivers, pressures, state, exposure, effects, actions (e-DPSEEA) is a conceptual framework for an integrated assessment of the human health and ecosystem service provision.

Fig. 2 shows an expanded version of the model developed in work for the European Environment Agency (EEA) (61). In this form, it is a particularly useful tool to think about the relationship between, health, well-being, equity and sustainability in the urban context. The model shows that an interaction of macro-level drivers in any location may lead to changes in health and well-being in two ways.

Fig. 2. Ecosystem-enriched Driver Pressure State Exposure Effect Action model (e-DPSEEA)

Source: based on Reis, Morris et al. (62) as subsequently expanded by the EEA (61).



Firstly, the drivers may create pressures which change aspects of the "proximal" environment that may be highly relevant to the health and well-being of those who live in a particular location. The effects of this change on individuals or community health and well-being are, however, dependent on interacting factors such as their stage of life and socioeconomic circumstances. These factors are represented in the model by context. Population and economic growth, urban and transport planning and social/cultural factors (such as the demand for convenience, speed and comfort) put pressure on the proximal urban environment, the amount of land use, the availability (or lack) of green space and walking or cycling networks, traffic density and people. As a result, individuals may be exposed to air pollution, noise and high temperatures or have (negative or positive) experiences such as exercising or relaxing, depending on the availability of, for example, cycling networks and parks.

In addition to resulting in human exposures to pollution, environmental pressures may interfere with the correct functioning of the ecosystem, damaging or altering its capacity to provide for supportive (cycling of nutrients, soil formation), supply (food, fuel, medicine, materials), regulatory (flood management, water and air quality, CO_2 capture and storage) and cultural (recreation, physical activity, education) services. Thus, depending on where people live, their lifestyles, nutrition and genetic characteristics, the urban environment can be a contributing factor to respiratory and cardiovascular disease, cancer and even premature mortality (63).

Secondly, the model presents a second, "distal", pathway, where the same combination of macro-level drivers may create pressures which disrupt not only the local proximal environment but also ecosystem services for populations in faraway places or for generations yet to be born. For example, emissions

of air pollutants, in addition to localized effects on air quality, may have an effect on climate change. Also in this case, the ultimate effects on health and well-being of individuals or communities remain critically dependent on the contextual factors which apply to those individuals or the communities in which they live. Although for European cities these "distal" changes may appear to be happening elsewhere or seem to be a concern for future generations, they are real and "proximal" threats to the people in the places affected. Moreover, in a world connected economically, socially and environmentally, Europeans are never isolated from the environmental, social and health changes occurring now and later elsewhere in the world.

The model also implies that urban and transport planners and architects need to work with environmental scientists, public health specialists and those from many other disciplines to make sense of the complexities of the urban metabolism and inform policy-makers about actions to regulate human activities, encourage changes in behaviour and promote equity (64). Experts and academics must also engage with local authorities and local communities to create knowledge together. Communities can provide access to big data offering more detailed analysis of the urban environment and its impact on health, and thus contribute to research aiming to solve societal challenges.

A clear understanding of the links between urbanization and the capacity of planet Earth to cope with their broad environmental impact can help to provide a strong driver for the development of an international policy framework that can confront new common trends and challenges and reduce the inability of isolated governments to tackle climate change and work towards eradicating poverty and inequality. This international framework must also engage cities. As the German Advisory Council on Global Change identified, the objectives of the 2015 Paris Agreement on Climate Change Mitigation, Adaptation and Resilience will not be achieved without fundamental changes in the infrastructure, protection of the environment and quality of life in cities (64). This is the direction of travel for the EU Urban Agenda's 12 themes for engagement with urban settlements. The next two sections explore further the pressures mounting on the environment and the resulting impact on human and planetary health.

2. The city, natural resources and health: key drivers and policy response

Cities have become economic and consumer hubs critically responsible for managing both a web of resources and delivering a healthy environment for an ever growing urban population. Five key resources are of particular relevance to cities: energy, materials and waste, ecological systems, water and food. The effective use and management of these resources are related to the environmental, social and economic spheres of sustainable development as well as the health and well-being of city dwellers.

2.1 The growing mismatch between demand for and supply of urban resources

The majority of Europe's population now live in urban areas, yet cities are not able to provide all the resources needed by these populations to maintain healthy and high-quality lives. The result is that cities must draw on the resources from their surroundings locally, nationally and globally. For example, urban areas use around 70% of global energy and are responsible for 70% of global energy-related CO_2 emissions (64). The footprint of cities is, therefore, far greater than that taken up by their buildings, roads and other infrastructure. Since they rely on large areas of land and water for supplies of energy, materials, drinking-water and food, these ecological and environmental systems are altered in the process. This means that a "growing mismatch has emerged between human demand patterns and the capacity of the planet to supply resources and absorb wastes" (65), a mismatch which could potentially destabilize the global ecological system (66).

The connection between the use of resources and its impact has been eroded to such an extent that it may be invisible to city dwellers, although when an impact occurs in a city (such as increased flooding) it may be more visible to them. This unsustainable use of resources in cities has negative consequences on the health of current and future urban populations. It is, therefore, critical that the interaction between cities and resources both within and outside the city limits is understood and action taken accordingly.

It is challenging to persuade urban populations that measures to reduce their impact are essential to the maintenance of their health and quality of life, both now and in the future. However, national and local policy-makers and those managing cities now have access to a robust evidence base linking the urban environment and the sustainable use of resources. Their responsibility is to manage economic growth sustainably through careful allocation of resources, and to promote resilience, social cohesion, health, well-being and equity in line with the SDGs. This will require suitable policies to be designed and implemented and governance arrangements to be introduced at city level that promote community engagement with and buy-in to high-quality urban design.

2.2 Cities, energy and health

Energy is a critical component of urban living. It enables people to travel, live in thermal comfort and have a high quality of life. However, the continued use of fossil fuels to generate much of the energy supply has significant direct and indirect consequences for

health and well-being. Although energy consumption has remained relatively stable in recent years (67), it is still at unsustainable levels across all sectors. The key drivers include: climate change, where the burning of fossil fuels contributes directly to greenhouse gases in the atmosphere; environmental degradation as these resources are extracted and transported, resulting in habitat loss, change in land use and pollution; fuel insecurity since countries are dependent on volatile energy supplies; and fuel poverty as a result of the increasing cost of household energy. In addition, the energy used in the transport, industrial and domestic sectors pollutes the air, contributing to poor air quality in cities. These pollutants include particulate matter, nitrous oxides, sulfur dioxide and carbon monoxide which cause a number of health problems, including heart disease and lung cancer.

In the region covered by the UNECE, the housing stock is responsible for up to 40% of national energy consumption for heating and cooling and electrical appliances and, therefore, represents a natural priority for energy efficiency measures (68). In the transport sector, energy use has increased in recent years (67): vehicle emissions are the main cause of ambient air pollution, with dramatic adverse effects on human health.

As net consumers of energy, cities have a key role in reducing demand for it and contributing to its supply. The transition to a more sustainable situation focuses first on reducing the need for energy (the demand side). This is happening in all spatial contexts: for example, compact city policies aim to reduce the need for motorized transport, particularly private motor vehicles, through high-density mixed-use urban developments. In construction, a range of initiatives aim to increase the efficiency of buildings' fabric and services while ensuring that there is sufficient ventilation to maintain indoor air quality at acceptable levels (69) (Box 7). Measures are also being taken to change how energy is generated (the supply side), focusing on increasing the use of renewable energy supplies and decentralizing energy systems. Again, this is happening in all spatial contexts, from decentralized systems such as heat distribution or communal heating and cooling networks to the microgeneration of energy in individual buildings. City authorities can also set expectations regarding the supply and use of energy in new developments through, for example, requirements for certain standards to be met or accreditation systems to be used. City energy policies directly support SDG 7 (to ensure access to affordable, reliable, sustainable and modern energy for all), which aims to bring about a substantial increase in the share of renewable energy and to double the global rate of improvement in energy efficiency by 2030.

Box 7. Energy policies for buildings: a few examples from the EU

In the EU, the following three directives are aimed at reducing the demand for energy and making the supply of energy more sustainable.

- The Energy Performance of Buildings Directive (2010) aims to increase the efficiency of buildings' fabric and services (70). Measures include providing information on the energy performance of buildings and minimum energy performance standards for new and retrofitted buildings.
- The Energy Efficiency Directive (2012) aims to improve the efficiency of government buildings across member states and provide strategies for retrofitting the existing building stock (71).
- The Renewable Energy Directive (2009) sets targets for renewables to make up 20% of energy requirements and 10% of transport fuels across the EU (72). This is already having an effect, as the production of energy from fossil fuels is decreasing while it is increasing from renewable sources.

Source: www.istockphoto.com

2.3 Cities, materials, waste and health

Urban populations are also significant users of materials and producers of waste. These are intrinsically linked as the need for more materials is related to how waste is managed and disposed of. As with energy, the current patterns of consumption and disposal are unsustainable. The key drivers are: climate change, as many extraction technologies are very energy-intensive and waste management can result in greenhouse gas emissions, for example through incineration and decomposition processes, environmental degradation and resource insecurity. In 2012, construction and mining/quarrying accounted for the greatest proportion of waste generation across the EU (33% and 29%, respectively), with manufacturing (11%) and households (8%) producing far less. Excluding mineral wastes, the amount of waste produced fell by 5.8% to 1.8 tonnes per inhabitant between 2004 and 2012 (67). This, however, masked differences between sectors. Whereas household waste was broadly equivalent over this period, waste from manufacturing and mining/quarrying fell by around 25% while that from construction increased by 45% (67). The availability of data on waste is limited in many countries, but the Organisation for Economic Co-operation and Development has documented its member countries in Europe producing 270 million tonnes of municipal waste in 2012 (three million tonnes less than in 2004) while the Russian Federation produced 81 million tonnes, an increase of 23 million tonnes from 2004 (73).

Another area of concern is local soil contamination. In 2011, the EEA estimated that there were potentially 2.5 million contaminated sites in its 39 member countries derived from various activities (including industry, commerce, transport, nuclear activities or waste disposal and treatment), of which only 45% had been identified (26). Land affected by contamination may present a risk to human and ecological health through the migration of pollutants to surface and groundwater, inhalation of dusts and vapours, ingestion of soils and dermal contact. This land is also a wasted resource; while not generally situated in city centres, it is often located in or near to existing conurbations and presents an opportunity for development and regeneration of former industrial areas.

Generally, waste management happens at city level. In Europe legislation exists to protect the environment and human health (Box 8). Although there are national waste strategies to reduce, reuse, recycle and recover energy from waste, it is cities that often implement change to break the chain of events that see resources, once used, turn into waste. They may do this through, for example, influencing individual behaviour by changing or promoting the location of recycling facilities. Effective waste management at city level is instrumental to achieve the objectives of SDG12: to ensure sustainable consumption and production patterns by 2020, in particular through: (i) achieving the environmentally sound management of chemicals and all wastes throughout their life cycle; (ii) significantly reducing their release into the air, water and soil in order to minimize their adverse impacts on human health and the environment, and (iii) substantially reducing waste generation by 2030 through prevention, reduction, recycling and reuse.

Box 8. Waste management policies: examples from the EU

The Landfill Directive (1999) has targets for reducing the amount of biodegradable municipal waste sent to landfill (74). The Waste Framework Directive (2008) has set a target of 50% of household waste to be recycled, composted or reused by 2020 (75). Across the EU, the proportion of waste recycled or composted and used for energy generation increased to 45.7% and 6.0%, respectively, between 2004 and 2012. The quantity of waste landfilled in 2014 was 16% lower than it had been in 2004 (67).

In 2015, the European Commission also adopted the Circular Economy Package, which includes revised legislative proposals on waste. This establishes a concrete and ambitious programme of action with measures covering the whole cycle from production and consumption to waste management and the market for secondary raw materials. The aim is to "close the loop" of products' life cycles through greater recycling and reuse, and thus bring benefits for both the environment and the economy. The revised legislative proposals on waste set clear targets for its reduction and establish an ambitious and credible long-term path for waste management and recycling (76).

Source: WHO/F. Racioppi

2.4 Cities, water management and health

Water resource management has become a significant challenge globally in the context of population growth, urbanization and climate change. Extreme weather events (such as torrential rain, flooding and drought), water scarcity and the quality of urban freshwater resources have substantial impacts on health and the environment. These challenges require cities to be more resilient and adaptable, and to manage the supply of and demand for drinking-water and the flows of wastewater so as to protect public health and manage the flood risk more effectively. Cities should be designed and built in such a way as to allow for better sustainable water management solutions through adaptive, multifunctional infrastructure and urban design at different scales as well as behaviour change (Boxes 9, 10). This is supported through a range of legislation aimed at improving or protecting environmental and human health.

Box 9. Water management policies: examples from Europe

The UNECE and WHO Protocol on Water and Health to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1999) aims to prevent, control and reduce water-related diseases through sustainable water management across Europe (77). The Protocol is a legally binding instrument that requires its 26 ratifying countries to ensure, inter alia, adequate supplies of wholesome drinking-water, adequate sanitation, protection of water resources (including the reduction of harmful discharges) and the safe use of water for recreational purposes.

Similarly, in the EU, water quality is protected through the Water Framework Directive (78), the Drinking Water Directive (79), the Urban Waste Water Treatment Directive (80) and the WHO guidelines for drinking-water quality (81).

Source: www.istockphoto.com

Box 10. Blue-green infrastructure

Urbanization has resulted in dramatic changes to the water cycle. Impermeable surfaces in the built environment increase surface water run-off. Grey water infrastructure systems are often unable to cope with this during periods of prolonged or excessive rain, resulting in flood events. At the same time, water scarcity is a serious problem in many cities. As the climate changes, drought and water scarcity are likely to become more pronounced in many parts of the Region. The establishment of a blue-green infrastructure is a key mechanism in the ability of cities to adapt to these challenges.

The aim of a blue-green infrastructure is to bring the natural water cycle back to cities. This may include hydrological and vegetated features, such as using the permeable surfaces in green spaces to allow water to filter naturally into the groundwater, rainwater harvesting to relieve the pressure on the grey water infrastructure and green roofs to slow the release of water to the surface and increase evapotranspiration (82).

These elements have multiple additional benefits including to nature conservation, health and the quality of life.

The WHO guidelines for drinking-water quality promote the water safety plan approach which presents a preventive risk management framework that is most effective in consistently ensuring the safety of a drinking-water supply. The adoption of water safety plans in policy and practice has been proved to prevent water quality-related incidents and to result in long-term health gains. Such plans can also effectively support the building of climate-resilient water supplies (83).

The reuse of water is likely to increase as cities adapt to climate change. It can contribute to the conservation of water in areas suffering from drought and water scarcity, including through the use of rainwater or recycling of grey water from dishwashing, showers and baths in toilets and washing-machines or for watering plants, as long as such uses are managed safely and are protective of public health. The reuse of wastewater in agriculture and horticulture, however, requires safe management along the entire sanitation chain to ensure that effluents are of sufficient quality to prevent crops contaminated by pathogens and/or toxins entering the food chain. The sanitation safety plan approach is promoted by WHO to manage the safe reuse of wastewater.

In many countries legislation, systems and guidance are in place to manage the flood risk in existing areas and reduce the risk of flooding in new developments. For example, the use of sustainable drainage systems is being integrated into local planning strategies and implemented at the local level. Sustainable water management policies and practices in urban areas contribute to ensuring healthy lives and both promote well-being for all by 2030 (SDG3) and ensure the availability and sustainable management of water and sanitation for all (SDG6).

2.5 Cities, ecological systems and health

Ecosystems are often destroyed or degraded in the quest for other resources needed to sustain urban areas, but they are also a resource for urban populations that provide benefits, or "ecosystem services", from outside or inside the city. These ecosystem services have been classified as supportive (nutrient cycling, soil formation), supply (food, fuel, medicine, materials), regulatory (flood management, water and air quality, CO_2 capture and storage) and cultural (recreation, physical activity, education). Ecosystems are, however, under threat through loss of habitat, degradation, fragmentation, increases in invasive or non-native species, pests and diseases, overexploitation and climate change. Green infrastructure, defined as "a strategically planned network of high quality natural and semi-natural areas with other environmental features, which is designed and managed to deliver a wide range of ecosystem services and protect biodiversity in both rural and urban settings" (58), is the primary mechanism for improving the extent and function of ecological systems in cities (84).

In cities, the green infrastructure generally includes most vegetated features: parks and amenity spaces, sustainable drainage systems, wildlife and transport corridors, gardens, green roofs, allotments, cemeteries and ponds. There is now good evidence that green infrastructure can improve health and the quality of life by, for example, providing spaces for rest and restoration, physical activity, play and social interaction (85) (Box 11). It can also provide environmental benefits, such as habitats for nature, reductions in urban heat and spaces for flood risk management.

Box 11. Green spaces and health

In 2015, the Regional Office carried out a review of evidence on the health impacts of urban green spaces. This showed that green spaces have a wide range of benefits for physical and mental health, as well as positive impacts on social cohesions and well-being (86).

Following this, in 2016 the Regional Office commissioned a series of reviews of evidence on the effectiveness of interventions related to green space on health (23). There is now a good evidence base for the positive impact of such interventions, including:

- the role of parks, which offer opportunities for increasing rates of physical activity;
- the greening of brownfield and derelict land, which not only improves health and well-being but also creates social benefits such as reduced antisocial behaviour and a greater perception of safety;
- the planting of streets with increased biodiversity and reduction of illegal dumping of waste;
- the creation of a green infrastructure and better storm water management.

The strongest evidence was found for interventions that combined both physical changes to the built environment and soft measures to promote the use of green space (for example, availability of maps, community outreach or marketing).

A wide range of case studies was also reviewed. Key findings highlighted the need for effective collaboration with stakeholders, early and consistent engagement with the community, a long-term approach and good practice in the planning, design and management of green spaces (23).

For cities, the green infrastructure also provides financial rewards by encouraging inward investment and economic growth (87–91). Poorly maintained or designed green spaces can, however, also contribute to environmental degradation in cities, antisocial behaviour and fear of crime. Many cities in Europe now have, or are developing, green infrastructure strategies or frameworks to identify this resource and look for opportunities to create new green infrastructures. This can be seen as a key response to SDG15 (to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss) and to the specific target in SDG11 to provide, by 2030, universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.

2.6 Cities, food systems and health

Food security and nutrition is a global concern. Population growth, falling crop yields and changes in land use and in the climate are all contributing to growing food insecurity. SDG2: end hunger, achieve food security and improved nutrition and promote sustainable agriculture, sets out the need to address these concerns.

In addition, obesity rates are increasing globally with parallel increases in the consumption of processed and calorie-rich food and beverages. The Foresight obesity report (92) identified two domains, food and activity, closely linked to city living, including the form and governance of urban settlements. In cities, the quality, variety, cost and convenience of calorie-rich food and drink are eroding their nutritional value. The extent to which the urban and social environments support or hinder physical activity can also have an impact on health (92).

Many cities are developing policies to reconnect the food environment with place, including the licensing of fast food outlets, provision of spaces for community food production or allotments and facilitation of the sale of healthy, locally produced food in, for example, farmers' markets. The early years' food environment is seen as critical to establishing life long healthy food behaviour (93). Many countries and cities across Europe are now prioritizing healthy meals in nurseries and schools made with local and seasonal food. In England, the Food for Life Schools Programme has been successful in increasing the consumption of fruit and vegetables, improving satisfaction with school meals and reducing the consumption of high-energy drinks and high-fat foods (94). Improving the food environment in cities is key to the delivery of SDG2.

2.7 International policy response

Cities' strategies to manage resources more effectively need to be placed within a European or international framework. Table 2 summarizes key international policy and legislative responses to resource management.

Table 2. Key international policy and legislative responses to resource management

Name	Instrument	Levels of responsibility
Energy – climate change		
UN Framework Convention on Climate Change (1994) (57)	Binding • Limit average global temperature increases	International: environmental treaty
EU European Climate Change Programme (2000) (95)	Non-binding • Strategy to implement Kyoto Protocol • Partnership and collaboration	National: national experts, industry and nongovernmental organizations
EU 2030 Climate and Energy Framework (2014) (96)	Binding • Target to cut emissions in the EU by at least 40% below 1990 levels by 2030	National: new governance system based on national plans for competitive, secure and sustainable energy
EU Energy Efficiency Directive (2012) (71)	Binding • Help the EU to reach its 20% energy efficiency target by 2020	National: targets for government buildings and strategies for retrofitting
EU Renewable Energy Directive (2009) (72)	Binding • Target for at least 20% of total energy from renewables by 2020	National: specifies national renewable energy targets for each country

Materials and waste		
UNEP Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989) (97)	Binding • Aim to reduce hazardous waste generation and promote environmentally sound management of hazardous wastes, wherever the place of disposal • Restrict transboundary movements of hazardous wastes	National: requires states to observe the fundamental principles of environmentally sound waste management
EU Circular Economy Package (2016) (76)	Binding • Targets for recycling 65% of municipal waste and 75% of packaging waste by 2030 Non-binding • Promote recyclable materials • Economic incentives	National: incorporate in national law
EU Regulation on Shipments of Waste (2006) (98)	Binding • Regulations to control waste shipments	National: member states
EU Taking sustainable use of resources forward: A thematic strategy on the prevention and recycling of waste (2005) (99)	Non-binding • Simplifying law and facilitating greater compliance by member states	National: member states
EU Landfill Directive (1999) (74)	Binding • Minimize negative effects of landfills	National: member states Local: responsible competent authority
EU Waste Framework Directive (2008) (75)	Binding • Waste management plans • Recycling targets by 2020 • Non-binding • Include voluntary schemes	National: member states to take measures that deliver the best overall environmental outcomes
EU Roadmap to a Resource Efficient Europe (2011) (100)	Non-binding • Milestones and framework explaining how policies interrelate	National: mapping ecosystems
Water		
WHO/UNECE Protocol on Water and Health (1999) (77)	Binding • Improve water management • Protect water ecosystems	International cooperation: WHO, UNECE National: member states
WHO/United NationsChildren's Fund (UNICEF) (17)	Non-binding • Global reporting on the status of water supply and sanitation • Support for countries in improving their monitoring performance	International cooperation: WHO, UNICEF National: member states

UN-Water Global Analysis and Assessment of Sanitation and Drinking-water (101)	Non-binding • Comprehensive and global analysis of the investment and enabling environment to make informed decisions for sanitation, drinking-water and hygiene • Support for monitoring SDG 6 on water and sanitation	International cooperation: UN-Water, WHO National: member states
UNEP Operational Strategy for Freshwater (2012–2016) (102)	Non-binding • Assessment and awareness of water issues • Management of basins, coastal and marine water • Cooperation	International cooperation: UNEP National: member states
EU Water Framework Directive (2000) (78)	Binding • Management and protection of water	International cooperation and national: as based on natural water catchments
EU Drinking Water Directive (1998) (79)	Binding • Standards for drinking-water	National: member states
EU European Water Initiative (2002) (103)	Non-binding • Support achievement of water-related Millennium Development Goals • Promote dialogue globally	International cooperation: political initiative National: policy dialogues, coordination, cooperation and assistance
EU Urban Waste Water Directive (1991) (80)	Binding • Provision of collecting systems for urban wastewater	National: national law Local: implementation
EEA Blueprint to Safeguard Europe's Water Resources (2012) (104)	Non-binding • Evidenced-based strategy • Accompanied by an impact assessment	National: member states
Air quality		
UNECE Convention on Long-range Transboundary Air Pollution (1979) (105)	Binding • Deal with problems of air pollution on a broad regional basis	International: environmental treaty
EU Ambient Air Quality Directive (2008) (106)	Binding • Air quality objectives, action plans and monitoring	National: member states
EU Integrated Pollution Prevention and Control Directive (2008) (107)	Binding • Prevention and control of emissions from industry	National: member states
EU Large Combustion Plants Directive (2001) (108)	Binding • Emission limits for air pollutants	National: member states
EU Waste Incineration Plants Directive (2000) (109)	Binding • Emission limits for air pollutants	National: member states
EU Automotive Fuel Quality Directive (2003) (110)	Binding • Specifies quality of diesel and petrol to reduce air pollution	National: member states

Cross-cutting policy responses		
UN Agenda for Sustainable Development (2015) (111)	Non-binding • Commitment to goals and targets • End poverty • Protect the planet • Ensure prosperity for all	National and local: build partnerships at all levels
UN HABITAT III New Urban Agenda (2016) (1)	Non-binding • Commitment to objectives • Strategic partnerships among governments	National and local: build partnerships at both levels
WHO Children's Environment and Health Action Plan for Europe (112)	Non-binding • Improve the state of the physical environment • Share knowledge on evidence-based interventions • Collaboration	International cooperation: WHO, EC, UNEP, UNECE, UNICEF, OECD, World Bank, EEA, International Labour Organization National: member states
WHO Parma Declaration on Environment and Health (2010) (113)	Non-binding • Mechanisms for implementation • Cooperation and partnership	National: five time-limited targets agreed in 2010 Local: promotion of local action
EU Environment Action Programme (2013) (114)	Non-binding • Priorities to be achieved over a period of years • Guiding EU environment policy	National: strategy should guide future action Local: supporting cities
WHO Health 2020 (2012) (4)	Non-binding Commitment to: • improving health for all and reducing health inequalities • improving leadership and participatory governance for health	National level
UNECE Paris declaration (2014) (115)	Non-binding • Commitment to five goals • Including promotion of transport, health and environmental issues in urban planning • Implementation mechanisms for sustainable transport	National and local levels

3. The city, human habitat and health: key drivers and policy response

The dominant causes of mortality in industrialized urban populations shifted dramatically during the 20th century from infectious diseases to noncommunicable diseases. As shown in the previous section, the human habitat can be part of the problem (116) with impacts on health linked to the use and management of natural resources and the environmental risks of city living. Furthermore, different population groups are affected unevenly (117). Individual lifestyle factors, social and community networks and general socioeconomic, cultural and environmental conditions, such as education and working conditions, can have an impact on human health and well-being, as can the built environment through housing, water and sanitation, the work environment and transport systems. Many of the urban policy responses deployed to promote health and well-being and reduce health inequalities (urban and transport planning, environmental health, social services) can have environmental benefits as well as economic savings and can promote social justice. Today, a further dimension to the equity dilemma for policy-makers is international and internal migration, which can have an impact on a city's economy, its social cohesion and physical infrastructures and can create political tensions. In what ways are the pressures arising from, and the state of, the local environment linked to the way cities are designed which would justify a strong engagement with local actors and the importance of local policy responses?

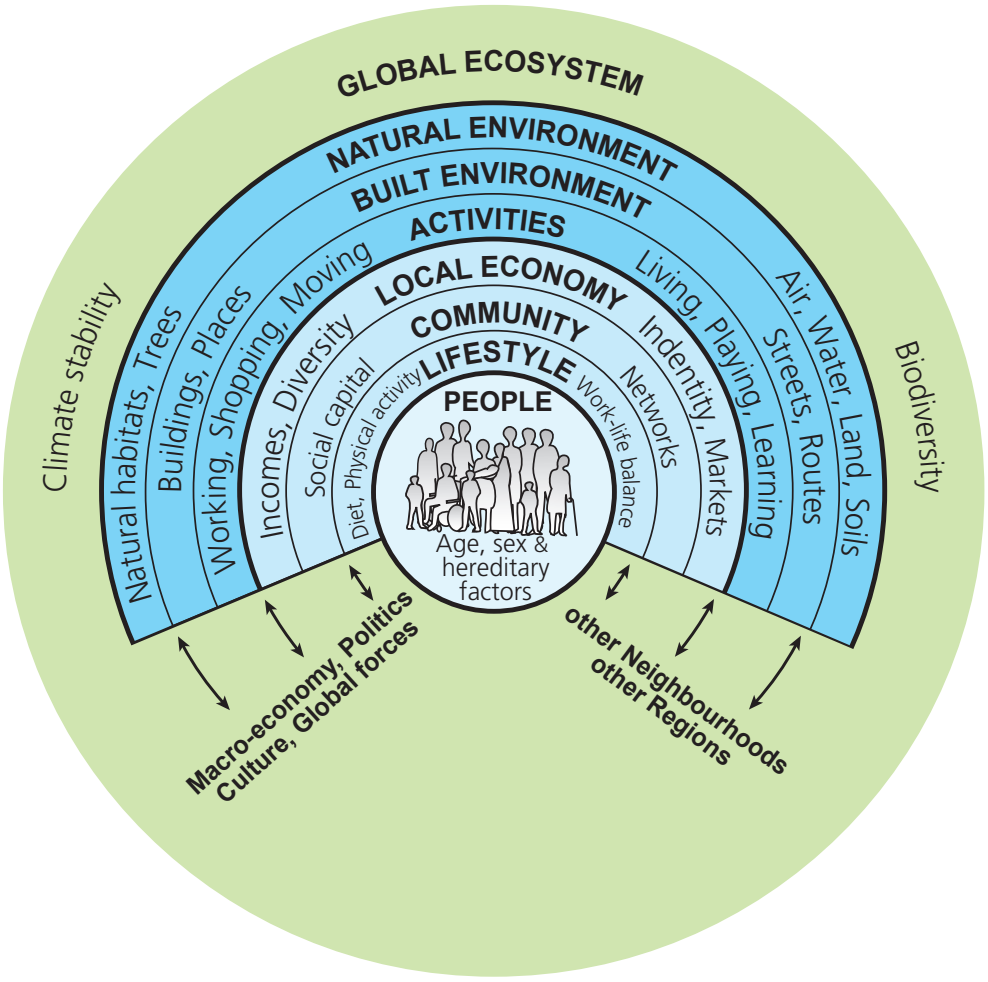
3.1 City living and health

Evidence shows the links between human experience, the human habitat and health (118).

There are multiple determinants of health and well-being in cities and neighbourhoods linked to lifestyle and behaviour as well as the interaction between human activities and the nature of urban design (Fig. 3).

Fig. 3. The determinants of health and well-being in neighbourhoods

Source: Barton & Grant (119) developed from a concept by Dahlgren and Whitehead (117).

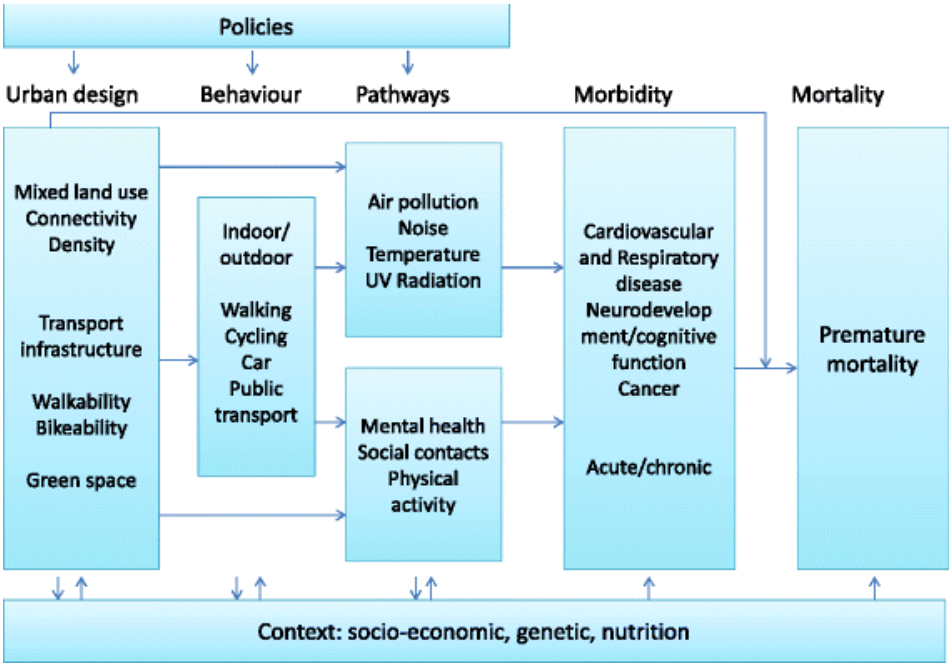


Buildings, streets, neighbourhoods and cities themselves have an impact on physical, mental and environmental health. Altogether, evidence shows that individuals "are happier when living in urban areas with a greater amount of green space" (120).

Today, researchers and policy-makers (including the EHP) are interested in explaining the relationship between urban and transport planning, multiple environmental exposures and health to reflect the synergies between them (Fig. 4). In particular, city dwellers are exposed to multiple exposures (from, for example, air pollution, noise and lack of green space) which need to be addressed simultaneously.

Fig. 4. Interlinks and pathways linking policies to urban infrastructures, behaviour and effects on health

Source: Nieuwenhuijsen (63).



3.1.1 Urban design and physical activity in cities

The extent of the role of the built environment in influencing the levels of physical activity is now coming under close scrutiny as physical inactivity is related to almost one million deaths a year in the Region (121). Adequate levels of physical activity are considered to be an important factor for achieving long-term health and for tackling a broad range of noncommunicable diseases and obesity (122).

Physical ill-health, which can in many instances be averted by physical activity, has enormous social, personal and economic impacts. A study in the United Kingdom showed that "if 20% of the population who live within 2 km of a green space used it for 30 minutes of physical activity per day on five days per week, the saving to the National Health Service could be over £1.8 million per year" (123,124). Nearly 85 000 people died from road traffic injuries in the Region in 2013 (31). Of road fatalities in the Region, nearly 40% were pedestrians, cyclists and motorcyclists (31).Mortality due to road traffic is nearly nine times greater in the worst affected European country than the least (31); within countries, socioeconomically disadvantaged groups are often at disproportionate risk of road traffic injuries (125).

Recent research has shown that differences in the levels of physical activity between the most and least activity-conducive neighbourhoods in 14 cities on five continents could be between 68 and 89 minutes a week, representing 45–59% of the recommended duration of weekly activity (126). European transport systems often encourage car use over active travel, affecting the level of road traffic injuries.

Active forms of transport, such as walking and cycling, have proven health benefits both for adults and children (127–134) (Box 12). Yet travel statistics suggest that a large number of Europeans' journeys currently taken by car could be taken by active travel modes: over 50% of European car journeys are shorter than five kilometres (121).

Source: WHO/F. Racioppi

Box 12. How can urban areas make us more physically active?

Urban design and planning greatly influence levels of physical activity and have proven health benefits for both adults and children. What features of cities encourage people to be more active?

- A compact city and higher residential density
- Good public transport facilities within easy reach of where people live
- A network of parks and public open spaces
- Local access to shops and services
- Access to sport and recreational facilities
- Access to lakes and rivers
- Active travel facilities: pedestrian areas, cycle lanes
- Aesthetics: well-lit streets, natural surveillance from buildings

What are the benefits of physical activity?

- Reduction in chronic disease
- Reduction in cardiovascular disease
- Prevention of traffic injuries and mortality
- Improved mental health

Sources: Sallis et al. (126); Andersen et al. (127); Pucher et al. (128); de Nazelle et al. (129); Warburton et al. (130); Audrey et al. (131); Bowen & Parry (132); Department of Health (133); Almanza et al. (134); Giles-Corti et al. (135); Prüss-Ustün et al. (20).

3.1.2 Urban design and mental well-being in cities

Concerns have increased recently that economic growth has been achieved at the expense of the environment, human well-being and social equity. Policy-makers are starting to realize the magnitude of mental health issues. Happiness is emerging as a facet of urban health which can be delivered through urban design (136) and happiness indexes are emerging to support, for instance, decision-making for housing (137). Indeed, place and urban design influence mental well-being through a variety of pathways including physical activity, privacy, closeness to nature, accessibility, sense of attachment to a place, independence, opportunities for social interactions and equality (138) (Box 13). Furthermore, crime and, more importantly, fear of crime are becoming critical aspects of city living with dramatic impacts on mental health and social cohesion. Security and safety are seen as critical attributes of a healthy city across the globe (139,140). While urban design might not eradicate entrenched prejudices, it still has a role to play in designing-out crime and fear of crime by facilitating social networks and social cohesion and promoting a sense of local pride and cultural identity (140).

Box 13. How does place influence mental well-being?

The following features of a city encourage people and influence mental well-being.

- A compact city and higher residential density
- Street configuration and design
- Form of and space in housing
- Natural lighting in buildings
- Energy-efficient housing
- Sound-proofing
- Good indoor air quality
- Soft edges, semi-private spaces
- Green spaces and greenery (trees, roof terraces)
- Local access to shops and services
- Natural surveillance from buildings
- Aesthetics of the neighbourhood
- Social and health resources of a neighbourhood: provision of community centres, good public transport, recreation centres, affordable housing, grocers' shops

What are the benefits?

- Ability to tackle stress and depression
- Better mood
- Ability to cope with symptoms of mental disorders
- General comfort
- Lower perception of crime
- Satisfaction

Source: Burton (138); Guite et al. (141); Nielsen & Hansen (142); Galea et al. (143); Kihal-Talantikite et al. (144); Maas et al. (145); Lindstrom (146); O'Campo et al. (147).

Source: Statutory City of Ostrava, Czech Republic

3.1.3 Urban design and environmental health in cities

The links between the built environment and environmental health probably offer the most compelling argument for city authorities to engage in action on the climate and reduction of air pollution. As shown in section 1, air pollution remains the biggest single environmental health risk (6,148). Only one person in 10 lives in a city that complies with the WHO Air quality guidelines (148). Transport is one of the main sources of air pollution in Europe, particularly in cities and urban areas. Urban sprawl "has accelerated in response to improved transportation links and enhanced personal mobility"; for the EEA, car use in sprawling cities was clearly a major factor in the growth of urban greenhouse gas emissions (149). A broad range of action can be taken in cities to tackle air pollution and climate change at once (Boxes 14, 15).

Box 14. How local urban designers and planners and transport can contribute to reducing air pollution

WHO has identified a range of successful policies in transport, urban planning and power generation for cities.

Transport policies include:

- shifting to clean modes of power generation;
- prioritizing rapid urban transit;
- creating walking and cycling networks in cities and encouraging interurban rail freight and passenger travel.

Urban planning policies include:

- improving the energy efficiency of buildings;
- providing health-promoting elements such as green and public spaces;
- making cities more compact and thus energy-efficient.

Power generation policies include:

- cogeneration of heat and power;
- distributed energy generation (such as mini-grids and rooftop solar power generation).

Municipal and agricultural waste management policies include:

- strategies for waste reduction;
- waste separation;
- recycling and reuse or waste reprocessing;
- improved methods of biological waste management that offer feasible, low-cost alternatives to the open incineration of solid waste, such as anaerobic waste digestion to produce biogas;
- where incineration is unavoidable, the use of combustion technologies with strict emission controls and reuse of the energy generated (for example, for domestic heating).

The health benefits policies include:

- reductions in:
    - ischaemic heart disease and strokes
    - chronic obstructive pulmonary disease
    - acute lower respiratory infections
    - lung cancer;
- reductions in deaths due to the above;
- improvements in health equity.

Sources: Prüss-Ustün (20); WHO Regional Office for Europe, unpublished short meeting report on Environment and Health for European Cities in the 21st Century: Making a Difference – Stakeholder Meeting, Bonn, Germany, 27–28 June 2016.

Box 15. WHO Urban Health Initiative on Urban Air Pollution and Health

A new urban health initiative is being implemented to mobilize and empower the health and other sectors at local level with the technical knowledge, tools, analyses and communication skills to support the adoption of the best-performing policies for air quality, climate mitigation, disease prevention and health promotion. The initiative is led by the Department for Public Health, Environmental and Social Determinants of Health at WHO headquarters in cooperation with international and local partners. It:

- makes available knowledge, methods and tools to address environment and health impacts of urban policies in different sectors (waste, transport, household energy);
- engages with local stakeholders, maps policies affecting air pollution, climate and health, and helps to visualize alternative policy scenarios using the results from health and economic impact assessments;
- builds competencies to quantify health gains and estimate the costs of inaction for policies or scenarios;
- trains health practitioners to advise patients and communities about reducing the risk from air pollution;
- conducts health communications campaigns to raise public awareness of the connection between climate, air pollution and health, catalyzing local engagement for action on sustainable and healthy policies.

The project is being carried out in cooperation with Accra (Ghana) and Kathmandu (Nepal).
The first results are expected in the second half of 2017.

3.2 City living and equity

The poorer people in society are more exposed to the risks associated with urban living (151). This is confirmed by the recent WHO Global report on urban health (9) which concluded that "…health equity remains a persistent problem for residents of all cities", identifying urban health inequity as a key obstacle to national and global progress towards the SDGs if left unaddressed. A study of 16 European cities found evidence of health inequity within all cities, which was strongly associated with socioeconomic deprivation (152).

Almost half of the excess mortality in the lower socioeconomic groups is explained by inequities in cardiovascular diseases (153), for which environmental conditions, such as air pollution and opportunities for physical activity, represent a major and (until recently) greatly underestimated risk factor. A link between income inequality and health in rich countries has been identified: for example, in London 40% of the poorest groups suffer from long-term limiting illness while only 5% of the richer groups do (154).

Yet socioeconomic factors alone do not explain the difference in health between rich and poor. First, given the housing market, poor or disadvantaged people often live closer to roads with heavier traffic and are thus more exposed to air pollution (155). They are also more likely to live in the proximity of contaminated sites, such as polluting industries or landfills. In some countries, marginalized communities (such as the Roma) who live in informal settlements experience compounded environmental health risk factors (156).

A direct link between specific environmental factors and health inequalities at neighbourhood level is still tenuous due to a lack of comparative data and a number of social, economic or environmental factors. Nevertheless, the INEQ-Cities project has demonstrated that areas with high socioeconomic deprivation (measured through the percentage of unemployment and number of manual workers) have a higher excess of mortality in the majority of the 15 cities analysed (157).

In the United Kingdom (England), the more deprived the neighbourhood, the higher the incidence of human exposure to various environmental health risks including air, soil or water pollution, flooding, road accidents and lack of access to green infrastructure (158). Similarly, the WHO assessment report on environmental health inequalities in Europe has produced evidence on the equity gap in exposure to a wide range of urban environmental risks (159).

The physical environment where people work, play or socialize also encourages unhealthy behaviour and limits access to more healthy amenities such as parks, allotments and fresh food shops (160). Here is a sample of other research findings.

- One hundred thousand deaths are linked annually to inadequate housing with factors of inequity including location, type and design of dwellings as well as affordability (22).
- Children will be more likely to walk to school if they live close to it and are less exposed to traffic on the way (144). But children from lower income families are more likely to be exposed to traffic hazards and injured in accidents when their neighbourhoods are less safe (161).
- In the United Kingdom (England), 20% of the most affluent neighbourhoods have five times the amount of green space than the most deprived 10% neighbourhoods (162), yet the accessibility and proximity of green space are pathways for people to benefit both physically and mentally from engaging with nature in the urban environment (163).

3.3 Opportunities for action

Many of the challenges highlighted above are related to the infrastructural and social design of cities. A rethink of the way cities are designed must be part of the solution for tackling these challenges, improving the environment and health and promoting equity.

In terms of policy response, there is no doubt that land and transport planning, supported by participatory governance, are seen as key to deliver human and planetary health in the increasingly urbanized world. SDG 11 clearly set the policy ambitions at international level: to make cities inclusive, safe, resilient and sustainable, with 11 targets clarifying the policy areas which should be given priority (Box 16).

Box 16. SDG11: Make cities inclusive, safe, resilient and sustainable

SDG11 has the following 11 targets:

- by 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums;
- by 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons;
- by 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries;
- strengthen efforts to protect and safeguard the world's cultural and natural heritage;
- by 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations;
- by 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management;
- by 2030, provide universal access to safe, inclusive and accessible green and public spaces, in particular for women and children, older persons and persons with disabilities;
- support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning;
- by 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, and resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels;
- support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials.

Source: United Nations (53).

Source: WHO/F. Racioppi

So how can better planning of cities help to make them inclusive, safe, resilient and sustainable?

First of all, for the sustainable city to be inclusive and equitable, citizens must be part of the decision-making process that affects them and their environment, a principle now endorsed by the New Urban Agenda and ratified by Habitat III. Policies then need to be made inequity-proof.

Local policies can entrench the systemic inequity linked to market or governance failures at national level. On the other hand, they can engage local stakeholders to design healthier communities. In the period 1980–2000, low-density suburban development on the peripheries of European cities has become the norm, with an over threefold increase in the expansion of urban areas in many eastern and western European countries (149). Some of the changes to city living must be driven by local authorities. Compact urban design can improve walkability and access to services and promote public transport and cycling, thereby contributing to a reduction in greenhouse gas emissions. “Generally, the efficiency savings of more compact city development as compared with market driven suburbanisation can be as high as 20–45% in land resources and 15–25% in the construction of local roads” (149).

Urban planning can also help to mitigate the impact of climate change on health. Urban green spaces, for instance, contribute to reducing the effects of heat islands. Daytime temperatures in a large urban park can be 2–3 °C lower than in the surrounding streets, with cooling effects felt up to 100 metres from the site (164,165). Sustainable urban drainage solutions tackle flooding, create valuable amenities and promote biodiversity and, in a compact city, can also help to bring further savings in the provision of water and sewerage facilities.

Urban planning can influence consumers’ and residents’ behaviour and choices, levels of physical activity, social cohesion, housing quality, access to work and services, food systems, green infrastructure, safe and equitable environments and air, water and soil quality and contribute to a reduction in climate change. Barton & Tsourou (166) have developed healthy urban principles for the WHO Healthy Cities programme, which have been used by planners and urban designers as useful standards and guidelines as well as topics for health impact assessments. To secure healthy people and a healthy environment in cities, the health impact of multiple environmental risk exposures must be identified and assessed at the local

level and integrated with urban policies. However, this also requires the capacities and skills to perform health assessments and a political culture that recognizes, values and invests in them.

There are good examples of cities creating healthy and sustainable environments that benefit both health and the environment (Boxes 17, 18).

Box 17. Many ways to share expertise, foster collaboration and unite environment and health agendas at city level

The green capital approach is a way for cities to promote their environmental credentials, innovation and multisectoral partnerships. Good case studies come from Bristol (United Kingdom), Copenhagen (Denmark), Ljubljana (Slovenia), Malmö and Stockholm (Sweden).

Ecotowns can also offer good windows into local innovation and partnership-building for climate action with health benefits. Hammarby Sjostad (Sweden) is an example.

In the United Kingdom, the National Health Service England Healthy New Towns programme demonstrates the importance of cross-sectoral partnerships and, in particular, of embedding local public health teams into urban regeneration projects.

Private companies from the energy and technology sectors collaborate with cities around the world in the C40 Climate Leadership Group, an example of public/private sector collaboration for sharing best practice and tackling climate change (50)

Box 18. An integrated approach: modelling urban transport for healthy people and a healthy planet

The city of Dresden (Germany) has developed its mobility model based on three overall goals: promoting the sustainable development of Dresden as a European location, protecting the mobility needs of the population and the mobility demands of the economy, and reducing the undesirable consequences of traffic (167).

Copenhagen has pedestrianized its mile-long main street connecting the railway station with the harbour, reduced car use and encouraged cycling (37% of trips to work are by bicycle) through strong local partnerships.

Lille (France) now works with 80 adjoining communes in a "metropolitan compromise" and has developed an integrated driverless metro and tram system.

Freiburg (Germany) has developed urban extensions on new tramlines and car use has declined.

Kuopio (Finland) has developed a sophisticated transport system prioritizing walking, cycling and public transport in the city centre and relegating car use to the suburbs (168).

The Dutch approach to urban growth has managed to maintain the green belt while expanding cities organically, creating neighbourhoods with identities (Vahorst), prioritizing cycling and walking (Houten) and using schools as community hubs (169).

To implement the commitments of the Paris Climate Conference, Edinburgh (United Kingdom (Scotland)) works with EUROCITIES on the Sustainable Edinburgh 2020 vision, which states that in 2020 Edinburgh will be "a low carbon, resource efficient city, delivering a resilient local economy and vibrant flourishing communities in a rich natural setting" (170). The partnership will guide the city's sustainable development by encouraging the sharing of good practices and knowledge, raising awareness and identifying aspects of city life that could benefit from stronger action around sustainability.

Urban policies contribute to SDG 11 (Make cities and human settlements inclusive, safe, resilient and sustainable) as well as to other SDGs. Section 4 will further identify the link between urban policies and SDGs.

4. Cities and their networks: key assets for action with health benefits

This section discusses the added value that cities and city networks can bring to international environment and health policy-making. A cohesive city-level contribution to the formulation and implementation of international policies will depend on a number of factors and the ability of cities to organize themselves. The EU Urban Agenda encourages urban areas to "capitalise on the knowledge and capacity of specialist EU urban networks" such as the EU Committee of the Regions, EUROCITIES, the Council of European Municipalities and Regions and other bodies.

4.1 Local governance for a healthy planet and healthy people

For cities to be able to support international policy, they must have the right governance structures, including leadership and engagement mechanisms, as well as fiscal autonomy. The structure and functions of local and regional governments across Europe vary vastly, but some commonalities exist. This would support the argument for adopting a common approach to environment and health policies.

Traditionally in post-industrial Europe, welfare functions such as health, education and social services fall within the remit of regional governments (or the upper tiers of local governments). When geographical scale or

levels of complexity are key factors for policy delivery (such as in planning, transport, environment protection and infrastructure projects), these functions will be undertaken at the supralocal level rather than by the local authority. Diversity between functions will be more noticeable at the local level. National frameworks or steering will vary: in, for example, Austria, Germany, the Netherlands and the Scandinavian countries, local authorities have key responsibilities in primary education, social and health services. Across the EU, local authorities are usually responsible for the provision of public goods closely related to the quality of life and the environment of their communities, including road maintenance, public transport, water and sewerage systems, refuse collection and disposal, cultural and leisure facilities/activities, urban planning, the management of green spaces and social housing. Usually local authorities have wide-ranging constitutional powers to take action where there is a need in the local community, but these powers depend on the financial resources available to the local authority (171,172). In large cities, the metropolitan governance system delivers the infrastructure, fosters investments and ensures service delivery on the regional/metropolitan scale for sustainable development as long as power is devolved at the right geographical scale with the right financial resources. Amsterdam's system of governance, to give one example, allows for political vision and a strategy and planning to tackle climate change (173).

Other cities, such as London (through the Greater London Authority), might have to rely on lower tiers of government (the London boroughs) to implement their policies as they lack financial autonomy. Cities in Norway and Sweden have considerable fiscal autonomy allowing them to develop strategic and flexible responses to local needs, whereas cities in the United Kingdom remain strongly dependent on grants from central government – although plans for local authorities to retain business rates (taxes) might soon give them more financial freedom. Crowd-funding is emerging as a way to alleviate the lack of local resources and become a new form of project financing at city level to improve the quality of the environment, for example in Liverpool (United Kingdom) or Rotterdam (Netherlands).

Identifying the success factors in policy for and governance of smart cities is also important in ensuring the delivery of sustainability objectives. A study for the European Parliament has identified Amsterdam, Barcelona (Spain), Copenhagen, Helsinki (Finland), Manchester (United Kingdom (England)) and Vienna (Austria) as leading smart cities in the EU (174) (Box 19).

Source: WHO/Racioppif

Box 19. Factors for successful governance in smart cities

"A Smart City is a city seeking to address public issues via ICT-based solutions on the basis of a multi-stakeholder, municipally based partnership" (174).

Factors for success	Description
Vision	The study makes clear that inclusion and participation are important targets for successful smart city programmes to avoid polarization between the urban elite and the low-income areas.
People	The case studies highlight the inspiring leaders (city champions) behind many successful initiatives. Citizens should be empowered through active participation to create a sense of ownership and commitment. It is important to foster participative environments that facilitate and stimulate business, the public sector and citizens to contribute.
Process	The creation of a central office that acts as go-between for smart city ideas and initiatives, drawing in diverse stakeholders, is of vital importance and allows for the coordination of ideas, projects, stakeholders and beneficiaries. Local level coordination can also be important for uptake, to ensure the integration of solutions across the portfolio of initiatives. For example, many municipalities insist that information about public services be provided as open data. This allows individuals and companies to process and recombine these and other available data in order to create useful resources for the public, such as real-time traffic information. It is important for cities to participate in networks to share knowledge and experiences, therefore promoting their own initiatives as well as learning from others and laying the foundations for future collaboration.

Source: Manville et al. (174:11).

Source: WHO/Racioppif

City leadership forms another key asset for delivering a liveable city (175). This requires mayors to openly acknowledge social fractures and focus on addressing poverty and inequity rather than simply seeing their role as one of national or even global city promotion. "No mayor stands up and says, 'I represent an unhealthy city'" (176). A number of European city mayors have recently signed up to the international Inclusive Growth in Cities Campaign (177). In the area of climate change, many city leaders have signed up to the Covenant of Mayors Initiative which commits more than 2000 signatory towns and cities to go beyond the objectives of EU energy policy in terms of reduction in CO_2 emissions through enhanced energy efficiency, cleaner energy production and the use and implementation of their sustainable energy action plans.

But leadership is not enough to deliver healthy and sustainable environments. Partnerships with the private sector, citizen empowerment, grassroots involvement and public participation remain the other key resources to be tapped into by city leaders. Cities have developed as hubs for skills, creativity, urban design and planning for sustainable communities and the environment. They are an ideal ground for private sector innovation and research and development strategies, product innovation and the delivery of corporate social responsibilities. They can also foster cross-sectoral, multi-actor partnerships adapted to local economic, social or environmental contexts that can lead to emotional engagement by various stakeholders to get more involved in civil matters and policies (50). Cities also offer a direct link between policy-makers and citizens and residents. Beyond traditional modes of consultation, social media now allow easier participation and more opportunities for citizens' initiatives and co-creation processes. This can mean opportunities for "guerrilla urbanism" and crowd-funding. Through the use of mobile technology, citizens can be engaged in data-gathering ("big data") related to behaviour, air quality, energy and food use or mobility in the city to inform policies or evaluate them (178). Citizens, just like corporations, have a social responsibility towards the environment and their own health. Changes in behaviour and consumer practices can go a long way to help reduce reliance on non-renewable materials and energy, food wastage or trends in obesity.

4.2 City networks and the 2030 Agenda for Sustainable Development

Cities and their networks play an important role in achieving international environmental and health goals. Previous sections have highlighted the importance of urban policies in achieving specific SDGs. In addition, a number of networks bring cities and urban settlements together to support international policy for health, well-being and the environment through vertical and horizontal policy integration. For instance, the ICLEI supports the implementation of the 17 SDGs, in particular SGD11 on cities, through its 10 Urban Agendas (179). Together with specific projects, programmes, networks and tools, these Urban Agendas support national governments in achieving "positive impacts for the Earth we depend on and care for, the People we serve, for the Places we live in, and for the Policies we implement to govern ourselves" (180). The Basque declaration, agreed at the 8th European Conference on Sustainable Cities and Towns, hosted by ICLEI in 2016, places the responsibility for creating a societal transformation and working towards a better quality of life while respecting the limits of the local and global ecosystems in the hands of city leaders, among others, and suggests that civil societies need to be particularly engaged on the local level.

For EUROCITIES (a network of major European cities), a prerequisite for urban sustainability in Europe is integrated approaches to spatial, temporal and factual coordination and the integration of diverse policy areas and planning resources to achieve defined goals using specified (financial) instruments. The comprehensive and early involvement of local residents and players from the business world, together with other stakeholders, is crucial for urban development (181).

The WHO European Healthy Cities and Regions for Health Networks also promote health and sustainable development, community participation and empowerment, intersectoral partnerships and participant equity among their members (182). These working principles and strategies are key to delivering SDG16 (Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels).

These networks and others have developed invaluable strategies in urban priority areas such as air pollution, water and sanitation, energy, waste, urban spaces and mobility and climate change. In addition, city networks have taken action to tackle the integration of immigrant populations. These strategies support the direct delivery of a number of SDGs.

5. Placing urban policies at the heart of the delivery of the 2030 Agenda for Sustainable Development and Health 2020

Can international and national policy-makers afford to ignore the city level of governance? How can the EHP capitalize on its own multisectoral nature to enhance and facilitate the implementation of selected SDG goals and targets through collaboration and new formal partnerships with cities and local authorities?

5.1 10 Key messages

The previous sections have highlighted, firstly, how a strong scientific evidence base has shown the links between urban operations and health, well-being and environmental sustainability; secondly, how attributes of leadership, community engagement, fiscal resources and autonomy, creativity and skills are useful assets for urban strategies towards the creation of healthy communities; and thirdly, how cities and their networks are already actively engaged in addressing environment and health policy domains that support the implementation of relevant goals and targets of the 2030 Agenda for Sustainable Development. The following are the key findings that need to guide the structure for collaboration between the various levels of governance.

1. Cities are complex systems that can be understood by multispatial and multisectoral approaches. Cities are key engines of growth.
2. Drivers of change in cities and the resulting pressures on the environment and on health come from within and from outside the city (national and international commitments, demographics, migration, economic growth).
3. Healthy urban policies have the ability to promote health and well-being and to support the fight against noncommunicable diseases. In particular, effective urban and transport planning and other urban strategies can protect people from environmental risk factors to their health (air pollution, flooding, noise) while contributing to action on climate change. Targeted local urban measures aimed at changing motivation and habits of (groups of) citizens also contribute to promoting healthy behaviour while supporting biodiversity.
4. City authorities have proximity and close connection to residents and are thus equipped to explore and understand the specific needs of different groups and respond to these needs. They are equipped to identify and respond to inequity in health in the local population and to change people's behaviour.
5. City authorities engage upstream with local communities and neighbourhoods in decision-making processes that will affect these communities and neighbourhoods. Participatory tools such as environment and health impact assessments are useful to inform these decisions.
6. City governance can allow mayoral vision and local leadership to foster local partnerships and vision adapted to local circumstances.
7. Across Europe, city governance is not uniform and the functions of local and regional government vary widely. Commonalities in local government, however, transcend these administrative or constitutional barriers as welfare functions usually fall within the remit of regional government or the upper tier of local government.
8. Cities have the knowledge (through their officers and feedback from local residents) of what works and what does not work and of the unintended health risks created by specific policies in their areas.
9. Cities can exploit the link with research, and local policies can be informed, through modelling or guidance, by the vast body of scientific research that has explored the links between the urban environment and health. Research also supports impact assessments of new developments or regeneration projects.
10. Cities and networks are engaged in developing strategies that align with EHP efforts and towards the SDGs in a large number of areas which matter to local populations, including energy, air pollution, climate action, waste, water management, food systems, housing, green infrastructure, transport and biodiversity.

From these findings, a number of key directions for collaboration emerge strongly.

5.2 Considerations for a city vision oriented towards addressing environment and health challenges

European cities are definitely stakeholders in health and environment policies. Their engagement in international policy-making can add value if cities can organize themselves and develop the right institutional and procedural structures to channel their representation. What guiding principles, commitments or norms need to be in place for such representation? What areas of work are amenable for cooperation within the environment and health policy area?

1. The principles of subsidiarity and legitimacy must be respected. The issue of legitimacy is critical in those countries where there is a clear difference in responsibility between the federal level and subnational levels of governance (for example, the states in Germany or regions in other countries).

2. A city vision needs to be informed by multidisciplinary research, knowledge-sharing and cross-sectoral partnerships. In particular, there is a need for more robust knowledge about urban systems, and how local economic and social drivers and pressures on the local infrastructure and environment impact on human and planetary health.

3. A city vision needs to abide by the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters and its protocol (183), which empowers people to gain easy access

to information and to participate effectively in decision-making in environmental matters.

4. Cross-border issues need to be considered.
5. Explicit commitments to health in all local policies and to health equity could provide a clear direction to efforts, in addition to ensuring that action on the climate that benefits health is at the core of the vision.
6. One of the themes for cooperation with the EHP could be the role of impact assessments or health impact assessments to put health in the mainstream in urban policies and consider how the full spectrum of health outcomes is affected by urban operations.
7. Key topics for multilevel collaboration include air pollution, water and sanitation, energy, waste, urban spaces and mobility and climate change. These are both priority areas and policy domains for which cities have direct responsibility and which also align with ongoing international initiatives such as the 2030 Agenda for Sustainable Development and its Sustainable Development Goals, the Paris Climate Agreement, Habitat III's New Urban Agenda, the EU Urban Agenda for urban resilience and sustainability and the WHO Health 2020 policy for health and well-being.
8. Integrated urban and transport planning should be seen as a key policy towards a common city vision, offering guidance for healthy urban developments with a commitment to cross-sectoral collaboration with public health.

This report has identified areas where the urban/city level could contribute effectively to advance the European environment and health agenda. A refined mapping of areas where local authorities could have the biggest influence on health could help to provide thematic priorities for the process and develop useful guidance. This process could be spearheaded by a new platform for collaboration.

5.3 Channelling subnational representation in a new platform for collaboration

The New Urban Agenda has the clear objective of ensuring that local authorities are engaged in the definition of urban policies. In the context of the discussions which informed the development of this publication, the local, national and international actors consulted recognized the benefits that could be obtained by bringing the subnational and local levels of government closer, establishing structures to allow better support to local priorities and needs, and making strategic links with relevant international institutions including, in the EU, the EU Committee of the Regions and Covenant of Mayors.

The new platform for collaboration could help to address the current challenges posed to international action on the part of multilevel governance by bringing subnational and local decision-makers closer to the reality of international policy-making alongside governments in the Region, relevant intergovernmental organizations and agencies and nongovernmental organizations, as well as vice versa.

The platform for collaboration could start by refining the areas where partnerships would add most value but could also strengthen the engagement of subnational and local governments in the implementation of topic-specific areas of work in environment and health, with an initial focus on the Protocol on Water and Health, the Transport, Health and Environment Pan-European Programme and the Health in Climate Change network (among other instruments), as appropriate.

In practice, the platform for collaboration could:

- support the empowerment of subnational and local levels of government to provide health in local and urban planning processes;
- promote the development of approaches and methodologies for ex-ante policy evaluation and environment and health impact assessment, and support the development of capacities for their implementation;
- support the development of a concerted approach to post-ex evaluation of local implementation to inform future cross-sectoral policies;
- encourage the adoption of intersectoral management approaches;
- act as a broker between different levels of government, across different sectors and social actors;
- facilitate the exchange of knowledge and experience and promote the development of partnerships, for instance in smart technology sectors, that allow for the mainstreaming of a systems approach and modelling in key urban policies, with feedback to the international policy process.

In practice, the platform could support the development and sharing of public health or planning tools aimed at tackling climate change, air pollution, water and sanitation, transport, waste and housing and encouraging healthy behaviour, while working towards reducing environmental health risks. For instance, the Regional Office supports the development of public health tools to assess the costs and health impacts of urban policies and decisions (Box 20). At the same time, cities benefit from many locally developed tools that could be introduced to the international agenda. This could help in the development of a comprehensive toolkit from which subnational and local actors could make a selection based on their specific local needs, priorities and capacities.

The new platform for collaboration thus envisaged

Box 20. Examples of tools available to cities to evaluate the impact of city policies, plans and projects

AirQ+ is a software tool developed by the Regional Office that quantifies the health effects of exposure to air pollution, including estimates of the reduction in life expectancy, and the effects of short-term changes in air pollution and long-term exposures.

Health impact assessment methods and tools detail the expected health impacts of policy options under consideration, thus facilitating planning and community engagement.

The health economics assessment tool can be used when planning new cycling and walking infrastructure to assess the health benefit by estimating the value of reduced mortality.

Source: www.istockphoto.com

could support the systematic dissemination of such a toolkit to cities and city networks and allow for debate on the nature of the evidence base and the data required to develop these tools further. It could also engage in selected capacity-building and information-sharing activities, based on matching the interest of cities in getting engaged in certain topics with offers of tools, guidance and resources.

6.Conclusions

This report has demonstrated that towns, cities, metropolitan areas and regions offer huge opportunities for the European EHP to address the challenges of the 21st century and attain its goal of addressing environment and health challenges in the Region. The complex tasks required to manage increasingly scarce resources, provide webs of infrastructure and shape the human habitat while securing sustainable growth and promoting the health and well-being of local residents have equipped local and regional decision-makers with a wealth of technical skills in complex environments as well as direct knowledge of the needs, priorities, strengths and vulnerabilities of their communities. In addition, with limited resources and power in competitive situations, cities and regions need to innovate and foster partnerships between the public, private and research sectors.

Local and regional policy-makers need to nurture the skills of their populations, attract new skills, and respond both to the needs of vested interests and varied population groups and to calls for more bottom-up empowerment. This unique set of technical and democratic skills, if carefully harnessed at European level as proposed by this document, would enrich the EHP, bringing a more evidence- and experience-based contribution to policy discussions and a formulation to address the environment and health challenges of communities, countries and the planet.

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The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

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