GLOBAL REPORT

on

URBAN

equitable, healthier cities for sustainable development

HEALTH

World Health Organization

UN@HABITAT
FOR A BETTER URBAN FUTURE

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FOREWORD

We are at an unprecedented moment in human development as the greatest migration in history unfolds around us. Less than a decade ago a majority of humankind still lived in the countryside, yet today a clear majority live in urban areas. By the deadline of the new Sustainable Development Goals (SDGs) in 2030, 60% of all people will reside in cities, proportionally twice that of 1950. For most of us from now on, life and death will be an urban affair.

In 2010, at the dawn of this urban world, we published our first joint global report on urban health titled *Hidden cities: unmasking and overcoming health inequities in urban settings*. The global community was not only waking up to this new demographic reality and the consequent implications for health, society, and economic and political affairs, but also to a host of new opportunities as humans shape and are shaped by an urban future.

Apart from the impact of urbanization on human health, the report used new statistics to demonstrate that the growth of prosperity in cities leaves behind significant 'hidden' urban areas and populations. Indeed, many of today's urban poor are not only much worse off than their wealthier fellow citizens, they even lag behind rural populations. Urban inequity is obviously unjust, but certainly also hindered national and global achievement of the Millennium Development Goals (MDGs).

This new report coincides with the advent of the new SDGs and development paradigm. Equity, inclusiveness, and accountability in health and development are core principles and themes of the SDGs, as well as for the Third United Nations Conference on Housing and Sustainable Urban Development in Quito in October 2016. The commitment to universal health coverage, as well as to the New Urban Agenda that will emerge from Quito, is intrinsically linked to improving the living conditions and health of all city dwellers.

A healthy population is essential for creating economically competitive and inclusive cities. Health and its various determinants, cities and inequality, are all represented by individual goals in the SDGs and the solutions are interdependent. City leaders are broadening their responsibilities to take on global health and demographic issues such as pollution, slum upgrading, noncommunicable diseases, communicable disease such as HIV/AIDS and tuberculosis, as well as population ageing and migration.

Similarly, cities are increasingly focusing on measuring and challenging inequities. At least 102 cities in 53 countries use the WHO's Urban Health Equity Assessment and Response Tool (Urban HEART) to analyse and plan for more equitable health outcomes. International organizations have also focused on urban health equity in recent years, publishing flagship reports such as UNICEF's *State of the world's children 2012: children in an urban world*; UNAIDS' 2014 *The cities report*; and Save the Children's 2015 *State of the world's mothers: the urban disadvantage*, to name just a few.

Practical, proven solutions exist to tackle these 21st century challenges. This report presents evidence that in cities, progress in health depends not only on the strength of health systems, but also on shaping urban environments. Capitalizing on such intrinsically linked factors leads to efficiency, synergies and co-benefits, and is essential to the attainment of the SDGs. The report presents examples of effective actions by cities and nations around the world and subsequent successes. At the same time, it underscores the persistence of inequity and how its root causes must fundamentally be addressed in order to achieve meaningful progress.

As the global community transitions hopefully into a new era of sustainable development, committed leadership is needed to create healthier, more equitable cities. This report should serve as a starting point for identifying the health challenge faced by hundreds of millions of vulnerable people currently living in cities around the world, as well as for crafting policies and actions for sustainable urban development for the majority of humanity who will reside in the cities of the future.

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PREFACE

This timely report comes at a decisive moment in history where we can reshape urban environments and health systems for the majority of the world's population that live in cities. Enabling this transformation are the SDGs, which have reconfigured how governments and the international community need to plan and implement actions to eradicate poverty and inequality, create inclusive economic growth, preserve the planet and improve population health. Central to this quest is to create equitable, healthier cities for sustainable development.

A focus on urban health not only recognizes global demographic trends but the inextricable and inter-dependent links between health, economic productivity, social stability and inclusion, climate change and healthy environments, and an enabling built environment and governance. With half of the anticipated world's population that will live in cities in 2050 not yet born or living there, we must seize the opportunity to create health systems and environments that enable improved health outcomes and liveable cities.

The first WHO-UN-Habitat global report, *Hidden Cities*, focused primarily on revealing health inequities. This second report reviews progress made in reducing equity gaps and enhancing health in cities, especially with respect to achieving the Millennium Development Goals. It emphasizes the use of high quality evidence and best practices for a wide array of multi-sectoral actions and solutions, illustrates how health and non-health sectors are determinants for one another's outcomes, and strategies for addressing health inequities, essential for achieving the SDGs.

The report draws from the WHO Centre for Health Development (WHO Kobe Centre) and its network of collaborators' decade of work to increase the knowledge base for urban health, particularly in understanding health inequities and the interaction of social, economic, and political determinants for health. The report could not have been possible without the contributions from many WHO Departments, units, and Regional Offices, from UN-Habitat, and from over 150 experts outside of WHO.

Section 1 of the report presents a vision for healthier cities, inclusive of a review of health inequities, the promise of universal health coverage (UHC), the need, opportunities, and solutions to address communicable and non-communicable diseases, health emergencies, malnutrition, and supporting healthy ageing. As health gains can only be achieved with other sectors' engagement and actions, Section 2 provides a comprehensive look at actions required for co-benefits for health and for liveable, inclusive cities. These include urban planning, water and sanitation, transport, housing, energy, safety, and other factors that have positive and negative health implications.

The report seeks to provide a foundation from which to measure the SDGs, particularly for health, for urban settings, and for a number of other, inter-related goals and targets. Cities represent national "laboratories" for synergistic actions that are central to achieving a variety of SDGs and innovation at scale. Underpinning all such efforts is the need for bold leadership by leaders, across professional disciplines, and within communities, and the need for an "urban data revolution" as the report stipulates to measure and get things done.

For all of the potential of urbanization, disparities and inequities within cities will continue to undermine the realization of their promise. With nearly a billion people living in slums and informal settlements today, projected to double by 2050, optimal health outcomes for these populations cannot be realized without renewed commitment.

At the core of the dynamic and transformative nature of cities are people – healthy people. In order to pursue this goal and the SDGs, we must ensure that all citizens and communities, regardless of income, social status, or gender, have access to the quality health services they need with sufficient financial protection. A healthy population is the basis of a city's, and ultimately a nation's and the planet's, sustainable economic growth, social stability, and full realization of human potential.

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ACKNOWLEDGEMENTS

ACRONYMS

ACP	African, Caribbean and Pacific		PM	Particulate Matter
AIDS	Acquired Immune Deficiency Syndrome		PSU	Primary Sampling Unit
APHRC	African Population and Health Research Centre		PSUP	Participatory Slum Uprading Programme
BMI	Body Mass Index		RHEP	Richmond Health Equity Partnership
BRT	Bus Rapid Transit		SDG	Sustainable Development Goal
CLUES	Community-Led Urban Environmental Sanitation		SEWA	Self Employed Women's Association
CVD	Cardiovascular Disease		TB	Tuberculosis
DHS	Demographic and Health Surveys		TCNY	Take Care New York
DOTS	Directly Observed Therapy Short Course		UCLG	United Cities and Local Governments Network
DPT	Diptheria, Pertussis and Tetanus		UHC	Universal Health Coverage
FAO	Food and Agriculture Organization		UHI	Urban Health Index
GDP	Gross Domestic Product		UN	United Nations
HDI	Human Development Index		UNAIDS	United Nations Programme on HIV/AIDS
HEAT	Health Economic Assessment Tool		UNFPA	United Nations Population Fund
HiAP	Health in All Policies		UN-Habitat	United Nations Human Settlements Pro-gramme
HIV	Human Immunodeficiency Virus		UNICEF	United Nations Children's Fund
ICLEI	International Council for Local Environmental Initiatives		UNISDR	United Nations Office for Disaster Risk Reduction
IOM	International Organization for Migration		UNODC	United Nations Office on Drugs and Crime
LAC	Latin America and Caribbean		Urban HEART	Urban Health Equity Assessment and Response Tool
LMIC	Low- And Middle-Income Country		US	United States
MDG	Millennium Development Goal		US$	United States dollar
MDR-TB	multidrug-resistant tuberculosis		USA	United States of America
MICS	Multiple Indicator Cluster Survey		WHO	World Health Organization
MSM	Men Who Have Sex With Men		XDR-TB	Extensively Drug Resistant Tuberculosis
NCD	Noncommunicable Disease			
NGO	Nongovernmental Organization			
OECD	Organisation for Economic Co-operation and Development			

SDGS:

PVRTY
1

HNGR
2

HLTH
3

EDUC
4

GNDR
5

WATR
6

ENRG
7

ECON
8

INFRA
9

INEQ
10

CITY
11

CNSUM
12

CLCHG
13

OCNS
14

BIODV
15

PEACE
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PARTN
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INTRODUCTION

COUNTRIES:

BRA

CAN

CHN

COG

COL

FRA

GBR

GHA

GIN

IDN

IND

IRN

ITA

JPN

KEN

KHM

LBR

MLI

MOZ

MWI

NGA

PAK

PER

PHL

RWA

SLE

SWZ

UGA

USA

ZAF

ZWE

INTRODUCTION

Cities are now at the forefront of tackling critical global development issues, including public health. In September 2015, 193 Member States of the United Nations gathered in New York City, USA, to adopt a new set of 17 global development goals with 169 national targets called the Sustainable Development Goals (SDGs) (*1*). While the SDGs cover a wide range of critical issues such as ending poverty, achieving universal education and combating climate change, among others, one of its goals (SDG 11) is dedicated to making cities inclusive, safe, sustainable and resilient. Targets key to achieving this goal such as housing, air quality and transport are also important determinants of people's health in cities.

Improving health will remain a global priority during 2016–2030 with SDG 3 focused on ensuring healthy lives and promoting well-being for all at all ages. Healthy populations are essential to realizing human potential as well as the objective of equitable, inclusive and economically vibrant cities. The predominance and high density of populations in cities, the complexity of risk factors influencing health and the impact of inequities on health, social and economic outcomes argue for taking action on the determinants of health to improve health and attain universal health coverage (UHC).

The percentage of the world's population living in urban areas is projected to increase from 54% in 2015 to 60% in 2030 and to 66% by 2050. This is particularly significant when considering that until the start of the 20th century only one in 10 people lived in urban areas. In absolute terms, more than 1 billion people were added to urban areas between 2000 and 2014. The United Nations estimates that more than 90% of future urban population growth will be in low- and middle-income countries (LMICs) (*2*).

Cities are not just economic drivers for countries, but are centres of innovation to manage and respond to dramatic demographic and epidemiological transitions. A few examples illustrate innovative approaches and the leveraging role of cities. For instance, in France on 1 December 2014, World AIDS Day, mayors from around the world signed the 2014 Paris Declaration to put cities on the fast track to end the AIDS epidemic. The mayors pledged that by 2020, 90% of people living with HIV in cities will know their HIV status, 90% of people living with HIV who know their status will receive HIV treatment, and 90% of people on HIV treatment will have a suppressed viral load (the 90–90–90 Target). These targets are expected to be met at the national level by 2030, but cities are fast tracking their efforts to achieve them by 2020.

Also, in 2014, a coalition of city leaders pledged to address climate change by reducing their greenhouse gas emissions. This initiative, the Compact of Mayors, was launched by the United Nations (UN) under the leadership of global city networks – the Cities Climate Leadership Group (C40), the United Cities and Local Governments Network (UCLG) and the International Council for Local Environmental Initiatives (ICLEI). To date, through this agreement, 206 cities with a combined population of 270 million have committed to undertake a transparent and supportive approach to reduce city-level emissions, to reduce vulnerability and to enhance resilience to climate change. In October 2015, mayors from 115 cities, home to 400 million people, signed the Milan Urban Food Policy Pact. This commitment entails local actions to tackle global emergencies of hunger, malnutrition and food wastage. Cities have pledged to develop sustainable food systems that are inclusive, resilient, safe and diverse that provide healthy and

affordable food to all people in a human rights-based framework, among other issues.

These examples underscore two main reasons for cities to develop a proactive approach in order to resolve global development problems. First, cities are likely to account for a large proportion of both the burden and the causes of specific issues. For instance, 25% of all HIV patients live in just 200 cities worldwide. In sub-Saharan Africa, HIV prevalence in urban areas is twice that in rural areas despite much progress over the past decade (3). With respect to climate change, cities are responsible for more than 70% of all greenhouse gas emissions globally (4). Second, municipal and local governments have the ability to effect change through policies and programmes to address these problems locally, which collectively can make a significant impact at national and global levels. For example, municipal services such as energy, water and transportation can be delivered to citizens in a way that can reduce local greenhouse gas emissions. By making this a collective action such as through the Compact of Mayors, these local efforts can make a major contribution to addressing global climate change. There is much that the global development community can gain from the proactive and coordinated action of city leaders.

SUSTAINABLE DEVELOPMENT GOALS

The 17 SDGs are a highly ambitious agenda that seeks to achieve economic, social and environmental development objectives, globally, with a focus on equity. A United Nations estimate puts the annual investment gap for achieving the SDGs in developing countries at US$ 2.5 trillion (5). Achieving the SDGs will, however, require more than money. It will need a global change of mindsets and a synergistic approach to achieving the 169 targets set by the world's governments. Progress in cities will impact the achievements of every other SDG. Similarly, health achievements will support progress in other goals, and will be strongly influenced by advances in each of the other goals.

While the SDGs related to health and cities are not explicitly linked, they are increasingly linked in practice by mayors of cities, thus a number of synergies are likely to arise in achieving both goals. For example, SDG 3.8 for health establishes the far-reaching objective of UHC that is key to advancing equity, while SDG 11.3 broadly stipulates planning and management for inclusive and sustainable urbanization. Similarly, SDG 3.9 for health and SDG 11.6 for cities both focus on the impacts of air pollution. While the former emphasizes reducing deaths and disease, the latter focuses on the environmental impacts. Comparably, targets 3.6 and 11.2 both relate to improving road safety. These present clear opportunities for achieving two goals, and producing co-benefits, between those focusing on health development and those focusing on urban development.

There are a number of other health targets where achievement will be linked to urban development. For instance, SDG targets 3.3 and 3.4 focus on ending the HIV epidemic and reducing preventable mortality from noncommunicable diseases (NCDs). While the prevalence of HIV is concentrated in people residing in cities, urban lifestyle

is considered to be a driving factor for the increase in the burden of NCDs. If cities make adequate progress towards their targets on housing, the environment and socioeconomic issues, then they are more likely to support healthier and more prosperous populations.

An integrative approach to the SDGs will be beneficial for achieving the goals for health and for cities. Solutions for many of the challenges require multisectoral collaboration. For instance, reducing preventable deaths due to NCDs in cities will need coordination across diverse sectors such as health, urban planning, education, finance, commerce and regulation, among others. This coordination will also have to take place across different levels of government – local, provincial and national – and be supported by global actions.

The urban advantages of having greater resources, higher density, and better infrastructure and service availability than in rural areas, on average, can facilitate a higher quality of life. An emphasis on decentralizing authority in many countries has enabled city governments to achieve greater autonomy in raising revenues and developing social and economic policies and programmes. City authorities also have the advantage of being closer to the people they serve and can potentially collaborate more effectively across different sectors of government, the private sector and civil society.

Innovative initiatives by city governments, including cities in LMICs, in collaboration with civil society and academia have focused on improving people's health. Bogotá, the capital of Colombia, was one of the first to implement the *Ciclovía Recreativa* programme, where over 97 kilometres of city streets are closed to traffic on Sundays to help promote cycling, walking and physical activity, and to reduce traffic-related air pollution. Approximately, from 600 000 to 1.4 million people make use of the programme with over 40% participating for more than three hours at a time. It is estimated that the programme has led to US$ 3.2–4.3 annual savings in health-care costs per person in Bogotá (6).

In a move towards UHC, city authorities in Guangzhou, China, increased the scope of their free basic health service provision in 2009 to include registered immigrants. The free package includes 12 key health services focusing on infectious disease, chronic illness, maternal and child health, and public health emergencies, among others. This service reached nearly 13 million people in 2013. At the same time, Guangzhou government funding for the programme doubled between 2009 and 2015 from US$ 4 per person per year to US$ 8 (7).

Mayors are turning their city halls into policy labs and are innovating on a grand scale. Cities are collaborating across national borders more than ever before: sharing ideas; forming coalitions; and challenging their national governments to adopt policies. This is not to say that cities can replace the nation–state in reducing poverty, improving security or fighting disease. They cannot. Instead, this is to highlight that cities are not only effective partners for national authorities, but also that, increasingly, this partnership is becoming a necessity (8).

Global partnerships can also provide additional leverage for city authorities and civil society. A number of independent international organizations act as platforms for cities around the world to exchange ideas and cooperate on development issues. Some of these organizations, such as ICLEI and Metropolis, have been active for the past 25–30 years. These organizations connect city leaders from across the world in strategic alliances with an objective to develop better cities.

ICLEI, for instance, focuses on sustainable development in cities and encourages solutions that are low carbon, resilient and healthy with a green economy and

smart infrastructure. It connects more than 1000 cities, covering 20% of the world's urban population. Metropolis has a network of 141 metropolitan areas and cities and provides a global platform for mutual learning, innovation, governance and technical and financial assistance. While health is not yet a primary focus of activities at Metropolis, the organization has jointly developed initiatives with WHO, including its *Cities for health* report (*9*), to put health on the agenda of mayors.

The SDGs offer a new platform for cities to connect globally and cooperate on a wide range of development issues, including health, environment and the economy.

MULTIFACETED CHALLENGES FOR HEALTH

In virtually all cities the advantages for health can be considerably greater for some people than for others. In fact, for some people living in cities, there is no urban advantage at all. For example, in London, United Kingdom, people live 17 years longer in Westminster than those just a few stations further along the Underground (*10*). People in some communities in Baltimore, USA, live 20 fewer years than others in the same city (*11*). Their life expectancy is similar to that of the People's Republic of Korea, where people are, on average, 30 times poorer than those in the USA.

Cities in LMICs face severe problems in distributing limited resources among rapidly growing populations. This mismatch of rapidly increasing populations and limited resources is most visibly manifested in the proliferation of slums and informal settlements. More than 880 million people are currently estimated to live in slum conditions around the world (*12*). Projections reveal that this is expected to more than double to 2 billion people by 2050 (*13*).

Poor housing conditions, overcrowding, lack of access to safe water and sanitation, and a lack of secure tenure characterize slums. They account for about three in five people in urban areas of sub-Saharan Africa, one in three people in urban Asia and one in five people in urban Latin America and the Caribbean (*12*). Most worryingly, the extent of the problem might be underestimated. Poor urban households may be "invisible" in areas of higher wealth or "illegitimate" in informal settlements. Many people are also likely to be pushed into poverty due to higher prices of essential commodities in urban areas. For example, in eastern and southern Africa, rapid urbanization in almost all countries in the region is raising new social, economic, public health and health system challenges. While the rural–urban gap in poverty has narrowed in many countries, such as Mozambique and Uganda between 1990 and 2010, this reduction is in part due to a rise in urban poverty. A major consequence of rapid unplanned urbanization linked to rising urban poverty has been high urban food prices. In South Africa, for example, food inflation was 16.7% between October 2007 and October 2008, outstripping overall inflation (at 12.1%). The poorest urban households would have had to raise their incomes by at least 22% to maintain the same food basket between April 2007 and October 2008 (*14*).

Furthermore, a range of health conditions and vulnerabilities has emerged, which represent an urban disadvantage offsetting earlier gains. NCDs – the diseases that result from a combination of our biology, how we live our lives and the environment we live in – are endemic to city life. A study of more than 100 countries found that body mass index (BMI) and blood cholesterol levels, both major risk factors for NCDs,

rose rapidly with increases in national income and level of urbanization (*15*). WHO estimates that 68% of global deaths were caused by NCDs in 2012 (*16*). Much of this burden will be concentrated in cities.

Urban environments offer favourable grounds for the spread of infectious diseases, especially in areas of high population densities with low resources such as slums. Increased international travel and migration have resulted in cities becoming important hubs for the transmission of infectious diseases, as shown by recent pandemics such as H1N1 and Ebola virus. In addition, rapid urbanization can introduce diseases mostly prevalent in remote rural areas into cities. For example, schistosomiasis has established itself in urban areas, most probably through infected migrants in many sub-Saharan African cities. The global incidence of dengue has grown dramatically in recent decades with about half of the world's population now at risk. It is found in tropical and subtropical climates worldwide, mostly in urban and semi-urban areas. In high-income European countries, the prevalence of tuberculosis (TB) in big cities is 2.5 times that of the national prevalence (*17*). This has been attributed mainly to the concentration of high-risk population groups such as migrants from high-incidence TB countries.

The concentration of poverty in overcrowded urban areas also constitutes an increased risk for violence and injuries. Homicide rates in the 10 biggest cities of Brazil were 3.5 times higher than the national average in 2011 (*18*). In many LMIC cities, urbanization and the increased number of motorized vehicles have not been accompanied by adequate transport infrastructure, enforcement of traffic regulations or implementation of measures to ensure improved road safety, resulting in a higher incidence of road traffic injuries and deaths.

The types of health challenges that need to be tackled are varied. Looked at another way, however, cities have several potential entry points through which they can improve the conditions for health and their outcomes.
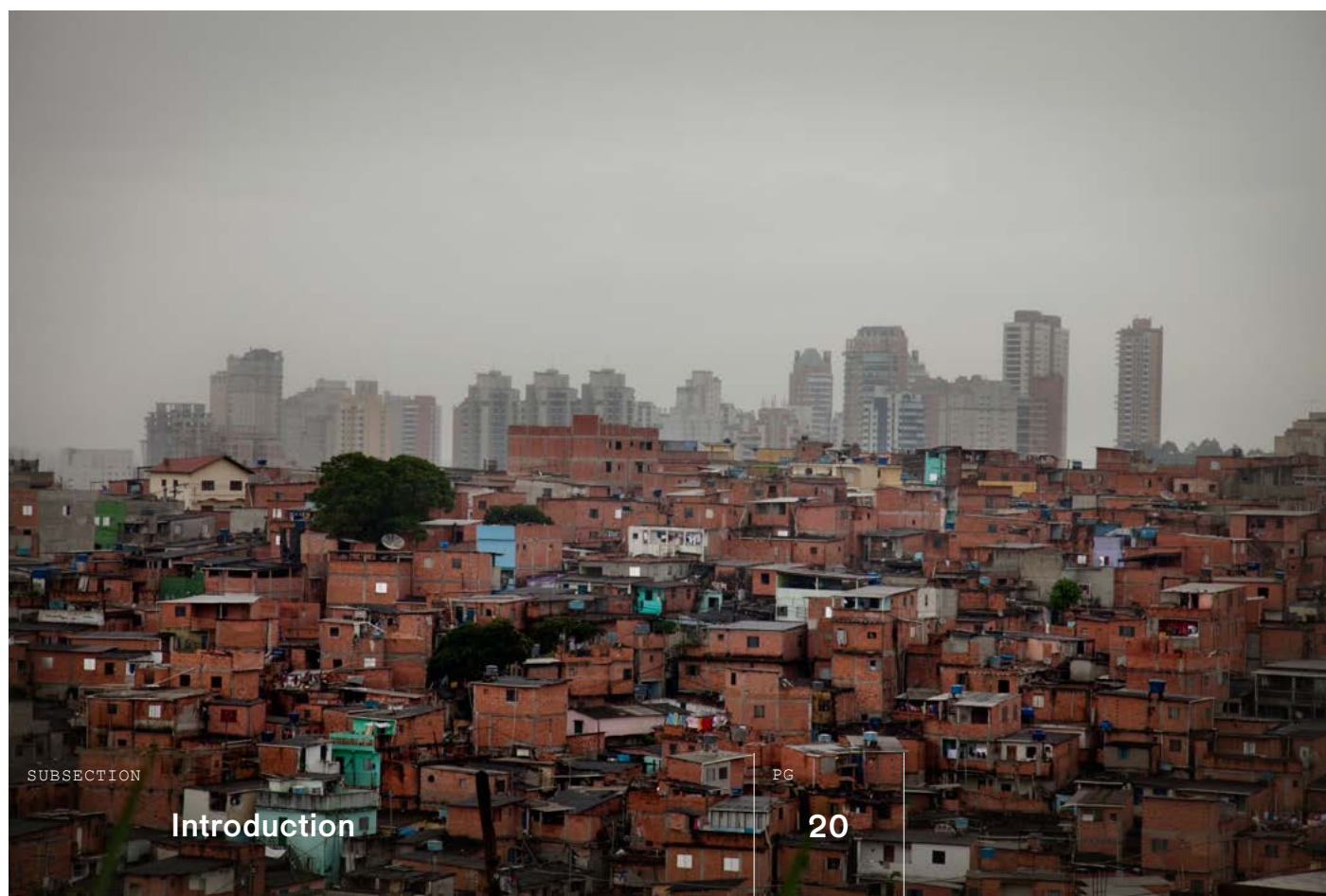
Source: WHO/Anna Kari

CITIES TAKE CENTRE STAGE IN GLOBAL HEALTH AND DEVELOPMENT INITIATIVES

A rising prevalence of NCDs, the persistent threat of infectious disease outbreaks and an increased risk of violence and injuries are key public health concerns in urban areas. WHO termed this phenomenon as the "triple threat of disease" in urban areas in 2010 when it led a global campaign on urban health. On World Health Day in April 2010, the worldwide 1000 Cities, 1000 Lives campaign engaged more than 1500 cities in 100 countries to conduct activities to raise public awareness on how urban living impacts health and what can be done about it.

Later in 2010, WHO and the United Nations Human Settlements Programme (UN-Habitat) launched a global report on urban health titled *Hidden Cities: unmasking and overcoming health inequities in urban settings*. This was the first joint report by the two organizations aimed at increasing the attention of policy-makers and the international community on urban health. It was also the first time that the magnitude of urban health inequities was systematically revealed and compared across countries. Drawing on the experiences of cities in different sociopolitical contexts and levels of development, this report introduced a framework for action on health for cities.

Also in 2010, mayors from around the world adopted a call to action at the Global Forum on Urbanization and Health in Kobe, Japan, consisting of three major

areas – evidence-based action, multisectoral coordination and community participation in decision-making. Tools to help local authorities and civil society plan action on health inequities, such as the WHO Urban Health Equity Assessment and Response Tool (Urban HEART), were introduced along with other resources.

Since then, there has been a growing recognition of the role of cities in improving global health. In recent years, a number of international organizations, including the United Nations Children's Fund (UNICEF), the United Nations Population Fund (UNFPA), the United Nations Programme on HIV/AIDS (UNAIDS), the Food and Agriculture Organization (FAO), the International Organization for Migration (IOM) and the international nongovernmental organization (NGO) Save the Children, to name a few, have produced global reports focused on the various impacts of urban living on population health and their key determinants. Each of the reports has recognized that cities need to address the significant disparities in access to basic services, social justice and economic opportunities.

The UNICEF *State of the world's children* 2012 report (*19*) noted that hundreds of millions of children live in urban slums, many without access to basic services. Many actually live in close proximity to urban amenities, including modern health facilities, but are still deprived of even the most rudimentary services due to inequity and social exclusion. There can be no enjoyment of health for these children. Such poor outcomes and opportunities leave children more vulnerable to the effects of environmental shocks. Improving access and service quality are vital to reducing child mortality and morbidity. This also has long-term implications for children's health, longevity and prosperity as adults.

The 2015 edition of the Save the Children report *State of the world's mothers: the urban disadvantage (20)* affirmed that "one of the worst places in the world to be a mother is in an urban slum". This report also focuses on the vast inequalities that impact health and economic opportunities for large numbers of urban citizens. For example, in relative terms, under-5 mortality across wealth groups have roughly doubled in urban areas of Kenya, Malawi and Rwanda despite these countries' overall success in saving more children's lives in cities.

The cities report in 2014 from UNAIDS acknowledged that urban areas are home to millions of people who are excluded from social, political and economic progress, and thus are more likely to be at higher risk of diseases such as HIV. Urban characteristics, especially in slums, of poor sanitation and overcrowding are also linked to a higher risk for TB, a leading cause of death among people living with HIV. While recognizing the challenges, the report expressed confidence in cities' abilities to tackle the social causes of inequalities that create a higher risk environment for health.

INEQUALITIES: A UNIVERSAL CONCERN

A common theme across all global initiatives on health in cities has been the need to tackle inequalities in health and in the underlying social, economic, environmental and political determinants of health. Even if cities possess resources in abundance, these resources often are concentrated in the hands of a relatively small proportion of the population and it is clear that the presumed urban advantage systematically excludes hundreds of millions of people. Inequalities that are systematic and remediable are considered to be

WEALTH QUINTILES

■ value for
wealthiest 20%

■ value for
poorest 20%

— Urban Average

UNITS

1.000 deaths
500 deaths
0 deaths

PERCENTAGE

100%
50%
0%
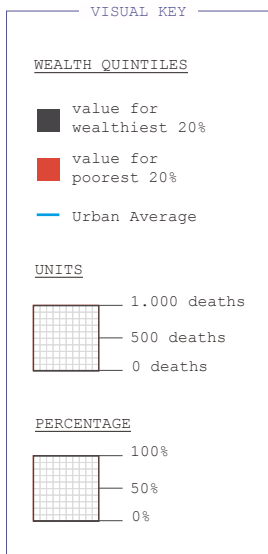
inequities, and are a manifestation of social injustice.

While there are substantial inequalities across regions, there are also high inequalities that exist within cities, countries and regions across various dimensions such as gender, age, wealth status, education levels and ethnicity. An analysis of urban data from 79 LMICs across four global regions revealed that children in the poorest fifth of urban households are more than twice as likely to die before their first birthday as children in the richest fifth of urban households are, with substantial variations within regions (Figure 1(a)).

As another example, solid fuel use for cooking, a major contributor to deaths due to indoor air pollution, is uncommon among the richest populations in three of the four regions, Africa being the exception (Figure 1(b)). However, in the Asia-Pacific region, one in two people in the poorest fifth use solid fuels for cooking. In Africa, 90% of the poorest fifth are likely to use solid fuels for cooking compared to 50% of the richest fifth. These two examples illustrate that it is not enough to monitor urban averages. It is also necessary to disaggregate data by sociodemographic characteristics of the population. This information can then inform policies and programmes to improve equity.

Figure 1(a). Infant mortality per 1.000 live births, median, by wealth quintile

Figure 1(b). Population using solid fuels (%), median, by wealth quintile
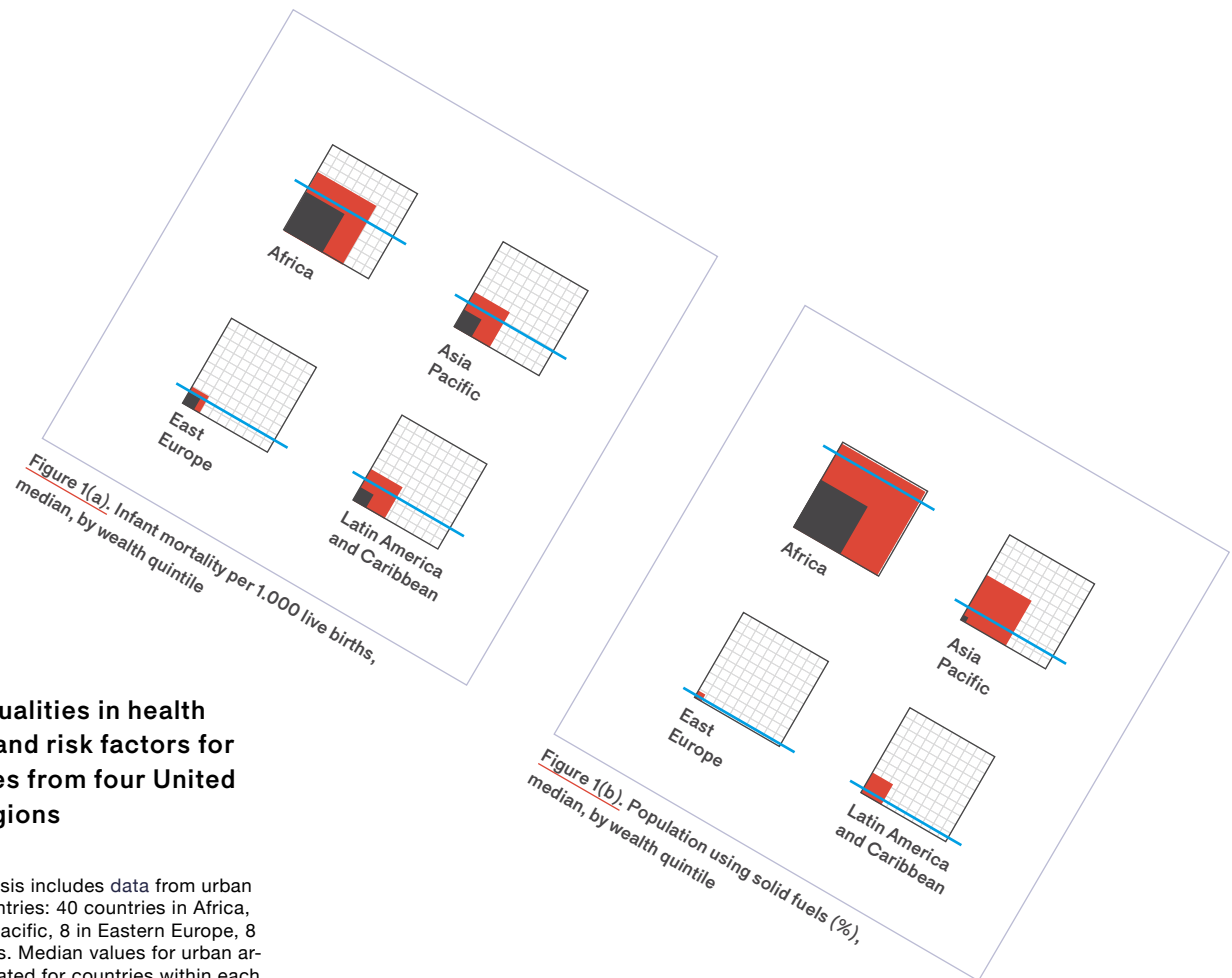
Figure 1.
Urban inequalities in health outcomes and risk factors for 79 countries from four United Nations regions

Note: The analysis includes data from urban areas in 79 countries: 40 countries in Africa, 23 in the Asia-Pacific, 8 in Eastern Europe, 8 in LAC countries. Median values for urban areas were calculated for countries within each region. For details, see Annex 1: Table A1.2.

Source: Global Health Observatory 2015 (21).

ACTION ON HEALTH INEQUITIES
USING URBAN HEART

More than 100 cities in 53 countries around the world have used the WHO Urban HEART tool (22) to plan action for reducing health inequities. Developed by WHO in partnership with academics and city officials, Urban HEART guides users through a process of bringing different stakeholders together, collecting and collectively analysing disaggregated data on health and its determinants and planning action to reduce inequities informed by best practices. The tool has been used in diverse environments, from small cities such as Matsapha, Swaziland, with a population of 35 000 to Tehran, the Islamic Republic of Iran, home to more than 8 million people. Cities at varying levels of development in countries such as Canada and Mali (23) have used Urban HEART to achieve the same goal of reducing health inequities.

In Matsapha, a town of 35 000 in central Swaziland, more than 80% of its population lives in peri-urban areas where no public services were provided. This situation changed after the town council used Urban HEART in 2014–2015 in partnership with the Ministry of Health, WHO, Médecins sans Frontières and many sectors within the government. Since implementing the tool, the town council has introduced an integrated solid waste management strategy, a mobile clinic, a maternal and child health programme, a partnership with Médecins sans Frontières to set up a comprehensive health-care clinic and has improved crime prevention strategies. Other towns in Swaziland are now planning to adopt Urban HEART based on Matsapha's experience (24).

Paranaque, a city of 654 000 people in the Philippines, has used Urban HEART routinely since 2009 to monitor health and take appropriate action. Key achievements include increases in facility-based delivery (from 65% in 2009 to 90% in 2014), access to safe water for the entire city, strengthening health information systems and institutionalizing the use of the tool to monitor health. Many of the city's subunits, called barangays, have also institutionalized the use of Urban HEART. Since 2015, the city has been using the tool to support its goal to achieve UHC, while focusing on equity (25).

In Agra, India, Urban HEART was adapted for a qualitative approach in the absence of good quantitative data. In the city of the Taj Mahal, the Urban Health Resource Centre trained women's groups from 40 slums in using the tool. Using neighbourhood mapping techniques and local information on priority issues, women from the slums were empowered to take action. This included ensuring better provision of basic public services, including access to safe water, girls' education and securing identification cards for slum residents to benefit from the government's food subsidy act (26).

Urban HEART continues to be used around the world, and increasingly so as the importance of equity and cities gains traction in the global development field.

MEASURING THE PROSPECTS FOR
GOOD HEALTH IN CITIES

A number of initiatives have developed measures of urban living and health. For example, in 2013, UN-Habitat introduced a measure for prosperity, the City Prosperity Index. This index was constructed to help decision-makers design appropriate policy interventions and was applied in 69 cities worldwide. The index includes five dimensions

that determine the quality of life in cities: productivity; quality of life; infrastructure; environmental sustainability; and equity. Health is one of the three subcomponents of the quality of life dimension along with education and public space.

The Urban Health Index (UHI) published by WHO in 2014 provides a standardized method for constructing a composite measure of population health. Adapting the method used by the Human Development Index, the UHI guides users through a flexible approach in the selection of indicators, tailored to local needs. This is particularly useful since priorities can vary substantially across cities and contexts. The UHI has the potential to measure overall health as well as inequalities in health.

For this report, the UHI was computed for 57 cities in 53 LMICs to determine how conducive city environments are for health (Figure 2). Of the 57 cities, 30 are in Africa, 16 in the Asia-Pacific, 4 in eastern Europe and 7 in Latin America and Caribbean (LAC) countries (Table 1). The index combined information from nine determinants of health indicators covering the social and physical environments and health service coverage. The nine indicators include access to water and sanitation, use of solid fuels, women's education, two indicators on women's knowledge of HIV (each weighted as ½), and three child health service coverage indicators (each weighted as ⅓). Latest available data during 2003–2013 were sourced from the Demographic and Health Surveys (DHS) for cities with sufficient sample sizes and identifiable boundaries using geocodes. Details of the construction of the index and process for selection of the indicators are described in Annex 2. While this application of the UHI is a first attempt at using reliable and comparable data across cities, there were limitations, especially with respect to selection of indicators and cities, and generalizability. It was not possible to include all cities or all preferred indicators in this iteration of the UHI mainly due to lack of data or small urban sample sizes.

Table 1.
List of cities included in the calculation of the UHI, using the United Nations classification of countries by region

Africa			Asia-Pacific		Eastern Europe	LAC
Abidjan	Dar es Salaam	Maputo	Amman	Kolkata	Baku	Bogotá
Accra	Freetown	Mbabane	Bishkek	Male	Chisinau	Georgetown
Addis Ababa	Harare	Monrovia	Delhi	Manila	Tirana	La Paz
Antananarivo	Kampala	Moroni	Dhaka	Mumbai	Yerevan	Lima
Bamako	Kigali	Nairobi	Dili	Osh		Port-au-Prince
Brazzaville	Kinshasa	Niamey	Dushanbe	Phnom Penh		Santo Domingo
Bujumbura	Lagos	Ouagadougou	Islamabad			Tegucigalpa
Casablanca	Libreville	Sao Tome	Jakarta			
Conakry	Lilongwe	Windhoek	Karachi			
Cotonou	Lusaka	Yaoundé	Kathmandu			

Figure 2.
**Applying a health lens to cities:
the UHI**

Source: Mil, million; Popn, population; Q2,
2nd quintile; Q4, 4th quintile

Note: Stauber et al. 2015 (27).

VISUAL KEY

CITIES (9 VARIABLES)

■ 0.075 – 0.235
■ 0.236 – 0.368
■ 0.369 – 0.509
■ 0.510 – 0.709
■ 0.710 – 0.944

POPULATION

○ Popn > 1mil

◯ 1mil≤ popn ≤ 10mil

◯ Popn ≥ 1mil

Disputed areas
/ boundaries

☐ Not applicable
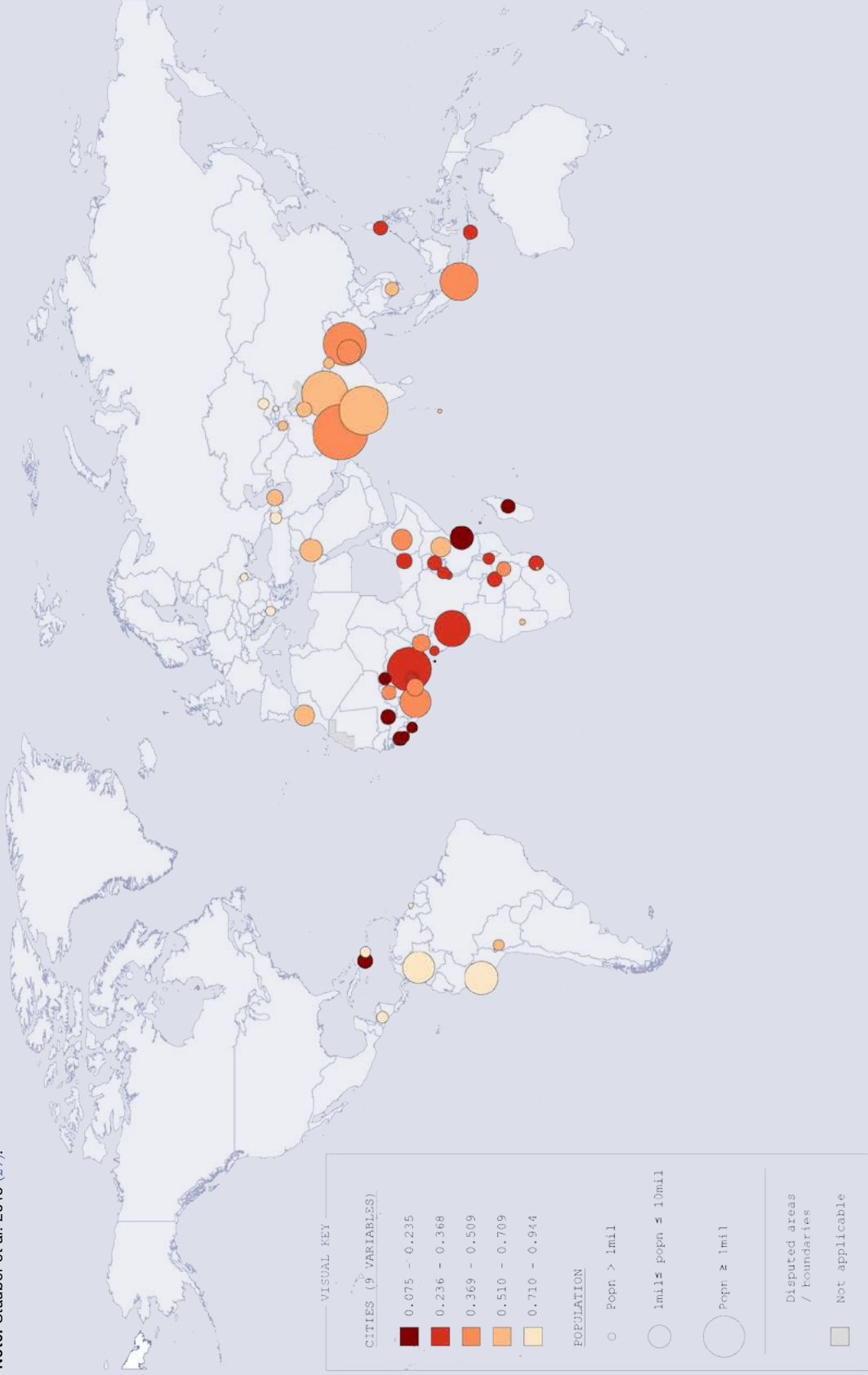
Figure 2 shows the results of the UHI. The UHI has a possible range of 0 to 1, and *in this analysis*, higher values of the index reflect better opportunities and environments for health. Of the 57 cities included, 21 were from low-income countries, 27 from lower-middle income countries, and nine cities were from upper-middle income countries. There are several key messages from this city-level analysis:

→ National level wealth does not always determine conditions for health at the city level. Index values range from 0.94 in Yerevan to 0.07 in Monrovia, with a median value of 0.44 (Harare). The median index value was nearly twice as high for cities in lower-middle income countries (0.57) compared to those in low-income countries (0.29). However, there is much variation even among cities in low-income countries, with values ranging from 0.07 for Monrovia to as high as 0.69 for Kathmandu.[i] Even in cities in upper-middle-income countries, the UHI value was as low as 0.33 for Libreville.

→ Megacities in LMICs have worse conditions for health than smaller cities. Seven megacities (population greater than 10 000 000) were included in the analysis: Dhaka, Jakarta, Karachi, Kinshasa, Lagos, Mumbai and Delhi; 19 cities have a population less than 1 million, while 31 cities have a population between 1 and 10 million. Megacities have a median index value of 0.43, while smaller cities with less than 1 million people have the highest average index value of 0.68 (not controlling for income level). Among megacities, Delhi has the highest value (0.59), which is still lower than the average value for smaller cities, and Lagos has the lowest (0.30).

→ Conditions for health vary widely even between cities within the same geographic region. While African cities have the lowest median index value (0.32), there is substantial variation across the continent. Nairobi has the highest index value among the included cities from Africa (0.69), followed by Mbabane (0.63) and Windhoek (0.63). The four eastern European cities have the highest median index value (0.88). In the LAC, median UHI value was 0.76, but values ranged from 0.15 in Port-au-Prince to 0.81 in Bogotá.

→ The capital cities of countries most affected by the 2014–2015 Ebola outbreak had some of the poorest conditions for health. The capital cities of Guinea, Liberia, and Sierra Leone, where the 2014–2015 Ebola outbreak had struck worst, suffered poor conditions for health prior to the outbreak. Based on data from 2013 and 2014, Conakry (0.21), Monrovia (0.07) and Freetown (0.17) fall in the bottom fifth of all cities examined. The need to strengthen health systems in these countries has increasingly become a focus in the aftermath of the outbreak, but these data also show the need for substantial improvement in other determinants of health such as access to water and sanitation, and women's education.

i   Data for Kathmandu were collected in 2011, four years before the April 2015 earthquake.

Despite some limitations to the analysis, these results convey an extremely valuable message. It is possible to develop city environments that are more conducive to health under widely different circumstances, even with relatively few resources. There is much that cities and local governments can accomplish independent of national-level wealth, or their geography or population size. In short, every city has a chance to make itself a place of opportunity for health and prosperity for everyone. Greater efficiency and impact can be attained by addressing a variety of factors that determine health outcomes, including the health system and social and physical environments. This report presents evidence of both how different domains of urban life affect people's health and how actions in these areas can contribute to better health, equity and sustainability in different contexts.

ABOUT THIS REPORT

This report aims to help cities uncover health inequities with a focus on identifying solutions to resolving them. These are not simple problems – cities are complex systems where a multitude of factors affects people's health. However, there are several clear pathways through which progress can be made. In order to reach the SDGs targets, and to achieve UHC, city decision-makers must act to strengthen health systems to create cities equitable and healthier cities. Accordingly, Section 1 presents the major urban health challenges that would need to be tackled in order to realize a vision for healthier cities. It presents evidence of deprived and high-risk populations within cities as well as possible solutions to control preventable ill-health within them. It further reviews past evidence on urban health inequities, and presents a special analysis (MDG Scorecard) showing the likely effects of urban health inequities in achievement of the Millennium Development Goals (MDG) at the national level.

There is abundant evidence that some of the greatest health gains to be had in cities lie beyond the health sector. The urban environment itself plays an instrumental role in health because it affects the way we live our daily lives. The places where we live, work and play, and how we access these elements of daily life are increasingly impacting our health. This has particularly been a problem for many of the fastest growing cities, which have had neither the time nor the resources to plan for unanticipated growth.

Still, throughout history, most of the world's cities have been planned largely without human health in mind. Whether in planning for public spaces, energy use or transportation corridors, cities have often been planned primarily for commerce and cars. Cities can and should be planned for people in order to optimize the health of their residents, and maintain their economic and cultural vibrancy. Section 2 uncovers the pathways through which cities, as currently planned, affect the health of their residents. It demonstrates that not only can these effects be identified, but that there are also practical ways to modify our cities and their structures to make them more conducive to health and prosperity at the same time.

This report strongly advocates that cities adopt a multisectoral response by showing how individual components of city life – such as urban planning, housing, transport and energy – are interconnected and both separately and together have positive and negative health implications. This report also considers the challenges for health equity through these lenses and provides evidence of solutions for cities where people can thrive.

Invariably, challenges bring out the best in people – from the leaders of cities and their advisers to the communities and families who live in them. Section 3 discusses the characteristics of a multisectoral approach in urban governance which should be mobilized to effectively act on the various challenges and solutions that emerged in this report. There is something in this report for every city in the world, and for every city leader. They can relate to the challenges and adapt the problem-solving approaches to their own unique circumstances to make their own city a healthier and better place to live in during the coming decades of the 21st century.

SDGS:

PVRTY
1

HNGR
2

HLTH
3

EDUC
4

GNDR
5

WATR
6

ENRG
7

ECON
8

INFRA
9

INEQ
10

CITY
11

CNSUM
12

CLCHG
13

OCNS
14

BIODV
15

PEACE
16

PARTN
17

SECTION 1

A VISION FOR HEALTHIER CITIES

KEY MESSAGES

Achieving meaningful progress in health in cities everywhere depends on reducing health inequity.

•

Greater attention to the health needs of the urban poor is essential to move towards universal health coverage.

•

Cities must play a leadership role in the fight to against communicable disease.

•

Noncommunicable diseases present not only a threat to human health, but also have significant economic implications for cities.

•

Cities increasingly face the unprecedented dual challenge of undernutrition and overnutrition.

INTRODUCTION

Cities worldwide are taking on the challenge of the major health issues of our time, from preventing and controlling the spread of endemic and emerging infectious diseases to taking bold initiatives on the growing burden of NCDs. At the heart of it all is the challenge of health equity – ensuring that all people have the opportunity to achieve good health and affordable access to the health care they need throughout the life course. These are not only a daily concern for individual health, but also one of the most daunting economic, political and social challenges of the 21st century.

The five chapters of Section 1 examine these issues and provide examples of some of the many initiatives that cities across widely different contexts have taken individually, and which can serve as models for others elsewhere.

Urban areas enjoy many advantages compared to rural areas when it comes to availability of resources that support good health. Basic infrastructure that are essential to health, such as water, sanitation and housing, are generally more developed than in rural areas. Health-care services and facilities tend to be concentrated in cities, along with financial resources, personnel, supplies and equipment. The density of urban areas coupled with better transport and information and communications technology facilitate access to these resources. More opportunities for education and employment, which are important enablers of health, are also available. In short, urbanization is associated with economic and social development that provide better opportunities to achieve good health.

However, cities also have relative disadvantages for health. Finite resources need to be distributed among a very large, often expanding, and heterogeneous population. Crowded conditions of daily living and working as well as large pockets of informal settlements are conducive to the spread of communicable diseases. Sedentary lifestyles and the urban food environment lead to the rise of NCDs. Crime and violence are often concentrated in urban areas.

Affecting all of these conditions is poverty and exclusion that result in certain areas and groups of people in urban neighbourhoods suffering substantially worse conditions than the rest of the urban population, and sometimes even worse than their rural counterparts. When such differences, or *inequalities*, are not random but are systematic, and not due to biologically determined factors but due to modifiable social factors, they are unjust *inequities*.

Inequity often manifests as a large and growing gap between the best-off and worst-off people in urban areas, but also as a socially graded pattern that affects the entire population. It is often worse in urban than in rural areas because of the tendency for both extreme wealth and poverty to concentrate in cities. Inequity is perhaps one of the biggest urban disadvantages for health as it hampers not only development in health, but also in social, economic and human development for the city as a whole, with implications for national and global development.

This section begins by examining the different manifestations of urban health inequity and what is needed to better address them. It then discusses the potential of UHC as a key approach to improving health outcomes and equity, focusing on specific implications for the urban context. The latter half of this section discusses the double burden of communicable and noncommunicable diseases, and food security and nutrition with an emphasis on the innovative actions and solutions undertaken by cities in all regions of the world.

CHAPTER 1 — REDUCE HEALTH INEQUITY FOR SUSTAINABLE DEVELOPMENT

KEY MESSAGE • **Achieving meaningful progress in health in cities everywhere depends on reducing health inequity.**

Equity is an ethical imperative and an essential principle of the SDGs and the new global health agenda to attain UHC. Progress in reducing inequity is a key milestone that can be measured. Cities everywhere can benefit from greater investment in achieving equity in health. In addition to ensuring that no one has to suffer from unfair disadvantages, cities are more likely to thrive and be stronger economically when equity creates greater solidarity and enables more people to contribute to society.

While evidence of the "urban advantage" suggests that city populations often enjoy better health than their rural counterparts, there are substantial differences in health opportunities and outcomes in urban areas. In 2010, the WHO/UN-Habitat global report on urban health, *Hidden cities: unmasking and overcoming health inequities in urban settings (28)*, was the first report of its kind to shed light on the lesser known, hidden side of cities; that is, the fact that a considerable portion of the urban population is suffering unacceptable conditions of living and suffering serious consequences to their health. Five years later, the body of new evidence gathered for this report reveals that urban health equity remains a persistent, priority global health issue.

The most recent analysis by WHO of urban data in 79 countries, extracted from the DHS and the Multiple Indicator Cluster Survey (MICS) *(21)*, showed that children in the poorest one fifth of urban households are twice as likely to die before their fifth birthday compared to children in the richest one fifth. In Cambodia, the Lao People's Democratic Republic, Mongolia, and Sao Tome and Principe, this ratio is actually greater than five.

The good news is that in nearly all (94%) of the 50 countries for which longitudinal trends were analysed, comparing data from 1990–2004 to 2005–2013, urban under-5 mortality rates improved over the two time periods. Some countries, such as Ethiopia and Nepal, have made rapid progress, with the poorest urban populations witnessing faster gains than the richest groups, even though under-5 mortality rates remain high in urban areas in both countries (Nepal = 46, Ethiopia=69, per 1000 live births) (Box 1). In other countries, such as the Philippines and Rwanda, which have made much progress in reducing urban under-5 mortality among its poorest groups, the richer urban populations have reduced mortality at an even quicker pace, thereby resulting in an increase in absolute inequality. This shows that even in cases where significant progress is made, special attention to differential rates of progress within urban areas is still warranted.

A special MDG Scorecard follows this section that illustrates the likely impact that achievements among the urban poor had on attainability of the MDGs. The MDG Scorecard also creates a baseline for the SDGs accounting for these health inequity effects.

HEALTH INEQUITY IN CITIES: A COMPLEX BUT SOLVABLE PROBLEM

The sheer size of the urban population can easily mask internal inequality. In most cities, and in all countries, there are urban subpopulations, defined demographically, socially, economically or geographically, that face disadvantages in their daily living conditions, or what are known as the broader social and environmental determinants of health. Many of the worst-off of these groups are in effect part of an "invisible population" that is systematically excluded from mainstream urban society.

Poor urban households, especially in informal settlements, are often invisible in population surveys or official statistics and unrecognized by researchers, analysts, city planners and others. This seriously challenges the equitable delivery of essential services, including primary health care. If certain people or areas are not recognized, then they are unlikely to receive health and social services.

BOX 1.   Counting the hidden poor in Nepal's urban centres

The hidden poor in Nepal's urban centres are thought to be a large and growing population as a result of food insecurity in remote rural areas and civil unrest. To better identify the hidden poor, the Health Research and Social Development Forum (HERD), a Nepali NGO, is testing an innovative approach to household sampling.

To ensure that people living in informal dwellings are fully represented, the WorldPop population dataset rather than census data is used as a first-stage sampling frame. WorldPop is a publicly available dataset that disaggregates census population data to 100 metre by 100 metre grid cells based on dozens of spatial datasets such as land cover type and road network. Not only does this give probability of selection to areas of informal settlement such as slums, it also overcomes a main hurdle to household sampling, which is that local-level census data are highly sensitive and difficult to obtain. GridSamp, a publicly available algorithm, is then used to randomly select and aggregate adjoining grid cells to create a set of primary sampling units

(PSUs) of approximately equal populations. These PSUs are overlaid onto street maps using OpenStreetMap to create paper maps for survey teams to use in the field. To fully represent the "hidden poor" in shared housing, all households within PSUs are listed by asking residents during field visits about the number of households within each dwelling (a household is defined as a group of people who share a cook stove). Finally, a subset of these households is selected at random to create the final sample for which the detailed questionnaire is administered. The data resulting from the survey will be used to assess the health status of small areas across cities, and to identify appropriate locations for health clinics. It will also allow health services to identify areas where the population includes large numbers of migrants, for whom previous work has shown special provisions must be made to advertise services and make it clear that the services are intended for all.

Source: HERD Nepal 2015 (73).

In many developing countries, inadequate supply of urban public facilities and poor quality services have resulted in significant inequity in provision and access. Even when public services are available and accessible, people are reluctant to use them because of many quality-related drawbacks such as poor attitudes of health workers, shortages of drugs and supplies and long waiting times. This has led to the proliferation of private sector practice in urban areas, some of which is unregulated, offering fee-for-service health care.

For example, a study of the effect of health facility access and quality on family planning decisions of urban Senegalese women found that the quality of the facility or service may effectively be a barrier to access (29). An analysis of data from 4950 households and 205 facilities across six urban sites, including the capital Dakar, found no evidence that greater access to health facilities and pharmacies increased family planning use among urban women. Neither the number of public or private health facilities nor that of pharmacies had any significant effect on the likelihood that a woman would use family planning. Instead, the greatest impact on a woman's family planning decisions was the average quality of the facilities near her home.

In examining equity, there is also a need to understand the demand-side factors. City residents vary by their geographic, social, cultural and economic backgrounds, which, in turn, influence their health-related behaviour, including health-care utilization. Historically, population heterogeneity is in part a consequence of the migration of large numbers of people into urban areas, either from rural districts in their own country, or from other countries. Much of the diversity currently seen in cities is a result of that history as well as more recent urban population dynamics, including more temporary migration and daily commuters from outside the city. While this diversity adds to the richness of urban society, researchers are uncovering great variations in the health of urban populations, in both high- and low-income contexts, upsetting the perception that urban residents enjoy better health than their rural counterparts do.

The graphs in Figure 3 illustrate some typical manifestations of urban health inequity, using urban data extracted from the latest DHS. In general, an urban advantage is observed when comparing the median values of health-care coverage or health outcomes in rural and urban areas, as shown with antenatal care coverage (upper left graph). Within urban areas, however, there is a disadvantage associated with demographic and socioeconomic factors, such as level of educational attainment (upper right), with wealth (lower left) and with gender (lower right), to varying degrees. The graphs are based on urban data from countries in four UN classified world regions to demonstrate global patterns, but these patterns emerge, often even more sharply, when urban data are disaggregated at the national or local levels.

While these are typical patterns, health inequity is actually very complex, and the patterns can vary depending on the health determinant or health outcome in question. For example, Figure 3 shows that urban women have a slight disadvantage in terms of having correct knowledge about HIV transmission. However, data from other studies show that men are often at higher risk of injury-related deaths in urban areas. Or, wealthier people often have a health advantage, but in several urban contexts, they are at higher risk for NCDs.

To illustrate, a survey covering more than 70 developing countries found that, while on average, child mortality is lower in urban areas for almost all countries, children living in city slums are substantially worse off than those in non-slum areas of

Figure 3.
Common patterns of the urban advantage and intra-urban health inequity

Source: Global Health Observatory 2015 (*21*).

cities (*30*). Furthermore, town settings, which are in transition from a village to becoming a city, seem to pose the highest health burden on children, more so than city slums. In contrast, among adults, average urban mortality rates exceeded rural mortality rates in many of the sub-Saharan African countries in the 2000s.

An added layer of complexity is that much of the data presented in the graphs, and other commonly used data sources, may not have included the invisible or informal populations living in a city. Therefore, inequities are likely to be generally underestimated. This systematic lack of data for certain populations is itself a fundamental form of inequity.

Experience shows, however, that such challenges can be overcome. The 2015 *State of the world's mothers: the urban disadvantage* report (*20*) featured six cities for having made good progress in addressing inequities in child health, despite significant population growth.

VISUAL KEY

Coverage for Disadvantaged group
Coverage for Advantaged group

PERCENTAGE

100%
50%
0%
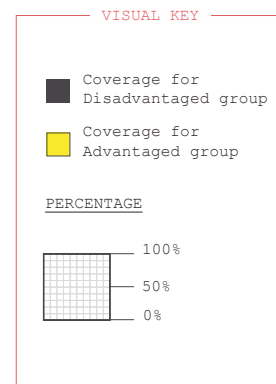
Addis Ababa, Ethiopia, for example, has made some of the greatest child survival gains of any city, and this progress has almost exclusively favoured the poorest children. Under-5 mortality in Addis Ababa dropped by half between 2000 and 2011, from 114 to 53 deaths per 1000 live births. In the same period, the child death rate among the poorest 20% of Ethiopian urban children (not only those in Addis Ababa) fell by over 40%, while there was little to no change among the top 20%. As a result, the urban survival gap in cities across Ethiopia has narrowed dramatically. The rapid socioeconomic progress in the city as well as increased availability and coverage of maternal and child health services partly explain the success seen in Addis Ababa. Their case reinforces the need for multiple health and non-health interventions to effect positive change.

In the case of Kampala, Uganda, the progress in reducing child deaths and closing the survival gap within the city is attributable to a variety of outreach efforts that take health-care information and services directly to the communities where poor people live. In Phnom Penh, Cambodia, rapid improvements in facility-based births and skilled birth attendance were achieved in part through investments in midwifery training and increasing the numbers of midwives within an expanded primary health care network. In addition, an expanded system of health equity funds made health care free of cost for poor people.

The six featured cities have achieved success through a variety of approaches, but the most consistently employed success strategies included: (i) better care for mothers and babies before, during and after childbirth; (ii) increased use of modern contraception to prevent or postpone pregnancy; and (iii) effective strategies to provide free or subsidized quality health services for the poor. Whereas these are often considered to be national-level strategies, these cities show that it is possible for local authorities to take these actions themselves with demonstrable success.

BOX 2.	Uncovering urban children's needs

UNICEF, in partnership with leading research organizations and universities, is developing disaggregated data methodologies to uncover urban children's needs and give them a voice to policy-makers. One example is enhancing the UNICEF MICS (*31*) to assess more accurately not just urban areas, but also urban slums. This greater precision allows urban MICS to identify pockets of poverty and children's needs that would otherwise go unseen in aggregated data models.

This promotes routine use of equity and performance assessments of localized areas, with innovations such as the use of improved spatial data analysis for risk-informed planning. When projections of urban growth are overlaid with analysis of multiple health and social deprivations, decision-makers have greater ability to estimate and respond to future needs. Such data are used to inform policy-makers, spur innovation and support local advocacy efforts.

CITIES CHAMPIONING HEALTH AND SOCIOECONOMIC DEVELOPMENT STILL MARKED BY HEALTH INEQUITY

The challenge of health inequity is not limited to low-income countries; it is a challenge for cities everywhere. Japan, a country that sets the world's standard for healthy life expectancy and provides its people with universal health insurance, also exhibits striking health inequities between and within cities. Figure 4 visualizes how health outcomes vary at the ward and municipal subdivision levels of the Greater Tokyo Area using the UHI based on age-adjusted, cause-specific mortality rates (32). Here, a higher UHI value represents worse outcomes (higher mortality), and mortality is highest in some older parts of the urban core (the far east/right end of the map), lowest in the newer downtown parts and adjacent areas (middle section) and then higher again in the peripheral areas furthest away from the urban core. Using longitudinal data, it can also show differences between areas with improving or worsening health outcomes, and where health gaps are narrowing or widening.
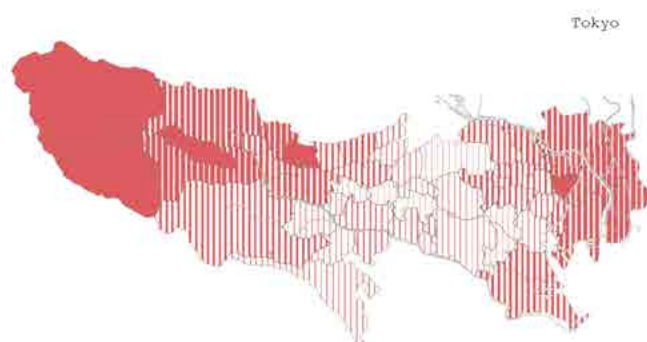
A separate comparative study of mortality in the 10 largest cities in Japan during 2003–2007 found that the average total mortality (as expressed by five-year cumulative standardized mortality ratios) among the cities was about the same as the national average. However, levels of mortality varied widely both between and within the cities (33). A comparison of the two largest cities, Tokyo and Osaka, revealed that over half of the 23 wards that form the urban core of Tokyo have lower levels of mortality than the national average; in contrast, only one of the 24 wards in Osaka had lower levels of mortality than the national average. The range in ward-level mortality was also much wider in Osaka than in Tokyo. These examples illustrate place-based inequalities.

Health inequities are also a major concern for public health in Europe. In the last two decades, the number of studies examining health differentials by geographical area has increased, but intra-urban inequalities in mortality have been less frequently analysed. In 2008, the former London Health Observatory showed that every two stops on the London Underground travelling east from central London represented more than one year of life expectancy lost. In 2012, a researcher at the University College London further expanded this work. The new map, Lives on the Line (10), shows

Figure 4.
Visualization of ward-level UHI values, based on age-adjusted mortality rates in Tokyo

Source: Rothenberg et al. 2014 (32).

VISUAL KEY

Urban Health Index (from 0 to 1)

	0.194 – 0.243
	0.244 – 0.252
	0.253 – 0.276
	0.277 – 0.280
	0.281 – 0.291
	0.292 – 0.323
	0.324 – 0.356
	0.357 – 0.379
	0.380 – 0.389
	*0.390 – 0.601

*WORSE OUTCOMES

Figure 5.

Maps of socioeconomic deprivation and smoothed standardized mortality ratios (sSMR) for men and women at the census tract-level in London

that the range of life expectancy in London is as wide as 20 years. For instance, there is a six-year difference in life expectancy at birth between two consecutive stations on the London Underground, just on opposite sides of the River Thames. The new analysis also showed the link between life expectancy and child poverty, providing further evidence for the well-established association between deprivation and life expectancy.

A more extensive study of European cities supports these findings. The INEQ-CITIES project examined socioeconomic inequalities in mortality by census tracts of 16 European cities. The results for London are shown as an example in Figure 5 *(34)*. Areas with relatively higher rates of mortality for both men and women correspond to those areas that are more deprived, indicated by the clusters of brown areas. Similarly, areas with relatively lower rates of mortality correspond to those areas that are less de-

London (sSMR, female)

London (sSMR, male)

London (Deprivation Index)

VISUAL KEY

smoothed Standardized Mortality Ratios (sSMR) for females

58.3, 84.9
84.9, 91.8
91.8, 96.6
96.6, 102.2
102.2, 108.5
108.5, 118.8
118.8, 173.1 *

* higher value indicates higher sSMR

smoothed Standardized Mortality Ratios (sSMR) for males

48.3, 83.6
83.6, 91.5
91.5, 97.4
97.4, 104.3
104.3, 111.6
111.6, 119.8
119.8, 179.8 *

* higher value indicates higher sSMR

Deprivation Index

1.27, 5.38
5.38, 6.49
6.49, 7.48
7.48, 8.19
8.19, 9.39
9.39, 10.57
10.57, 15.02 *

* higher value indicates greater deprivation

prived, indicated by the clusters of blue areas.

There was a consistent pattern of inequality in total mortality in almost all cities, with mortality increasing in parallel with socioeconomic deprivation. Socioeconomic inequalities in mortality were more pronounced for men than for women, and relative inequalities were greater in eastern and northern European cities.

What makes people vulnerable in cities? The health inequities seen in cities are linked to many factors – social, demographic, economic or geographic – and these factors can interact to create compound vulnerability.

POVERTY AS A PREVAILING VULNERABILITY

The urban poor are a central concern of this report, and the effect of poverty and deprivation on urban health inequity has already been shown from different perspectives. Many of the analyses presented in this report highlight the gap between the poorest and the wealthiest urban residents based on a measure of wealth that is broader than an income measure. Other analyses show an incremental, almost dose-response relationship, between wealth and health determinants and outcomes that affect the entire spectrum of the population. More sophisticated measures of social deprivation are also used to show how it relates to differential outcomes in health.

Poverty profoundly affects all aspects of the daily conditions where people live, work, learn and play – those essential determinants and enablers of health. Poverty and the social exclusion that often comes along with it are extremely detrimental to people's health. They increase people's exposure to health hazards, deprive them of the capacities, resources and opportunities to achieve good health, and often trap them in a cycle of poverty for generations. The effects of poverty in a community are not only restricted to the poor, they also have wide-ranging impacts on the social, physical and economic well-being of the entire community.

In the following discussion about other common social stratifiers linked to health inequity, it must be recognized that to be among the urban poor is an overriding vulnerability in itself that is often compounded by other factors, such as gender, age, migration status and place of habitation.

Source: WHO/Anna Kari

GENDER-BASED HEALTH DISADVANTAGES

Women and girls are among the most vulnerable members of society, for both biological and social reasons. Some gender-based differences in health outcomes (e.g. breast cancer incidence) are strongly determined biologically. However, several kinds of gender-based health inequalities are strongly influenced by social factors.

A study of urban poor communities living in informal settlements in Nairobi, Kenya, found that almost three quarters of adult deaths in 2003–2012 were attributable to HIV/AIDS, TB, injuries and cardiovascular disease (CVD), but there were clear differences by gender. There were twice as many deaths due to HIV/AIDS among women than among men, and CVD deaths were also higher among women (35). Many of the known determinants of HIV/AIDS and CVD are modifiable, some more easily than others are. Unfair access to resources, such as education, formal employment, money, health care and preventive measures, as well as unfair distribution of power between genders, can contribute to the relative vulnerability of women.

By contrast, injury deaths were four times more likely among men than women in the Nairobi study. While women in slums are generally at greater risk of physical and sexual violence, men are more likely to be involved in armed conflicts and gang-related violence leading to death. The poor infrastructure and weak law enforcement in informal settlements contribute to higher levels of homicides and violence.

Given the effects of gender on health risks and outcomes, gender-based approaches to address health inequity can produce benefits in all contexts. An example is the Self Employed Women's Association (SEWA) in Ahmadabad, India, a women's organization with more than 1.8 million national and international members. Since the overwhelming majority of these women are poor and self-employed in the informal sector, the main objective of SEWA is to help them develop their social and economic empowerment.

SEWA members realized that their earning capacity depended on their health and the health of their family. Affordable health insurance, health awareness, immunization and training of midwives have been part of the strategy to improve their health status. Trained members provide all of these basic health-care services at families' doorsteps. These activities have contributed to substantial declines in incidence of illness and reductions in monthly health expenditures. SEWA illustrates how even some of the most disadvantaged women in society can be empowered to overcome their challenges and produce positive health outcomes for themselves and their families, and reduce health inequities.

OLDER AGE: A VULNERABILITY IN CITIES THAT FAIL TO PLAN FOR DEMOGRAPHIC CHANGE

Attention to the vulnerabilities of different age groups is essential to ensure health for all people throughout the life course. Global health initiatives have historically had a strong focus on maternal and child health, while the needs of older adults have received relatively less attention. There is growing global concern about the welfare of older adults, especially in cities. Population ageing is considered one of the two global demographic transitions of the 21st century, alongside urbanization. It affects the more developed regions of the world first, where fertility is lower and life expectancy is longer, but a rapid increase in the older population is expected in less developed countries in coming years. In developed countries, population ageing typically begins in rural areas due to the drain of young people who leave for the city in pursuit of better opportunities though now it is affecting many urban areas in high-income countries and increasingly in LMICs.

Cities are generally designed with a relatively young, healthy and actively working population in mind. In these settings, older age can easily become a vulnerability factor. For example, Japan's "new towns" were projects of the 1960s and 1970s in suburban areas that accommodated a massive influx of people into metropolitan areas. The people who moved to these new town settlements during their working years are now 65 years or older, and constitute the majority of residents in many such places. The new towns were designed for the convenience of private automobiles, which makes it extremely difficult today to provide efficient access to public services for older people, especially once they are no longer able to drive (36).

Careful planning can prospectively address these vulnerabilities. Beyond improving physical accessibility to essential urban services and facilities, it is important to create urban communities that are inclusive of older people as well as people of other generations. Such an approach is embodied in the WHO Global Network of Age-friendly Cities and Communities, discussed later in this report. It is not only important to ensure that older people as a whole are included in society, but also to pay attention to any possible subgroups of older people that may be disadvantaged or even marginalized. A pioneering initiative in Japan called the Japan Gerontological Evalua-

Source: WHO/Anna Kari

Reduce health inequity for sustainable development
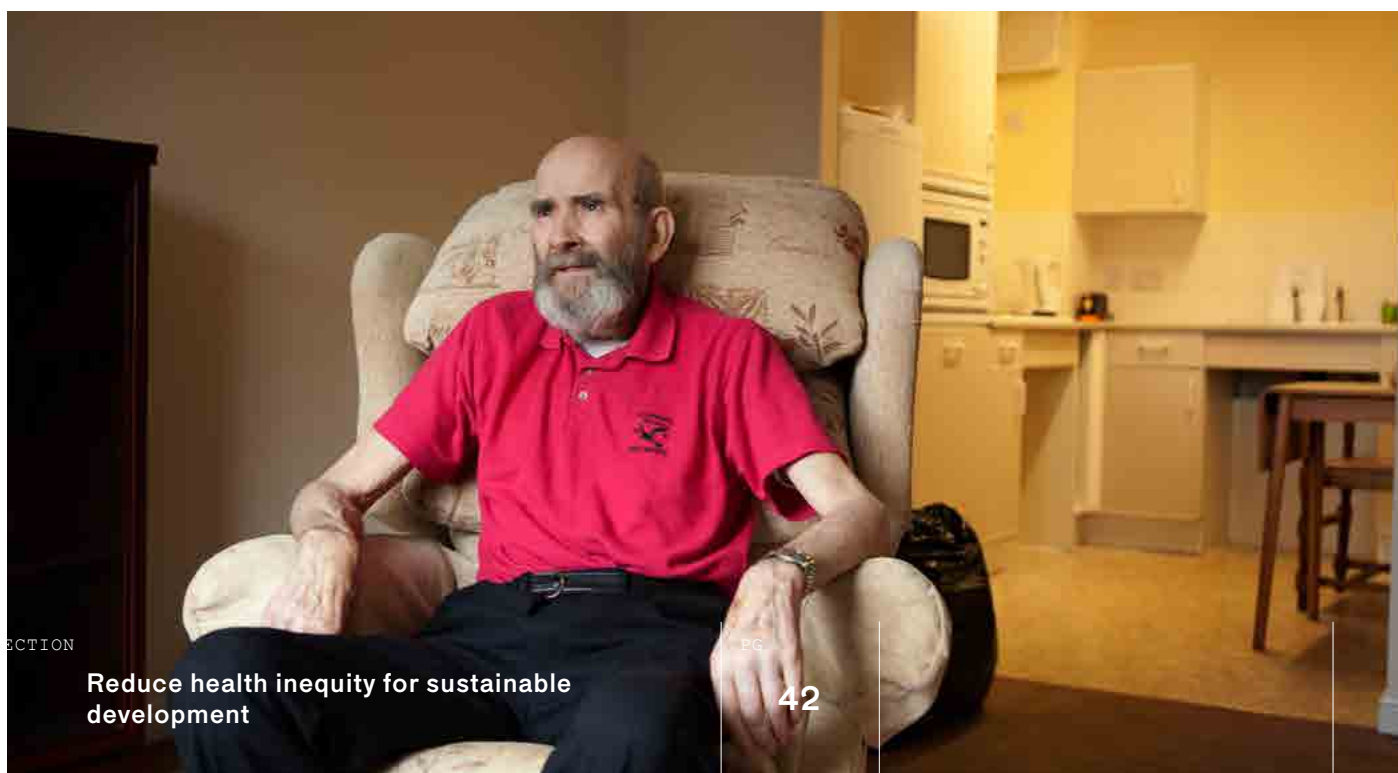
tion Study (*JAGES*) has been collecting longitudinal data on over 100 000 older people residing in 30 municipalities across the country to examine health inequalities at the local government level and at a small area (e.g. ward, school district) level. This research, while not exclusively focused on urban areas, has generated valuable evidence of socially modifiable differences in health determinants, risks and outcomes among older people (*37*). It has also identified a number of effective and equitable community-based prevention interventions that local governments can implement to increase opportunities for older people to maintain their functions and enjoy a good quality of life (*38*).

PLACES WHERE PEOPLE LIVE WITHIN CITIES CLOSELY TIED TO OPPORTUNITIES FOR GOOD HEALTH

The places where people live within cities can create inequities when the social benefits of urbanization are not widely extended. The location of health-care facilities, for example, may favour areas where private or employee-funded insurance cover most people rather than those where people are uninsured or relying on public programmes. As cities grow outward, outlying neighbourhoods – the peripheries of urban expansion – are particularly vulnerable, especially in cases where there is unplanned growth of informal settlements.

People can be vulnerable even at the metropolitan core; for example, in the USA, the urban core has a higher poverty rate than in the suburbs. The heavy urban core population losses of the 1960s through the 1980s are generally no longer occurring. Yet, between 2000 and 2010, more than 80% of the population growth in the urban cores was below the poverty line (*39*).

Place-based inequalities arise from a combination of factors. Population redistribution – for example, rural–urban migration – can shift and sort the population with regard to advantage and disadvantage. Inequalities are also often linked to political, class or ethnic divisions, and cause some groups to be socially excluded and deprived. In many urban areas, those at most risk remain invisible, subject to heightened risk from diseases and with the least access to health care and healthy living conditions. Even when they do have access to the things they need, such as schools, health care and food, they may be of poor quality. Coupled with these challenges often comes a sense of distrust of government and experiences of discrimination and marginalization, that is, a breakdown of social capital. Policies can surely play a role. This may result from the absence of appropriate policy in the face of demographic and health trends as well as explicit policies that have unintended deleterious consequences, or policies that are perhaps invoked to favour one group or condition over another.

Policies to formalize residential areas, or not, can have grave impacts. Since 2008, researchers in Burkina Faso have been following the status of 80 000 individuals living in five neighbourhoods in the capital of Ouagadougou through the Urban Health and Demographic Surveillance System (HDSS) observatory (*40*). Longitudinal data are collected and compared between the residents of three informal areas devoid of formal planning zones located on the periphery of the city and the residents of two formal neighbourhoods located nearby.

People living in informal areas tend to be younger, poorer, less educated, further from public services and more often migrants. Despite their disadvantages, the residents of informal areas go to health centres when their children are sick as often

as those who live in formal areas. Still, infant mortality is almost twice as high in the informal settlements, compared to the formal ones, and the risk of child morbidity is also much higher due to deprived living conditions. In addition, older adult residents of informal settlements are less likely to seek health care when they are sick compared to their counterparts living in the formal neighbourhoods. However, they appear to have the advantage of being less affected by chronic conditions and road traffic injuries.

These particular patterns may partly be due to selective in or out migration, but they also reflect the health impacts of the physical and social conditions of places where people live, and the broader impacts of unplanned urban growth.

Understanding the potential impact of location on facilitating or interrupting the intergenerational transmission of health inequities is also important. For example, according to a study of more than 5 million families who moved across counties in the USA (41), every extra year a child spends in a better environment (as measured by the outcomes of children already living in that area) improves the outcomes with lasting effects into adulthood. Equal and opposite exposure effects have been found for children whose families moved to worse areas, with some gender differences. When a family with a boy and a girl moves to an area with a high crime rate, the boy's outcomes worsen in proportion to the number of years he grows up there, but the girl's outcomes change much less. Boys have especially poor outcomes in highly segregated areas.

The high housing prices that families often must pay to achieve better outcomes for their children may partially explain the persistence of poverty in large cities in the USA. One approach to addressing this problem is to provide subsidized housing vouchers that enable families to move to better neighbourhoods. Related research (42) showed that the Moving to Opportunity experiment, which randomly assigns families to receive subsidized housing vouchers to move to low-poverty areas, significantly improved long-term outcomes for children who moved at young ages, providing direct support for such policies.

There is also increasing evidence that place-based interventions – multicomponent approaches that often combine environmental, social and policy changes – may be effective in ameliorating spatial or placed-based inequities. See Section 2 for examples of cities planned for people.

BARRIERS TO GOOD HEALTH LIMITING MIGRANTS' POTENTIAL CONTRIBUTION TO CITIES' PROGRESS

In some cities, former migrants have established themselves as long-time members of a multicultural society. In others, a steady flow of new migrants continue to flow in, either internally or internationally. In all cases, to varying extents, the migration of sizable numbers of people with diverse backgrounds challenges the equitable provision of health care and other services in cities that may already be stretched.

In general, most people moving from rural areas to cities do so for economic reasons in search of a better life for themselves and their families, to find employment, education and all the services and benefits that they perceive cities have to offer. Others migrate to escape poverty or intolerable hardships that include natural disasters, wars, civil strife or political oppression. For them, cities offer a place of safety, as well as economic opportunities.
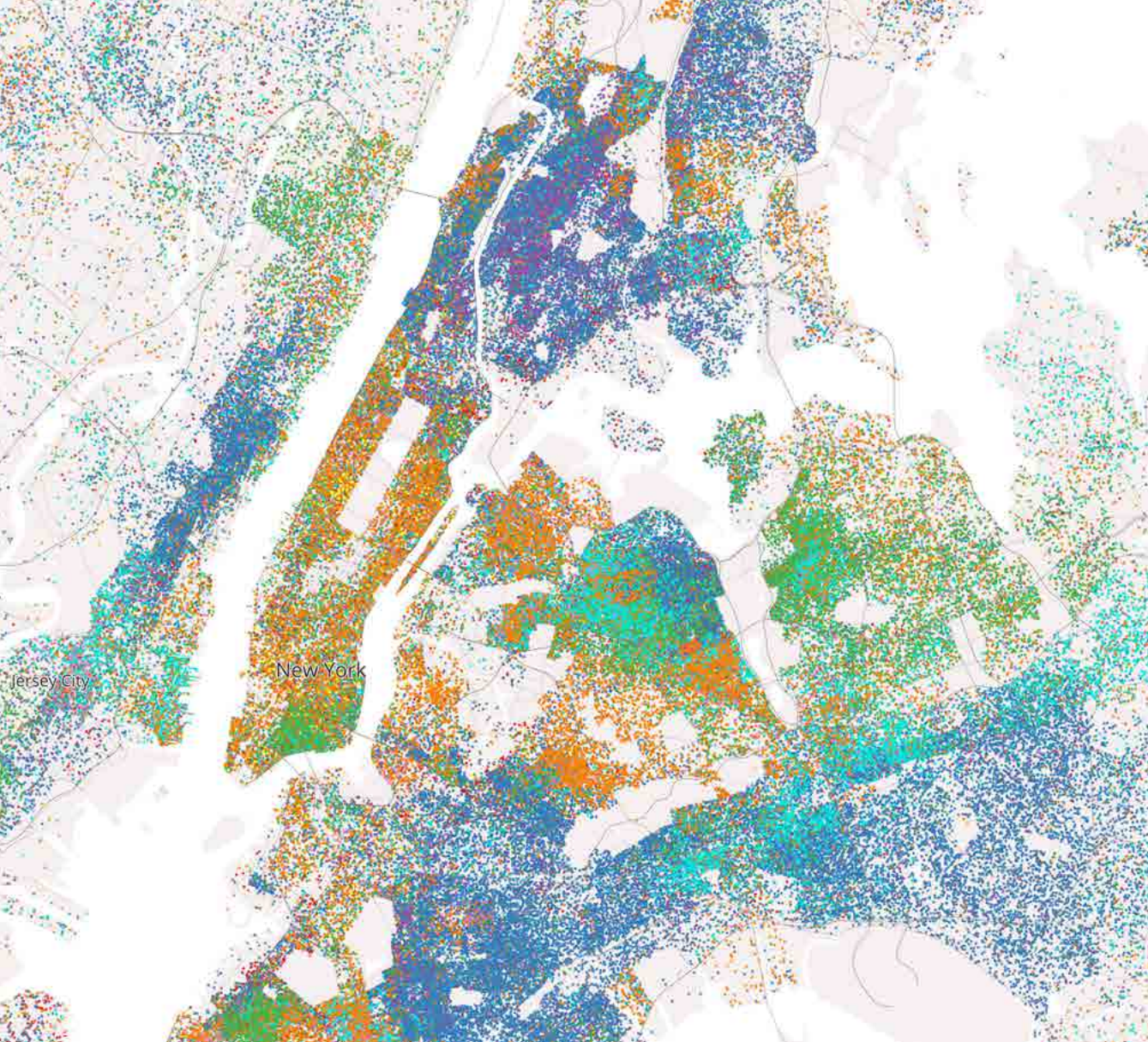
Figure 6.
Dot map showing the concentration of immigrants in New York City by place of origin

Migrants also differ by where they came from, what their lives were like before they migrated and the situations into which they move. These differences lead to different levels of advantage and disadvantage, exposures to health risks and access to health services that should respond to their needs. Migration and mobility are determinants of the health of migrants as well as of non-migrants, both at places of origin and destination *(43)*.

In many situations, migrants are more likely to be exposed to poor living and working conditions because they have no other viable option, they are more willing to accept such conditions or are unaware of their rights or options. In the case of migrant girls, for example, their gender further compounds their vulnerability. In some countries, social barriers keep migrant girls from affordable, quality health services. They are more likely to be out of school and socially isolated, increasing their sexual and reproductive health risks, compared to their non-migrant peers *(44)*. Researchers in China have

Source: WHO/Anna Kari

identified insufficient antenatal care as contributing to the much higher rates of stillbirths among young migrant women than among non-migrants in urban areas (45). Survey data revealed a similar problem in India, where 15–19-year-old migrant girls in both rural and urban areas were less likely to deliver in a medical institution than non-migrants of the same age (44).

Elsewhere, there is evidence that migrant girls face considerable risks of abuse in exploitative work. Migrant adolescent girls may have difficulty responding to violence because of similar types of barriers that prevent them from accessing health services. For instance, harassment was a constant risk for Haitian girls working in domestic labour in a Dominican border town. The girls did not seek institutional protection when they experienced gender-based violence; instead, they went to members of their social networks. They explained that they were unaware of their rights and did not know where to go for safety (44).

Despite their struggles, migrants add to the richness of urban societies and contribute to their progress. Studies in the USA have shown that, in general, migrants have higher rates of upward economic mobility, independent of where they live. Thus, New York City, which has a very large share of immigrants (Figure 6), exhibits unusually high rates of upward mobility (41). Socioeconomic advancements can lead to better health opportunities for both the individual migrant and their families, and can also help create positive neighbourhood effects on health.

The IOM *World migration report 2015: migrants and cities, new partnerships to manage mobility* comprehensively addresses how migration and migrants are shaping cities and, in turn, how the life of migrants is shaped by cities (47). Understanding the drivers behind migration and ways to improve migrant health and welfare is critical to improving quality of life in cities.

The examples listed here by no means cover the full range of health inequities that occur in all urban societies. There are many other factors that may intertwine to cause certain people or places to suffer needlessly from poor opportunities for health. These include, for example, race and ethnicity, social class, and geography (48). The strength of these factors varies by context.

Targeted interventions towards well-defined groups that face unfair disadvantages in achieving good health have merit. They must, however, take into consideration the full range of possible sources of vulnerability rather than focusing on a single factor and be aware of the risk of creating or perpetuating stigmatization. Targeted interventions are often perceived as being more practical, but cities should strive towards comprehensive population approaches to redress health inequities. Approaches to improve urban health equity must fundamentally address the structural roots of poverty and the broader social and environmental determinants of health.

GROWING DEMAND FOR AN URBAN DATA REVOLUTION

The increasing global ambition to reach the most marginalized people and eradicate extreme poverty means that more information for the disadvantaged groups is needed. Now that equity clearly features on the new global agenda for both health and development, there will be a greater demand than ever for accountability. City and local governments are not exempt, as urban residents comprise the majority of global citizens and, as such,

equity in urban areas has strong implications for equity at the global and national levels. This emphasizes the need for better urban data – especially at the local level. While national and international initiatives often have the impulse to standardize, compare and scale up, local information is extremely important when trying to determine how to deal with local problems in local ways. The expected new indicators for SDG Targets, notably for SDG11 and 3, will require such data.

Despite the best efforts of international agencies, government officials and researchers using the latest technologies and tools, there are still enormous data gaps worldwide. Knowing how many people are born or have died, and from which causes, is vital information about a population, and yet many countries do not have a well-functioning health information system. Even when they do exist, data about entire groups of people, often those most deprived, are missing. This is the highest form of inequity, and one of the most profound forms of exclusion that is as true for cities as it is for countries. The absence or shortage of urban health data, and the lack of capacity to produce and use data, are a major handicap in advancing science, developing policies and monitoring and evaluating programmes to address urban health equity.

Many city, national and international organizations are calling for an urban data revolution that informs local action and draws on the knowledge and capacity of the urban poor as collectors and users of information.

In 2015, the United Nations Secretary-General Independent Expert Advisory Group on a Data Revolution for Sustainable Development produced the report *A world that counts: mobilising the data revolution for sustainable development (49)*. It highlights the challenge of invisibility and inequality in the current state of data and urges governments and the United Nations to take advantage of an unprecedented opportunity to close key gaps in coverage, access and use of data in working towards sustainable development.

Some political leaders may prefer to leave the masses nameless, however, counting everyone is a step in the acknowledgement of human worth. The many who have been toiling with this issue for years have laid the groundwork.

Semi-structured interviews conducted with over 100 policy-makers, data producers and data consumers in Ethiopia, Ghana, Senegal and Uganda led to one conclusion, that the demand for data is indeed increasing (50). The drivers of this demand include international influences such as requirements for monitoring progress towards targets and results-based budgeting. At the same time, internal demand is viewed as essential to sustain better quality data, access and use. Such internal demands for data have been catalysed by moves towards decentralization and democratization. If central governments lack useful data at the subnational level, then they are prone to making decisions without taking into account the real needs at lower levels. Without access to good disaggregated data, the larger goals for health, as well as democratization and decentralization are unlikely to be met.

This report advocates strongly for greater investment by cities in comprehensive data gathering. Enhancing the availability and quality of data, including technological improvements for geocoding and analysis as well as developing the capacity to use the data *at the local level*, are key requirements for improving urban health outcomes and equity. Data can be a resource for innovation that will power sustainable development. It can also provide governments with the tools to provide better service for more people with less money, especially if they can demonstrate the health benefits resulting from action in different sectors or the co-benefits generated from coordinated action across multiple sectors.

Several research initiatives and institutions have already set good examples of how to improve data production and analytical capacities to inform urban health and development policies, even in low-resource settings. As mentioned in the introduction to this report, the WHO Urban Health Equity Assessment and Response Tool (Urban HEART) has been used in over 100 cities in 53 countries, mostly LMICs, since its introduction in 2010. The tool has enabled national and local governments to gather evidence of urban health inequalities, or identify the absence of such data, and devise actions to address those problems. UN-Habitat's Urban Data provide free and open access to urban data for countries and cities around the world. A few other examples of international initiatives or institutions in LMICs that generate urban-level data include the Urban Reproductive Health Initiative in India, Kenya, Nigeria and Senegal (52); the Urban Health and Demographic Surveillance Sites managed by the International Network for the Demographic Evaluation of Populations and Their Health (INDEPTH) (53), a global network spanning Africa, Asia and Oceania; the African Population and Health Research Centre (APHRC) (54); and the African Food Security Urban Network (55).

A number of new funding initiatives have been established in recognition of the critical need to address the data issue both nationally and locally. WHO and the World Bank, with input from several agencies and countries, have developed a Global Civil Registration and Vital Statistics Scaling Up Investment Plan (56) with the goal of universal civil registration by 2030. Bloomberg Philanthropies, in partnership with the Australian government, launched Data for Health (57), a US$ 100 million initiative that will enable 20 LMICs to vastly improve public health data collection and its use. Bloomberg Philanthropies will spend an additional US$ 42 million for a new What Works Cities Initiative (58), which is specifically aimed at 100 mid-size cities with between 100 000

and 1 million residents, to make better use of data and evidence in their policy-making.

Whether sampling or census is employed, most investigators would recognize the difficulty of counting everyone. A major group of researchers, policy-makers and public health workers, however, have noted the psychological and social importance of counting everyone *(59,60)*. A first step towards amelioration of social ills, poor health and health inequality is making it clear that everyone matters, everyone counts and nations should, therefore, count everyone.

In the meantime, a number of work-arounds exist to use the data that are available *(61,62)*. These include population censuses, sample registration systems and international surveys. Adjunct methods such as verbal autopsy, modelling based on available data and attempts to "triangulate" based on different data sources have been invoked as well in order to furnish estimates of vital events. Taken together, such methods provide a demographic and health picture that serves many of the needs of planners. However, none fulfils the fundamental mission of accounting for everyone. Cities will remain hidden until we learn who is there and how they live their lives.

WORKING ACROSS SECTORS AND ENGAGING THE COMMUNITY FOR HEALTH EQUITY

Equally important regarding urban health equity is the need to work across different sectors to address the broader determinants of health, and to have an inclusive approach that engages the local community *(63).* Urban health inequities arise as the result of decisions and policies across sectors that determine the distribution of power and resources. Such decisions are influenced by national and global forces, but local governments are

A community health worker conducting a survey in the Korail slum, Bangladesh

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uniquely placed to take action on health inequities at the city level as they have policy control over many of the determinants of health (e.g. transport; land use policy).

Tackling health inequities requires governments to consider the influence on health outcomes of policies and decisions made beyond the health sector, and to work collaboratively across organizational siloes to address the inequitable distribution of the determinants of health. Relying on health sector responses and giving inadequate attention to the risks posed by the environment and wider cross-sectoral policies that affect them places heavy burdens on poor households in particular. The benefits of this collaboration are not just reaped by the health sector, but action across sectors can have multiple co-benefits for those involved. For example, improving nutrition outcomes positively influences not only health, but also educational attainment, employment and productivity.

It is also important for local governments to be reminded that people in cities are not merely passive consumers of information and services, they are also the creators of city life. Local governments need greater competence and willingness to work with the people in their communities, including those typically excluded or marginalized. By doing so, they can gain the granular information they need in order to make real improvements in health equity. Moreover, they can break down barriers of mistrust and empower the people to engage with governments in collective action towards common goals, thus building social capital. The active involvement of affected communities can add force to government sector interventions. It also engenders broad local ownership of key issues and initiatives, which help to ensure the social sustainability of relevant policies and programmes, even under changing political environments.

SUMMARY

Health inequities – the systematic, socially modifiable and unfair differences in health – still persist within urban areas, despite some progress since the first review of the situation in the 2010 global report on urban health. New evidence shows that health inequities affect both high- and low-income countries alike and, in some cases, health outcomes are even worse in urban areas than in rural areas.

Social, demographic, economic and geographic factors interact to create complex vulnerabilities in urban settings that affect health risk exposure, health behaviours, access to health care and health outcomes. It is essential to reduce such vulnerabilities and inequities in health as a matter of justice as well as to ensure the future sustainability of cities.

Actions to address urban health equity must fundamentally address the structural causes of poverty and the broader social and environmental determinants of health found in the daily conditions in which people live, work, learn and play. These actions need to be informed and guided by better urban-level data, which counts everyone and thus reveals detailed patterns of variance in health in cities. In addition, these must be a whole-of-society effort, where different sectors of government and society act in unison to tackle health inequity, with the engagement of the affected communities as a key principle. Concrete examples of how some of these actions are implemented at the local level illustrate the feasibility of action and its potential impact on creating fairer and more sustainable urban societies from a health perspective.

CHAPTER 2 — ADVANCE UNIVERSAL HEALTH COVERAGE IN CITIES

KEY MESSAGE • Greater attention to the health needs of the urban poor is essential to move towards universal health coverage.

Currently, at least 400 million women, men and children around the world are excluded from what is a basic human right: access to affordable health care (*64*). They either have little access or no access to health services and have inadequate health insurance or none at all. UHC is a major step towards reducing inequity in access to health care. Simply stated, the goal of UHC is to ensure that all people and communities obtain the quality health services they need without financial hardship.

Most of the excluded are living in low-income countries and large numbers are trapped in urban poverty. Greater attention to their health is essential to achieving real progress on UHC. The challenges for health systems are huge, faced as they are with the double burden among urban populations of infectious diseases and, increasingly, the spread of chronic NCDs in cities.

While the challenges are daunting, there are reasons for optimism going forward. The global movement towards UHC is a major opportunity. National and local governments, civil society, academia and international organizations have started working together to adapt solutions from successful countries. This has led to a global conviction on the prime importance of UHC in improving equity.

UHC is also a critical component of the SDGs, which include a specific health goal: Ensure healthy lives and promote well-being for all at all ages. Within this health goal, a specific target for UHC is proposed:

> Achieve UHC, including financial risk protection, access to quality essential health care services and access to safe, effective, quality and affordable essential medicines and vaccines for all (*1*).

In this context, the opportunity exists to unite global health and the fight against poverty through action that focuses on clear goals. The questions this chapter attempts to answer are how UHC can be adapted to different contexts to improve equity and ensure affordable and accessible high-quality health care for all and what is the role of cities in doing so.

Cambodia: Improving hospitals and healthcare helps save lives

Source: by Chhor Sokunthea / World Bank is licensed under CC BY 2.0, https://creativecommons.org/licenses/by/2.0/legalcode

Mother comforts baby

THE HALLMARK OF URBAN COMMITMENT

The focus on UHC as part of the SDG agenda has much to offer. First, it provides a platform for an integrated approach within the health sector. Second, the SDGs and UHC are intrinsically about improving equity. Using UHC as a common monitoring platform ensures a continuous focus on health equity. Third, the health goal is closely linked to many of the other social, economic and environmental SDGs.

UHC has a direct impact on a population's health, enabling people to be more productive and active contributors to their families and communities, which is also an economic bonus for the cities they live in. It also ensures that children can go to school and learn. At the same time, financial risk protection prevents people from being pushed into poverty when they have to pay for health services out of their own pockets. UHC is thus a critical component of sustainable development and poverty reduction, and a key element of any effort to reduce social inequities.

For UHC to be achievable it is important that a strong, efficient, well-run health system exists that meets priority health needs. In addition, the challenges in achieving UHC require recognition of the critical role played by all sectors in assuring human health, including transport, education and urban planning, among others (65).

One of the aims of this report is to show city leaders what they can do to make UHC a reality. Perhaps one of the biggest difficulties for cities in terms of progress on UHC is the growth and heterogeneity of urban populations, their different social, cultural and economic circumstances and backgrounds, and specific subpopulations that are disadvantaged. In some cities, many people are located in slums or informal settlements that city administrations often do not count. Many live in dire circumstances that exclude them from the urban development around them. They often represent the invisible or hard-to-reach populations within a city, who need to be reached most urgently.

UNIVERSAL HEALTH COVERAGE DASHBOARD FOR URBAN SETTINGS IN COUNTRIES

The Universal Health Coverage Dashboard illustrates urban inequalities in coverage for nine tracer indicators of UHC. Most of these are included in the WHO/World Bank list of illustrative measures of essential services.

The cone shadow model highlights the differences in coverage for the wealthiest and poorest population quintiles living in urban areas, by country. The values for these two sub populations are represented by a black circle and a white circle. Precise values are also given in the text beneath each cone. Inequality is represented by a shadow cast between the two, where the length of the shadow indicates the difference between the two values. Longer shadows indicate greater inequality.

KEY

COVERAGE (%)
FOR THE TOP QUINTILE

DISTANCE BETWEEN THE CIRCLES =
COVERAGE TOP (%) - COVERAGE BOTTOM QUINTILE (%)

COVERAGE (%)
FOR THE BOTTOM QUINTILE

79.1 —— COVERAGE (%) FOR THE TOP QUINTILE
55.8 —— COVERAGE (%) FOR THE BOTTOM QUINTILE
67 —— AVERAGE URBAN COVERAGE (%)

NA —— QUINTILE VALUES NOT AVAILABLE
NA

+ —— THE COUNTRY IS NOT INCLUDED
IN THE INDICATOR'S DATASET
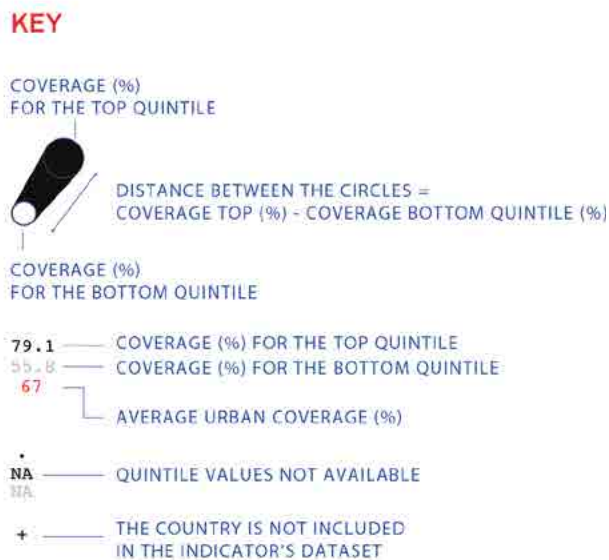
Antenatal care

Skilled birth attendance

HIV Knowledge (men)

HIV Knowledge (women)

DPT3 coverage

Measles coverage

ITN bednets coverage

Improved water

Piped water

Figure 7. Universal Health Coverage Dashboard for Urban Settings in Countries

	Afghanistan	Albania	Argentina	Armenia	Azerbaijan	Bangladesh	Barbados	Belarus	Belize	Benin	Bhutan	Bosnia & Herzegovina	Burkina Faso	Burundi
R1 (top)	51.4	95.4	99.3	97.6	78.2	74.2	100	100	97.8	85.6	90.2	90.9	61	53.5
R1 (red)	37.1	82.3	94.6	97	63	39.8	98.9	100	94.4	70.1	87.4	83.4	45	39.4
R2 (top)	93.4	100	+	100	99.5	82.3	100	100	97.8	98.8	99.5	100	98.3	98.3
R2 (red)	74.3	99.9		99.8	96.6	49.9	98.3	99.9	98.4	91.5	89.4	100	93.9	87.9
R3 (top)	+	97.2	+	73.9	88.4	100	+	87.4	+	80.1	+	89.3	91.2	94.4
R3 (red)		89.5		75.1	56.5	81.3		92.2		78.8		93	92.7	88.8
R4 (top)	38.1	92.6	94	79	51.9	76.6	96.3	92	85.6	78	66.8	33	79.9	92.9
R4 (red)	26.3	86.6	88	72.4	40.5	57.9	94.5	89.3	79.5	73.1	74.5	46.4	82.1	90.7
R5 (top)	49.9	100	+	96.1	84.9	96.7	+	97.8	72.5	76	+	97.5	92.3	90.7
R5 (red)	39.9	99.2		93.7	76.3	95.3		98.5	76.2	68.9		90.3	90.7	91.4
R6 (top)	79.1	100	+	95.7	94.8	94.4	+	94	85.2	88.8	+	94.7	95.1	97.2
R6 (red)	67	97.6		95.4	81	90.7		96.8	86.9	79.1		82.9	90.4	96.1
R7 (top)	+	+	+	+	+	+	+	+	+	73.2	+	+	48.7	68.3
R7 (red)										71.1			46.8	62.8
R8 (top)	96.8	99	99.7	99.8	98	99	100	100	98.9	98.4	100	99.1	99.2	95.7
R8 (red)	82.1	96.8	97.8	98.6	86.4	99.2	99.9	99.9	99.8	83.9	99.3	99.6	94.5	85.8
R9 (top)	58.5	58.2	+	99.8	95.7	76.4	99.5	99.2	3.1	80	99.3	93.2	80.4	92.6
R9 (red)	31.2	70.6		97.4	75.6	36.5	98.8	91.8	24.9	36.2	93	90.6	32.7	45.4

Figure 7. Universal Health Coverage Dashboard for Urban Settings in Countries

Indicator	Cameroon	Central African Republic	Chad	Colombia	Comoros	Congo (Brazzaville)	Costa Rica	Côte d'Ivoire	Cuba	Democratic Republic of the Congo	Dominican Republic	Egypt
Antenatal care	88.8 / 77.2	71.3 / 57.8	62.6 / 46.3	96.2 / 92.3	70.7 / 60.4	94.6 / 85.2	98.6 / 90.9	77.9 / 61.4	+	75.5 / 60.8	99.5 / 96.7	92.5 / 80.8
Skilled birth attendance	97 / 96.7	93.8 / 82.4	84.1 / 59.7	99.5 / 98.1	98.6 / 92.2	99.4 / 98.2	100 / 99.3	95.5 / 84.4	+	98.3 / 94.2	99.7 / 99.2	98.7 / 90.2
HIV Knowledge (men)	84.6 / 80.3	70.1 / 71	71.3 / 68.1	+	89.6 / 88.2	87.6 / 89.2	+	89.9 / 82.4	+	79.5 / 75.3	86.4 / 87.1	+
HIV Knowledge (women)	83 / 76.4	67.9 / 67.9	56.5 / 49.6	82.3 / 82.2	62.1 / 68.7	81.5 / 76.8	92.7 / 85.8	NA / NA	79.5 / 66	65.8 / 64.7	87.8 / 86.1	40.3 / 27.9
DPT3 coverage	87.7 / 80.3	60.6 / 51.4	31.8 / 27.5	90.7 / 89.9	74.1 / 70.6	70.3 / 68.7	92.5 / 87.1	81.7 / 71.6	NA / 98.6	88.7 / 76.6	96.2 / 89.9	99.7 / 99.1
Measles coverage	93 / 83.7	81.5 / 75.9	67.5 / 54.8	91.9 / 91.5	85.6 / 78.4	91 / 86.7	88.1 / 84.6	85.6 / 76.8	NA / 94.4	95 / 83.7	97.7 / 95.6	99.4 / 99.1
ITN bednets coverage	31.9 / 24.8	43.3 / 41.3	45.9 / 29.3	+	37.4 / 38.3	19.6 / 23.4	+	24.6 / 32.4	+	59.3 / 55.7	+	+
Improved water	98.5 / 89.6	97.2 / 85.5	97.6 / 84.4	99.8 / 98.1	94.1 / 94.8	87.9 / 92.9	100 / 99.9	99 / 92.2	NA / 96.8	96 / 84	94.7 / 88.8	100 / 99.8
Piped water	65.8 / 25.7	9.7 / 3.3	62.7 / 28.2	95.7 / 91.9	68.9 / 58	70.2 / 39	99.9 / 99.4	92.8 / 62.9	NA / 82.4	63.1 / 20.1	0.9 / 7	98.6 / 97.9

Figure 7. Universal Health Coverage Dashboard for Urban Settings in Countries

Country columns (left to right): Ethiopia · The former Yugoslav Republic of Macedonia · Gabon · Gambia · Georgia · Ghana · Guinea · Guinea-Bissau · Guyana · Haiti · Honduras · India · Indonesia · Iraq

	Ethiopia	Macedonia	Gabon	Gambia	Georgia	Ghana	Guinea	Guinea-Bissau	Guyana	Haiti	Honduras	India	Indonesia	Iraq
Row 1 (top)	76.6	99.4	89.7	+	+	98.2	89.1	+	97.2	89.8	95.8	88.8	97.8	67.2
Row 1 (bottom, red)	46.3	98.1	82.2			94.2	78		94.8	77.1	91.5	62.7	93.3	56.9
Row 2 (top)	91	100	95.2	95.7	97.9	100	95.5	88.3	98.2	83.8	98.2	95.1	97.6	96.1
Row 2 (bottom, red)	51.6	98.3	93.6	83	98.9	88.2	83.9	68.7	98.2	59.6	94.4	73.5	92.4	93.9
Row 3 (top)	94.6	+	92.4	+	+	72.7	86.7	+	99	90.4	86.1	90.5	70	+
Row 3 (bottom, red)	88.6		90			80.9	84.9		91.2	89.4	85.3	82.9	64.4	
Row 4 (top)	81.7	84.6	84.3	82.9	65.8	84.4	79.4	75	94.4	86.8	76.4	76.5	55.1	29.8
Row 4 (bottom, red)	79.6	74.7	83.4	81.6	61	79.6	76.9	73.3	91.3	86.9	76.3	56.7	50.7	21.2
Row 5 (top)	85.9	94.5	52.8	79.2	75.5	93.6	59.2	77	79.9	72.4	95.1	87.3	84	83.8
Row 5 (bottom, red)	55.8	94	47.1	80.3	69.4	92	58.2	69.2	89.2	67.6	94.8	68.3	76.6	77.1
Row 6 (top)	94.4	92.2	77.5	89.9	74.5	97.9	86.2	90.3	86.3	73.2	96.3	93.2	91.7	90.1
Row 6 (bottom, red)	76.1	93.4	79.2	90.4	73	94.6	78.9	84.7	86.1	72.2	94.4	74.2	85.1	85.2
Row 7 (top)	3.6	+	29.1	+	+	24	19.8	+	10.3	30.4	+	+	+	+
Row 7 (bottom, red)	4.1		41.3			29.9	25.3		12	22.4				
Row 8 (top)	99.2	100	97.1	98.7	100	78.3	97.5	94.4	99.8	94.5	99.8	98	76.2	99.4
Row 8 (bottom, red)	92.9	100	97	91.3	98.7	82.2	94.3	82.4	98.2	87.4	97.7	95.2	65.9	97.7
Row 9 (top)	94	83.7	93.8	96.9	100	28.9	78.3	62.8	10.5	10.2	10	78.4	17.1	76.3
Row 9 (bottom, red)	46.8	91.5	71.9	51.5	89.7	17.1	42.8	29.7	30	7.4	18.9	50.6	16.3	69.3

Note: ITN, insecticide treated mosquito net
Source: Global Health Observatory 2015 (21).

Figure 7. Universal Health Coverage Dashboard for Urban Settings in Countries

	Jamaica	Jordan	Kazakhstan	Kenya	Kyrgyzstan	Lao People's Democratic Republic	Lesotho	Liberia	Madagascar	Malawi	Maldives	Mali
Antenatal care	98.7 / 92.8	98 / 94.7	97 / 97.4	71.4 / 61.8	98.6 / 95.1	91.9 / 69.8	88 / 84.4	90.2 / 85.5	89.5 / 70.8	62.2 / 49	98.8 / 97.8	83.8 / 67.3
Skilled birth attendance	100 / 99.8	99.6 / 99.6	100 / 99.7	85.6 / 74.9	99.8 / 100	97.3 / 79.6	96.5 / 90.9	88 / 72.7	96.9 / 81.6	94.9 / 85.4	98.9 / 99.2	95.7 / 92.4
HIV Knowledge (men)	+	+	78.1 / 84.2	93.3 / 86	78.6 / 56.6	93.4 / 89.6	98.6 / 88	78.7 / 70	87.6 / 88.6	69.2 / 73.1	100 / 100	80.7 / 79.6
HIV Knowledge (women)	0 / 0	76.3 / 56.1	81.6 / 79	86.2 / 76.7	62.6 / 61.8	91.5 / 87.4	90.6 / 87.9	81.8 / 75.8	79.4 / 84.8	75.8 / 76.5	82.8 / 81.1	72.1 / 71.4
DPT3 coverage	84.2 / 89.4	99.2 / 98.9	95.8 / 96.3	87.8 / 84.1	71.6 / 82	77.3 / 67.7	91.8 / 83.9	78.5 / 73.1	95.1 / 88.3	93.6 / 92.3	97.2 / 96.4	78.8 / 76.8
Measles coverage	87.3 / 92.8	97.7 / 97.4	96.2 / 93.4	93.6 / 92.3	98.1 / 96.2	87.9 / 77.5	91.9 / 89.1	88.1 / 80.6	95.4 / 88.7	98.9 / 96.4	93.7 / 95	88.9 / 85.3
ITN bednets coverage	+	+	+	58.7 / 63.3	+	13 / 32.8	+	29.6 / 38.5	61.2 / 56.8	62 / 49.2	+	68.9 / 70.4
Improved water	99.2 / 99.1	41.5 / 57.1	99.8 / 99.1	98.7 / 91.1	100 / 94.5	93.4 / 81.7	98.9 / 90.4	77.7 / 81	99.4 / 87.6	99.8 / 91.9	98.7 / 98.9	98.9 / 93.4
Piped water	81.8 / 85.6	37.7 / 52.3	96.8 / 84.9	89.4 / 55.4	100 / 85.8	14.5 / 16.4	92.8 / 58.6	4.8 / 1.9	65.2 / 20.5	89 / 32.4	39.2 / 56.7	75.1 / 34.7

	Mauritania	Mongolia	Montenegro	Mozambique	Namibia	Nepal	Niger	Nigeria	Pakistan	Peru	Plurinational State of Bolivia	Philippines	Republic of Moldova	Rwanda
1	+	98.4 / 96.1	+	73.4 / 60.8	90.2 / 83.5	90.4 / 71.6	65.2 / 46.5	93.5 / 76	82.6 / 61.3	99.2 / 95.9	92.5 / 81.6	94.7 / 87.4	100 / 95.4	59.9 / 40.5
2	94 / 90.1	100 / 99.4	100 / 99.5	92 / 80.3	98.4 / 94.9	95.8 / 74.4	95 / 83	91.3 / 68.2	92.2 / 71	99.4 / 96	98.9 / 88.3	96.2 / 83.2	100 / 99.5	98.7 / 82.4
3	72.4 / 65.6	93.4 / 85.5	+	83.8 / 84.9	93.2 / 90.9	91.2 / 89.5	79.7 / 75.2	76.9 / 78.3	16.9 / 41.3	72.8 / 63	91.7 / 85.2	67.3 / 65.8	95.6 / 89.3	93.7 / 93.6
4	44.4 / 34.9	90 / 84.8	91.1 / 87	80 / 67.6	89.9 / 89.4	91.6 / 86.8	71.1 / 63	70.1 / 64.7	50.4 / 26.8	78.4 / 76.9	82 / 76	53.6 / 51.8	89.1 / 86.4	94.3 / 94
5	55.7 / 45.9	92 / 92	92.3 / 90.9	87.4 / 86.4	71.3 / 74.3	96.1 / 93.1	88.6 / 83.7	85.5 / 62.1	84 / 75.8	81.2 / 78.8	89.6 / 85.3	92.8 / 87.9	78 / 71.3	98.4 / 97.7
6	81.9 / 74.4	91.6 / 89.1	82.8 / 79.8	97 / 93.1	90.8 / 91.1	97.8 / 92.1	90 / 81.5	86 / 64.3	88 / 78.3	89.5 / 86.5	87 / 85.3	93.1 / 89	79.8 / 84.1	98.7 / 97.9
7	+	+	+	44 / 43.6	3.4 / 5.3	+	33.1 / 37.9	21.3 / 18.4	0.1 / 0.7	+	+	+	+	82.4 / 76.5
8	60.5 / 48.5	99.9 / 69.2	100 / 99.9	96.5 / 84.2	98.3 / 97.1	88.4 / 90.3	98.6 / 96.9	68.9 / 75.9	65.2 / 83.9	99.7 / 91.8	99.6 / 94.3	99.9 / 98.5	99.6 / 95.5	96.3 / 88.5
9	56.3 / 31.9	99.3 / 29.8	97.7 / 95.5	93.7 / 36	98.2 / 70.5	65.3 / 40.8	89.3 / 41.3	11.3 / 6.1	48.8 / 49.5	91.6 / 83.8	99.5 / 91.8	16.4 / 31.8	73.9 / 69.6	85.5 / 26.9

Note: ITN, insecticide treated mosquito net
Source: Global Health Observatory 2015 (21).

Figure 7. Universal Health Coverage Dashboard for Urban Settings in Countries

	Saint Lucia	Sao Tome and Principe	Senegal	Serbia	Sierra Leone	Somalia	State of Palestine	Sudan	Suriname	Swaziland	Syrian Arab Republic	Tajikistan
Antenatal care	72.4 / 84.8	93.1 / 81.4	72.5 / 61.4	98.8 / 97.5	94.1 / 90.6	+	96.4 / 94.8	89.3 / 69.4	92.3 / 87.3	82.7 / 80.1	+	+
Skilled birth attendance	100 / 100	96 / 88.7	90.2 / 78	100 / 99.8	88.3 / 78.9	68.5 / 58.4	61.2 / 68.1	100 / 94.5	92.3 / 94.5	88.5 / 89.3	99.5 / 97.6	96.8 / 89.4
HIV Knowledge (men)	+	88 / 83.1	90.3 / 83.4	96.6 / 95.5	85.6 / 80.2	+	+	+	+	92.6 / 92.9	+	+
HIV Knowledge (women)	86 / 87.1	80.7 / 78.5	82.8 / 77	95.8 / 95.4	81 / 76.3	30.3 / 25.4	+	26.7 / 23.4	84.7 / 79.5	92 / 94.5	40.1 / 33.3	38.1 / 24.7
DPT3 coverage	+	92 / 87.4	96.4 / 92.6	93.6 / 93.7	77 / 76	30.8 / 29.3	93.5 / 93	92.1 / 74.9	54 / 51	90 / 91	76.4 / 75.8	63.8 / 52
Measles coverage	+	88.7 / 86.1	92.4 / 88.8	78.5 / 81.6	87.1 / 85.5	58.6 / 43.7	94.6 / 95.9	97.4 / 79.7	77 / 74.6	97.4 / 94.7	90.9 / 85.2	88.9 / 76.7
ITN bednets coverage	+	80.3 / 67.9	29.1 / 42.5	+	35.4 / 41.8	+	+	+	NA / 0	NA / 0.9	+	+
Improved water	100 / 99.7	99.8 / 99.2	93.7 / 88.5	99.6 / 99.8	84.9 / 83.8	90.3 / 58.5	85 / 58.8	96.3 / 66.5	99.8 / 99	97.8 / 91.2	99.8 / 93.5	100 / 93.1
Piped water	62.2 / 70.1	80.5 / 38.8	92.4 / 74.2	77.4 / 84.2	24 / 10.6	83.5 / 38.9	81.1 / 53.5	96.2 / 59.5	95.2 / 80.5	96.7 / 76.1	99.7 / 92.1	100 / 75.9

	Thailand	Timor-Leste	Togo	Tunisia	Uganda	Ukraine	United Republic of Tanzania	Uzbekistan	Vanuatu	Viet Nam	Yemen	Zambia	Zimbabwe
Row 1	+	73.8 / 62.7	87.9 / 71.9	97 / 88.5	72.1 / 58.4	93.4 / 93.2	74.6 / 54.1	86.4 / 89.1	+	94.6 / 82	+	68.7 / 59.7	74.7 / 66.8
Row 2	100 / 99.4	83.2 / 59.1	95.5 / 91.1	99.5 / 99.7	95.6 / 90.3	99.2 / 99.2	96.6 / 82.4	100 / 100	93.6 / 86.8	97.7 / 98.8	88.1 / 61.7	94.1 / 83	91.6 / 86
Row 3	+	69 / 61.9	67.6 / 79.7	+	77.7 / 86.3	91.9 / 92.4	70.6 / 75.7	+	+	+	+	80.6 / 74.7	85.8 / 83.7
Row 4	80.4 / 84.6	53.1 / 47.7	78.2 / 76.4	74 / 65.4	82.7 / 85.4	96.8 / 93.9	76.7 / 76.9	58.5 / 59.8	62.5 / 65.9	39 / 49.9	32.4 / 32.7	73 / 71	82.3 / 80.1
Row 5	92.6 / 90.7	72.1 / 62.7	71.4 / 68.7	95.6 / 94.5	81.5 / 76.1	72 / 69.7	98.1 / 95.7	65.1 / 66	59.3 / 62.9	85.4 / 79.7	72.1 / 60.1	50.7 / 50.7	81.8 / 78.9
Row 6	95.5 / 94.9	81.2 / 71.7	87.5 / 77.7	86.3 / 88.2	91 / 87.5	71.8 / 71.2	98.5 / 95.1	90 / 91.5	53.1 / 57.9	94.8 / 94	85.4 / 78.1	95.6 / 88.9	86.9 / 84.6
Row 7	+	49 / 52.6	44.7 / 50.2	+	55.3 / 50.3	+	65.6 / 64.4	+	+	+	+	35.6 / 30.7	11.9 / 10.8
Row 8	94.8 / 93.9	98.6 / 88.2	91.2 / 87.8	99.6 / 99.5	98 / 89.7	99.6 / 98.5	87.1 / 76.6	100 / 99.9	100 / 97.8	97.3 / 93.3	85.5 / 73.8	97.3 / 82.2	99.2 / 95
Row 9	51.5 / 39.2	49.2 / 38.9	41.4 / 12.8	46.2 / 69.2	78.1 / 28.6	90.3 / 81.6	47.3 / 22.4	99.7 / 86.4	70.2 / 48.6	81 / 53.9	47.7 / 54.2	84.5 / 42.7	78.8 / 71.6

Note: ITN, insecticide treated mosquito net
Source: Global Health Observatory 2015 (21).

While the dashboard provides an opportunity to highlight a wide variety of messages, the following are some of the key findings that are most relevant to this chapter.

→ Median population coverage for some services such as access to an improved water source (93%) and skilled birth attendance (91%) are high in urban areas, globally. Using a threshold of 80% for defining UHC, most people in urban areas have access to these services. However, inequalities in skilled birth attendance are still high in some countries such as Bangladesh, Ethiopia and Timor-Leste, and services would need to be expanded, especially to meet the needs of the worse-off populations.

→ Globally, median access to piped water (51%) in households is still quite low. Relative inequalities in access to piped water are particularly high. Households in the richest quintile are 2.7 times more likely to have access to piped water compared to the poorest 20% households. In Africa, this rate ratio is closer to 17.

→ For seven of the 10 indicators, African countries have the lowest coverage. Asia-Pacific countries have the lowest coverage for having correct knowledge of HIV/AIDS, while LAC countries have the lowest bednet coverage. Coverage is particularly low for contraceptive prevalence (37%) and for access to piped water in households (42%) in Africa. For nine of the 10 indicators, LAC and eastern European countries have the highest coverage. The exception is bednet coverage where Asia-Pacific countries have the highest coverage, though data for this indicator were only collected in malaria-endemic countries.

→ Some countries have particularly low coverage rates (fewer than two in five people are covered) for certain indicators. For example, fewer than one in five women in Benin, Chad, Guinea and Togo reported contraceptive use. In nine countries – Afghanistan, Iraq, Mauritania, Pakistan, Somalia, Sudan, Syrian Arab Republic, Tajikistan and Yemen – fewer than two in five women had correct knowledge of HIV/AIDS. In Afghanistan, Chad and Somalia, fewer than two in five children received DPT 3 immunization.
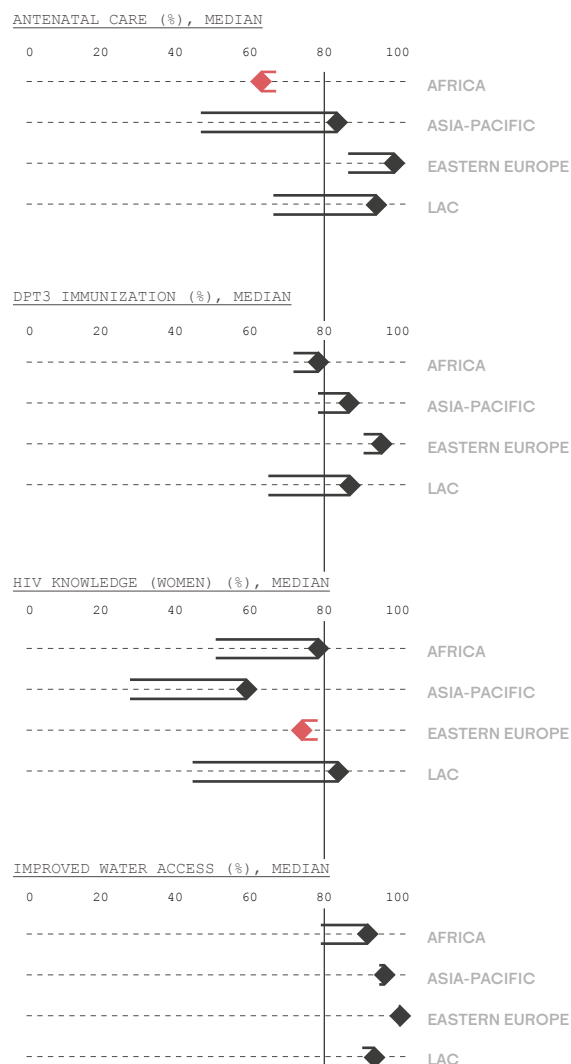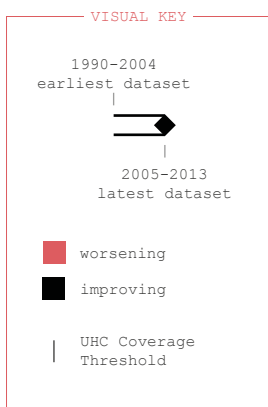

ANTENATAL CARE (%), MEDIAN

DPT3 IMMUNIZATION (%), MEDIAN

HIV KNOWLEDGE (WOMEN) (%), MEDIAN

IMPROVED WATER ACCESS (%), MEDIAN

Figure 8.
Trends in service
coverage, by region
across two time periods

Source: Global Health Observatory
2015 (*21*).

VISUAL KEY

1990-2004
earliest dataset

2005-2013
latest dataset

■ worsening

■ improving

| UHC Coverage
Threshold

Trends in coverage for five of the 10 indicators across four regions are shown in Figure 8. The earliest available dataset from 1990 to 2004 and the latest dataset from 2005 to 2013 are included for urban areas in each country. Only those countries with at least one dataset in each time period were included. This resulted in reducing the number of countries for which trend analysis could be done to 50. The 80% threshold identified by WHO/World Bank to determine universal coverage was used (*66*).

Figure 8 shows that the most rapid increase in coverage was for correct knowledge of HIV/AIDS among women, except in eastern Europe where there was a slight fall for the study countries. The largest increase (+45%) was in the Asia-Pacific; yet, median coverage of this indicator remained low at 59%. Access to antenatal care is another indicator for which there were substantial improvements across all regions, except in Africa. In fact, in Africa, there was a drop in median coverage of antenatal care from 65% to 60% between the two time periods.

In all regions, there was universal access to improved water sources for drinking. In three of the four regions, the exception being Africa, universal coverage had already been achieved in the earlier time period. For DPT 3 immunization, three of the four regions achieved universal coverage in urban areas. Each of the four regions witnessed an increase in coverage over the two time periods.

Caution is needed when interpreting the results. It is possible that in many countries, populations that are not officially registered or counted by the city administration have not been included during the data collection process. This often includes people who have recently migrated into cities. For example, in China, rural to urban migrants cannot easily take advantage of *Hukou*, a system of household registration, which entitles them to access essential public services in cities. Thus, it is likely that the urban coverage of services are overestimated.

OVERCOMING BARRIERS TO ACCESS

In order to progress towards UHC it is important to address the barriers to access and identify solutions that have worked in different contexts. Barriers to access take a variety of forms, as noted in the previous discussion on health inequities. One major barrier is the basic lack of quality health services, but there are other obstacles such as distance to the nearest health facility, restricted opening hours at facilities or overcrowded facilities that impose long waiting times. The cost of the health services may also deter use, especially where direct out-of-pocket payment is involved.

Even while facing such major obstacles, cities and communities have worked to develop solutions to improve access to health services. In Lima, Peru, people living in poverty have been excluded from high-quality health care due to health services that were concentrated around a very small number of central hospitals located far from people without insurance or those relying on Seguro Integral de Salud (SIS), the state insurance programme for the poor. Everyday stressors related to living in poverty made it more difficult for the poor to overcome an illness and stay healthy. Additional illnesses, such as HIV or TB, or managing a home as a single parent can make seeking services seem overwhelming. Even if a diagnosis is reached, these factors can make it difficult to follow through with treatment and long-term care.

Recognizing the problem, Socios En Salud (SES) (Partners in Health),

a non-profit organization, has developed strong community-based networks of care and health services for TB, HIV, mental health and child development in some of Lima's poorest neighbourhoods. Mutual support groups have led to particularly good outcomes in both multidrug-resistant tuberculosis (MDR-TB) and HIV patients (67). More than 10 500 people with MDR-TB have been treated in slums around Peru at a cost-per-case lower than that of countries such as the USA, and with the highest cure rate in the world of 75%, overturning assumptions that treatment of MDR-TB is too expensive and too complicated to succeed in poor communities (68).

National governments, too, can play an important role in addressing the issue at the urban level. For example, India's recently launched National Urban Health Mission aims to improve availability and access to essential primary health care services and reduce out-of-pocket expenses for treatment. It will cover close to 800 cities with a population exceeding 50 000, which includes over 220 million people, including 77.5 million who are considered poor (69).

However, in a country the size of India, the role of civil society and NGOs will be equally important in alleviating critical health issues in slums and disadvantaged areas of cities. For example, the Asha Community Health and Development Society is an NGO that is working to transform the lives of half a million residents in 60 slums across New Delhi (70). Asha (meaning "hope") has worked to create networks of trained community volunteers who provide basic health care to their fellow slum residents. These volunteers educate them on how to keep healthy and on the importance of utilizing services when needed. Asha's multipronged approach includes emphasizing acting on the social determinants of health. Programmes on education, environment, empowerment and financial inclusion supplement and enhance the opportunities for people in slums to lead healthier lives (71).

In Lagos, Nigeria, recommendations from its first urban inequity study in 2011 by the Lagos State Investment Case for Health stressed the need of having integrated service delivery for hard-to-reach and marginalized populations (72). This led to the implementation of a government-led urban slum initiative, with a strong social protection and equity lens. One of the advantages of localized systems strengthening approaches is the potential to engage the community and local providers in solving coverage and access issues. This initiative also engaged traditional birth attendants as community health links to improve service utilization through systematic referrals. Preliminary results of these localized systems strengthening effort, though unpublished, indicated an increased access to maternal and child health, HIV and sanitation services for slum dwellers.

Many low-income countries, which are the least urbanized, are experiencing rapid rates of urbanization. This is leading to high growth of population levels in cities that is putting pressure on local resources to deliver basic services, including health. Nepal is one of the fastest urbanizing countries in South-East Asia. Cities in Nepal are not able to keep up with increased demand for health, education, and environmental and housing needs, thus the urban poor face many adversities. With the changing pattern of diseases and population dynamics, the national government endorsed a new National Urban Health Policy that aims to ensure the delivery of quality essential health-care services to the urban population, particularly to the urban poor, women, children and marginalized groups (73). A related initiative involves a community health centre that provides basic health services and an outreach clinic for one of the biggest squatter slum

settlements in the capital city region. Volunteers and tailoring other services for the slum community lowered access barriers and increased ownership of the clinic by the slum population, leading to increased use of services.

REFORMS AND ACCESS

In 2013, close to half of all countries in the world – across all income levels – were engaged in health reforms that aimed to extend, deepen or improve coverage by providing needed health services, financial protection, or both (74). These reforms have led to a sharp increase in the demand for expertise, evidence and measures of progress and have helped the push to make UHC one of the SDGs. UHC is also the motivation for many of the recent adjustments to health systems and health financing systems in LMICs.
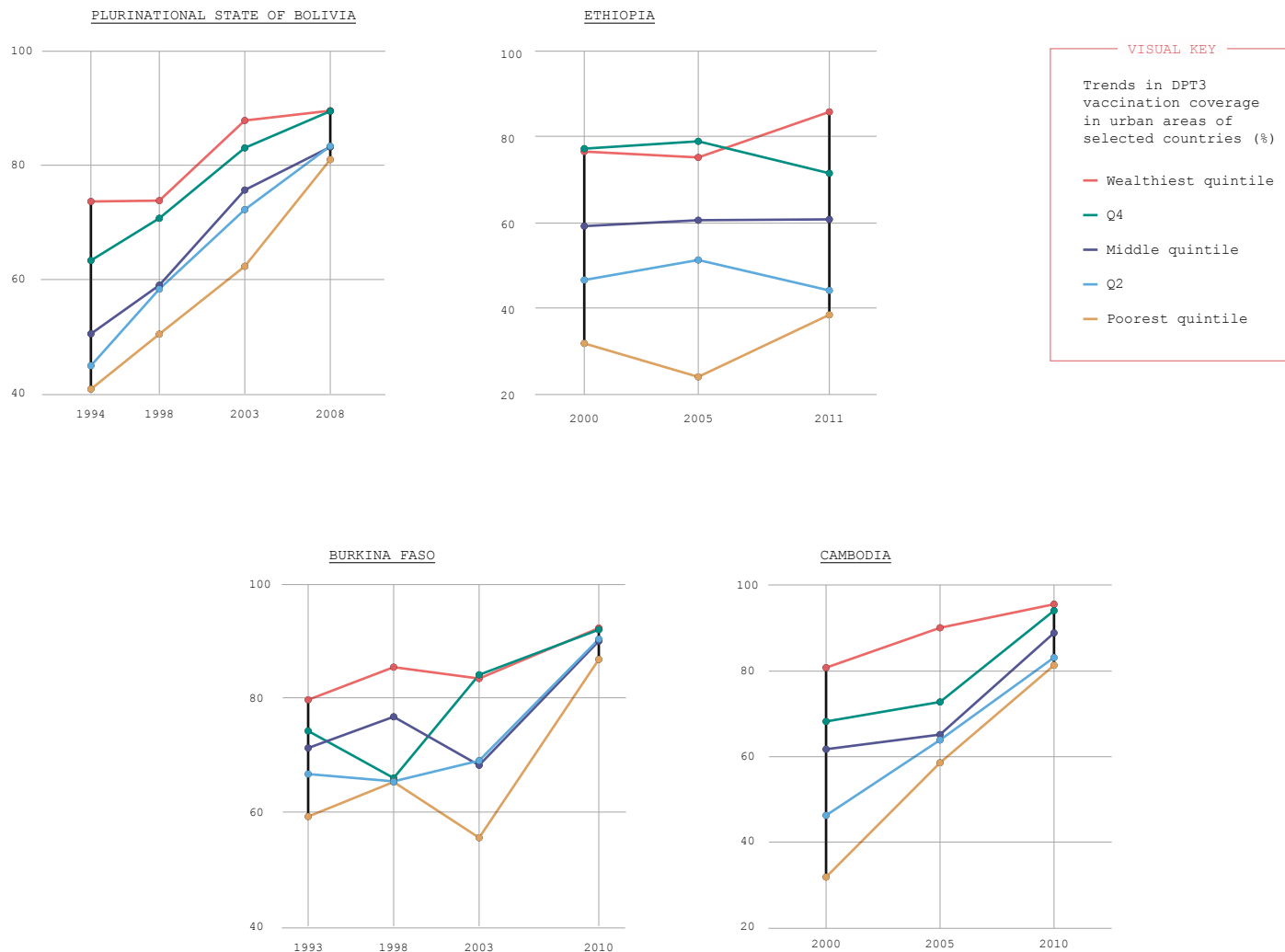
However, those country-level reforms do not always translate into real improvements in access to health services for the people who need them the most. Moreover, a global study of child mortality trends between 1990 and 2009 showed that while many countries made good progress in reducing the mortality rates for children 5 years and under, that heartening momentum masks a troubling fact: those countries have also experienced worsening inequities between their wealthy and poor populations (75). Gender discrimination and low levels of education also remained powerful determinants of inequities. Local governments must take action in addition to or in the absence of efforts at the national level to ensure universal coverage. Policy interventions that have allowed health systems to improve equity include removing financial and social barriers to accessing welfare services, innovations to make supply of critical services more available to the poor and increasing local accountability of the health systems.

ACHIEVING URBAN EQUITY IN DPT3 VACCINATION

Trends in DPT3 vaccination over the past two decades provide a peek into this reality. Importantly, the national and local governments can act together to achieve high levels of coverage, while maintaining a focus on serving the populations most in need of their services.

Figure 9 shows that in Ethiopia DPT3 vaccination coverage in urban areas did not improve over the past decade, and wealth-related inequity remained unchanged. At the same time, there are several cases where both coverage and equity in coverage in urban areas have substantially improved over the same period, as exemplified by Burkina Faso, the Plurinational State of Bolivia and Cambodia.

According to a 2014 UNICEF/WHO report on immunization, in the Plurinational State of Bolivia, DPT3 vaccination coverage was 41% in 1990 (76). In 2002, a collaborative project by the government, WHO and the World Bank launched a new phase with equity as its key priority (76). In a bid to increase coverage, since 1999, a collaborative project between the government, the Pan American Health Organization (PAHO) and the World Bank strengthened the National Expanded Programme on Immunization (EPI) and achieved an increase in coverage. In 2002, a second phase was launched with equity as its key priority. This phase focused on guaranteeing and ensuring universal access to immunization services for all children, with special emphasis given to the population at increased risk of contracting vaccine-preventable diseases.

PLURINATIONAL STATE OF BOLIVIA

ETHIOPIA

BURKINA FASO

CAMBODIA

VISUAL KEY

Trends in DPT3
vaccination coverage
in urban areas of
selected countries (%)

— Wealthiest quintile

— Q4

— Middle quintile

— Q2

— Poorest quintile

Central elements of this initiative were data analysis by district, purposeful engagement of local community leaders, inclusion of vaccination requirements in conditional cash transfers and the use of mobile vaccination brigades to ensure access in hard-to-reach areas (77).

Despite results showing equitable coverage by sex and ethnicity, vaccination coverage was significantly lower in urban areas compared to rural ones. Taking these results into account, the city of La Paz-El Alto, an area with the lowest coverage, conducted operational studies to understand better the causes, which, in turn, informed new strategies aimed at reaching unvaccinated or undervaccinated children in crowded urban areas. By 2013, DPT3 vaccination coverage had increased nationally to 94% (76). If the trends in urban coverage rates in Figure 9 are any indication, it is probable that the equity gap in vaccination coverage at the national level was reduced as well.

**Figure 9.
Trends in DPT3
vaccination coverage in
urban areas of selected
countries**

Note: DPT, diptheria, pertussis and tetanus

Source: Global Health Observatory 2015 (21).

HEALTH FINANCING: OUT OF WHOSE POCKET?

Many people, including those from different ethnic groups, those living in informal settlements and migrants, are also more likely to lack proper health coverage than those who are better off. Many informal settlements are not formally recognized by local authorities and as such do not receive health and other services.

Financing mechanisms exist to help cities advance UHC. Two important mechanisms are: (i) tax financing; and (ii) collecting insurance premiums from only those in salaried employment and pooling them with tax revenues to finance health coverage for the entire population. These financing approaches, compared with alternatives such as voluntary health insurance and social health insurance, prioritize equity and universality. Rather than collecting contributions from people who are too poor to pay, countries that are making the most progress towards UHC have prioritized spending on health from general taxation – either on its own or pooled from payroll taxes and international aid (78).

Cities are uniquely positioned to unmask the differences in health-care coverage and services among their residents and then ensure that those who are most vulnerable get those services. For example, Healthy San Francisco is a health-care access programme for uninsured adults ages 18–64. It offers enrolment in a subsidized system of health care rather than covering uninsured individuals through a health insurance product. A 2011 evaluation suggested that the programme has led to an increased use of primary care services in medical homes and decreases in emergency department visits and potentially avoidable hospitalizations (79).

China is another important example where social health insurance schemes cover most of the population (80). Urban populations benefit from the urban resident-based basic medical insurance scheme, launched in 2007, and the urban employee-based basic medical insurance scheme, launched in 1998. Following guidelines from the national government and implementation plans from provincial governments, funds for the two urban insurance schemes are pooled at the municipal (prefecture) level for local operation. As such, local governments play a key role in progress towards UHC. For example, the municipality of Guangzhou, a mega city in south China, with an urban population of over 15 million, launched programmes in 2009 through which grassroots medical and health service institutions offer free-of-charge basic public health services to both urban and rural residents. In 2015, it integrated urban and rural medical insurance schemes, unified financing and treatment standards across different subpopulations and raised the government funding ratio to 70%. The services are now available without any charge, including to those with household registration and migrants without household registration, but with permanent residency.

Box 4.	Financing care in low-resource settings

In many countries in West Africa, community-based health insurance schemes have been initiated to try to close utilization gaps. Mutual health organizations, often called mutuelles, provide health insurance services to their members, and are typically financed and managed by the communities they serve (*81*). Member households pay for enrolment and regular premiums as well as a co-pay when health services are used. The rise in popularity of these organizations reflects the need to address the financial distress that can be caused by significant health expenses.

The urban scheme in Mali, implemented in urban areas where half of the population lived in poverty, revealed a positive effect on the utilization of many priority health services. Members were 1.7 times more likely to have a fever treated in a modern health facility, three times more likely to use oral rehydration salts or seek modern care for children with diarrhoea, and twice as likely to make the full complement of prenatal visits during pregnancy. Members did not save money overall on health expenses, but the scheme helped to smooth health-care spending throughout the year so that shorter-term acute needs were not financially catastrophic.

Rwanda has rolled out a national-level policy establishing mutuelles to cover the uninsured. A 2012 evaluation found that the expansion of mutuelles brought coverage from 1% in 2000 to 85% in 2008, including the capital city of Kigali (*82*). During the same period, medical care utilization for children under 5 years with acute respiratory infections, diarrhoea or fever increased from 13% to 33%, and the utilization of skilled-birth attendants rose from 39% to 67%. Among children under 5 years who reported having acute respiratory infections, diarrhoea or fever, and women who had a delivery, mutuelle enrollees reported significantly higher rates of medical care utilization than the uninsured in the survey year.

SUMMARY

As a target in the SDG on health, attaining UHC is a priority objective for national governments, international organizations and NGOs to be achieved within each country's context. Given the emphasis on equity and access to a wide range of quality health services from prevention to palliative care, local and national authorities, along with the international community, will be expending substantial human, financial and organizational resources to secure attainment of UHC around the world. . Cities will play a major role in demonstrating the feasibility and value of UHC. Innovative solutions such as those from Guangzhou, Lagos and Lima highlighted in this report are likely to be replicated and adapted in different contexts.

Success in increasing coverage of health services over the past decade in urban areas masks the exclusion of large numbers of people without the rights or the means to access them. As highlighted in the discussion on the need for a data revolution, many people in urban areas are not even accounted for in official statistics due to their official status as migrants or illegal residents. People living in informal settlements have limited access to health services, or the services provided to them are inappropriate or unacceptable. Cities will have to ensure that the economic and well-being aspirations of billions

of people who live in them will not be curbed by restricted opportunities to access quality health care and services. Data at urban level will be essential to monitoring the SDGs.

An imminent challenge for LMICs is the rising burden of NCDs, which has major implications for their ability to achieve UHC. Even in countries with early success in controlling infectious diseases and improving maternal and child health, integrating NCDs in health services effectively remains a challenge. In addition, many of these countries and their cities still suffer from infectious diseases. This double burden of infectious and chronic NCDs and its implications for cities worldwide are discussed at greater length in the next two chapters, with environmental health factors discussed in Section 2.

CHAPTER 3 — LEVERAGE THE URBAN ADVANTAGE TO TACKLE COMMUNICABLE DISEASES

KEY MESSAGE • **Cities must play a leadership role in the fight against communicable disease.**

Cities are positioned to exercise leadership on altering the course of some of the most devastating infectious diseases of our time. They can lead national efforts to curb infectious diseases. Cities may also lead at the front lines of outbreaks. In 2014, the Ebola outbreak entered Nigeria via Lagos, a city with the largest population and greatest population density on the African continent. Aggressive contact tracing efforts identified all 900 people who had been in contact with the disease; 19 were eventually diagnosed with the disease, 12 survived, and the virus was effectively halted.

Cities have demonstrable advantages for controlling communicable diseases, thereby enabling them to play a central role in reducing this global burden. They are comparatively well resourced with health workers, financial resources and facilities. They are more likely to have stable electricity and refrigeration facilities as well as stronger supply chain management for vaccines and other medicines and commodities. The relative human density of cities enables mobility and access at scale for reaching health-care providers, facilities, medicines, and more.

Cities deserve special attention for the control of communicable diseases because they also have features that make them uniquely vulnerable. High population density can cluster people around risk. For example, in cases where there is unsafe water or poor sanitation, even one individual can make entire communities sick in densely populated spaces. Furthermore, the high human density can expose residents to airborne diseases such as influenza or TB.

Unquestionably, too many cities have become highly unequal societies. Many urban populations in developing countries are still growing faster than can feasibly be managed by local governments, creating new vulnerable communities in their periphery. In many cases, these develop as informal settlements where the combination of poor living conditions, disconnection from public services and infrastructure, and inadequate

health service coverage facilitate the transmission of disease. Children are particularly at risk of vaccine-preventable and diarrhoeal diseases under these conditions.

Inequity in cities can facilitate the transmission of disease, even in high-income cities that are hardly growing at all. Cities are heterogeneous places, and they are home to a great many vulnerable people. In some high-income cities, TB manages to hide and proliferate in disadvantaged subpopulations. HIV has become disproportionately prevalent in cities as stigma and high-risk behaviours in cities can expose vulnerable urban residents to transmission.

The tragedy is that the infectious diseases in cities are highly controllable and treatable, and cities are highly capable of taking action to reduce and ultimately eliminate them. This chapter addresses communicable diseases that are aggravated by the urban environment through the lens of HIV/AIDS and TB. It also explores the nature of these diseases in cities, including how they disproportionately impact certain people and communities within cities. Most importantly, it looks at the strategies cities can take or are already operationalizing to mitigate and ultimately eliminate these conditions.

ENDING HIV/AIDS IN CITIES

Cities have become the focus of global ambitions to end the HIV/AIDS epidemic. While the global epidemic may have peaked in the early 2000s, HIV has been concentrating more in cities of late. Analysis conducted by UNAIDS of 200 high prevalence cities has shown that they account for as much as 25% of all people living with HIV (83). Moreover, these 200 cities represent only 10% of the world's total population. In sub-Saharan Africa, for example, HIV is highly concentrated in cities. Nearly half of all people living with HIV live in urban areas (83), but the subcontinent is only 40% urbanized (84). A similar pattern of urban concentration manifests in other high prevalence countries as well. In Brazil and the Russian Federation, more than half of all people living with HIV live in urban areas. In the USA, just 21 cities can account for 40% of all HIV cases. In Viet Nam, 31% of all people living with HIV live in just two cities (83). In countries where the DHS has observed urban prevalence, both urban men (2.2%) and women (4.7%) are more likely to be HIV-positive than their rural counterparts (1.6% and 2.0%, respectively) (Figure 10).

Cities where injecting drug use and paid sex are prevalent can concentrate risk for HIV infection. In Indonesian cities, for example, HIV prevalence among intravenous drug users has been estimated at up to 56% (83). UNAIDS has also observed that infection rates among men who have sex with men (MSM) can be considerably higher in cities. In Bangkok, for example, infection rates among MSM are more than three times the national average.

For these reasons and more, UNAIDS and the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) view cities as critical venues and partners in achieving a world without AIDS. The concentration of risk and prevalence in cities presents an opportunity to be harnessed, both for access to treatment and prevention. Cities are endowed with better resources and infrastructure, and their density puts people in closer proximity to services. Cities are better equipped to manage health commodities and supply chains than rural areas. Facilities in cities are more likely to have electric-
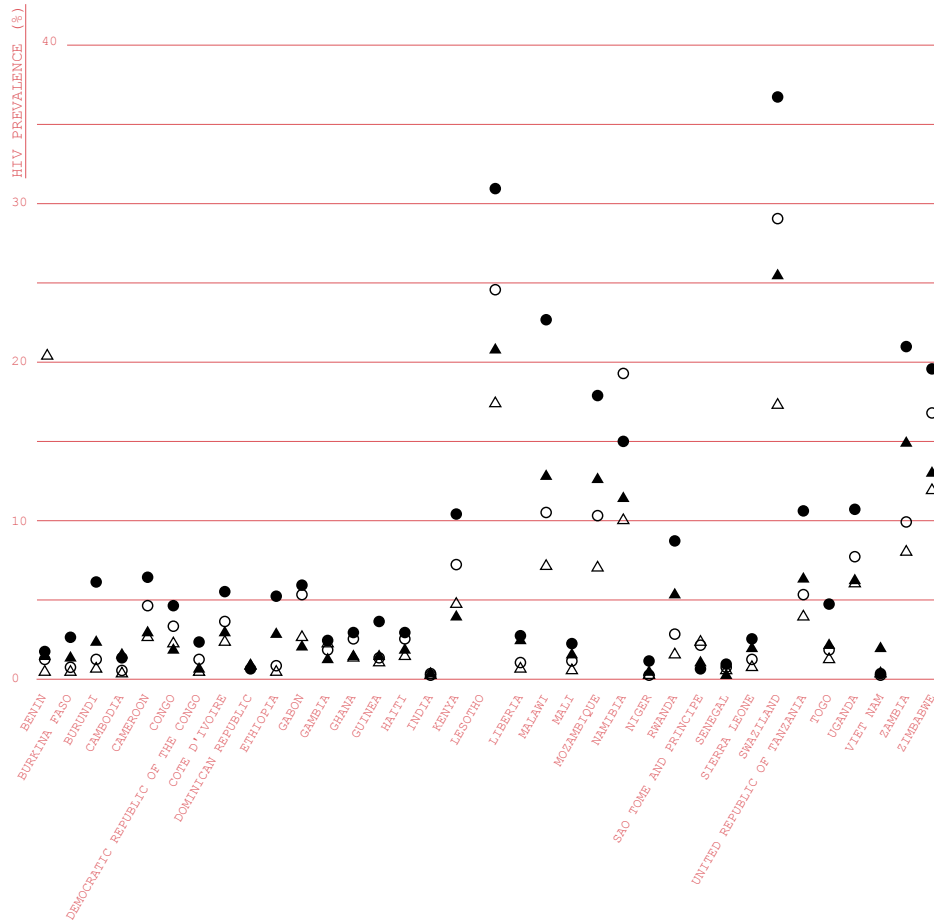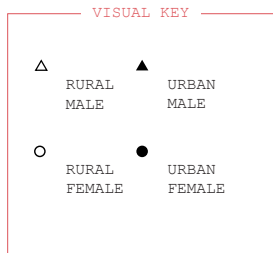
Figure 10.
HIV prevalence among general population, by sex and place of residence

Source: Global Health Observatory 2015 (*21*).

VISUAL KEY

△ RURAL MALE   ▲ URBAN MALE

○ RURAL FEMALE   ● URBAN FEMALE

ity for cold storage of antiretroviral medicines. In some sub-Saharan African countries, more than 90% of HIV/AIDS-related health services are located in urban areas (*85*).

Accounting for these factors, UNAIDS has encouraged cities to capitalize on the opportunity presented by the urbanization of the disease and the inherent strengths that cities offer to end the global epidemic. UNAIDS asked mayors from around the world to sign the Paris Declaration and to commit to doing their part in the AIDS response. Each of these mayors has pledged to reach three concrete goals: by 2020, they have pledged that 90% of their constituents living with HIV will know their HIV status, 90% of those who know their status will be receiving HIV treatment, and 90% of people on HIV treatment will have a suppressed viral load (the 90–90–90 Target) (Figure 11). The commitment also entails the provision of prevention services and the end of stigma and discrimination.

This strategy focuses on achieving these targets in the 35 highest prevalence nations, which account for over 90% of all new infections and more than 90% of people who die from AIDS-related causes (*86*). These "fast-track countries" are home

to more than three quarters of the highest prevalence cities in the world. If the targets can be achieved in the fast-track countries, beginning with cities, UNAIDS projects that AIDS-related deaths will drop by 80% by 2030, and 95% of people living with AIDS will have a suppressed viral load *(87)*. In accomplishing these goals, UNAIDS estimates that the world would be on track to end the AIDS epidemic as a public health threat.

Achieving these ambitious goals in 15 years will depend on cities successfully identifying and ultimately reaching at-risk populations and residents living with HIV. This will require cities to grapple with not just the risk factors for contracting HIV, but also the underlying social determinants that place certain people at greater risk than others. Importantly, it will also require cities to make the most of their vast potential to treat and care for people living with HIV.

In many countries, there is a strong gender dimension to HIV risk in cities. Urban women are particularly vulnerable. Figure 12 depicts the trends for both urban women and men, showing that prevalence is declining for both sexes virtually everywhere. However, it is also clear that despite this progress, women still disproportionately bear the burden of the disease. In countries where the DHS has observed urban prevalence, WHO finds that urban women are at least 1.5 times more likely to have contracted HIV than either urban men or rural women *(21)*. Urban men may be at lower risk than urban women, but MSM are at significantly greater risk than other men. MSM are 19 times more likely than other men to be living with HIV, and only 14% of MSM living with HIV have access to treatment in low-income countries *(87)*.

As seen in so many cases, the places where people live can be similarly influential in their risk exposure for contracting HIV. People living in informal settlements are particularly vulnerable, notably in urban South Africa and Nairobi where prevalence is at least twice as high as the formalized areas of the city *(83)*. In 2003, the leading cause of death in the slums of Nairobi was attributable to AIDS, at 30% *(35)*. Infrastructure

Figure 11.
Impact of the 90–90–90 Target on HIV infections and AIDS-related deaths, 2016–2030

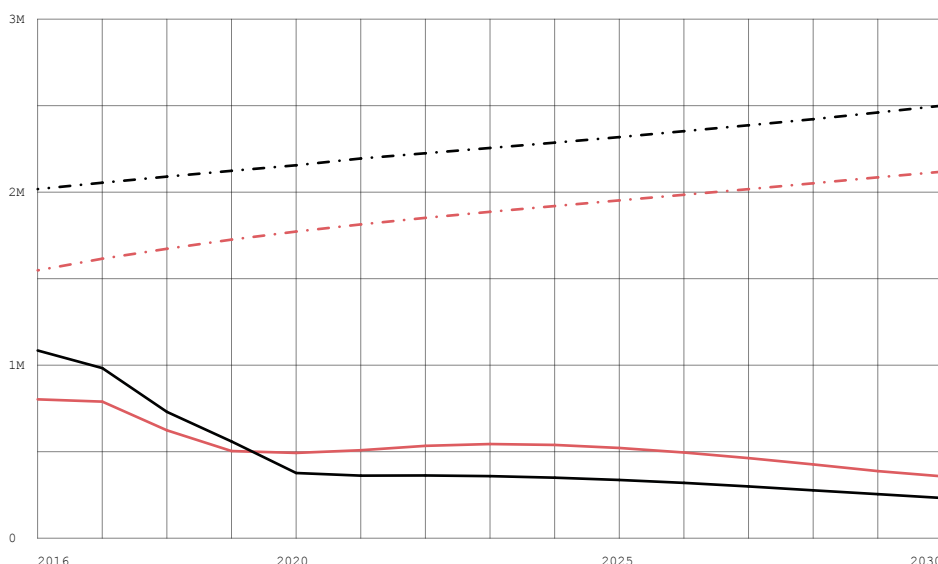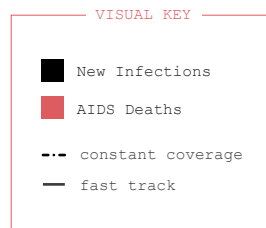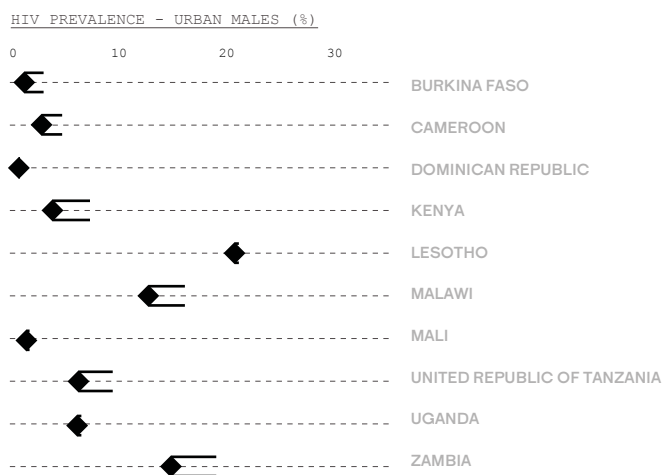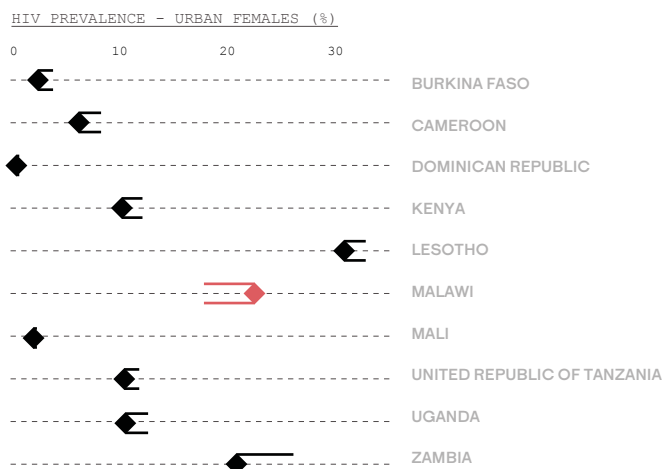**Source:** Joint United Nations Programme on HIV/AIDS 2014 *(88)*.

VISUAL KEY

■ New Infections
■ AIDS Deaths
-·- constant coverage
— fast track

Figure 12.
Trends in HIV prevalence, by sex in urban areas

┌─ VISUAL KEY ─┐

1990-2004
earliest dataset

2005-2013
latest dataset

■ worsening

■ improving

HIV PREVALENCE – URBAN FEMALES (%)

| 0 | 10 | 20 | 30 |

BURKINA FASO
CAMEROON
DOMINICAN REPUBLIC
KENYA
LESOTHO
MALAWI
MALI
UNITED REPUBLIC OF TANZANIA
UGANDA
ZAMBIA

HIV PREVALENCE – URBAN MALES (%)

| 0 | 10 | 20 | 30 |

BURKINA FASO
CAMEROON
DOMINICAN REPUBLIC
KENYA
LESOTHO
MALAWI
MALI
UNITED REPUBLIC OF TANZANIA
UGANDA
ZAMBIA
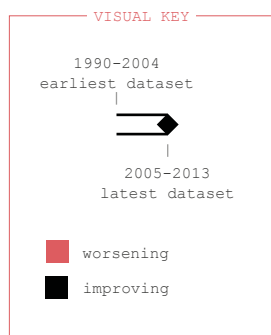
and health-care services in informal settlements simply cannot compare to the access advantages found elsewhere in cities. Informal settlements in Durban, South Africa, for example, have the highest rates of mother-to-child transmission and the lowest rate treatment utilization compared with other areas of the city.

In the 35 fast-track countries, health equity remains a hurdle to accomplishing the fast-track goals by 2020. Urban slums and informal settlements are crucial issues that must be addressed not only on the grounds of social justice, but also as clear obstacles to making progress with HIV. Urban women disproportionately bear the burden of HIV. In fast-track countries where it is measured, poor and less educated

urban women, in particular, are less likely to have comprehensive knowledge of how the HIV virus is transmitted than their wealthier, more educated peers. In some cases, the gaps between income groups and educational attainment is quite large (Figure 13). In Pakistan, for example, the wealthiest urban women are nearly six times more likely to have knowledge of transmission than the poorest urban women. In the Ukraine, highly educated women are more than 2.5 times more likely to have comprehensive knowledge than poorly educated women. Urban women in nearly all fast-track countries are less likely to have this knowledge than urban men (21).

Box 5.	Cities responding to the call

Cities with high burden of HIV/AIDS around the world are taking the initiative to develop city-level strategies to turn back the epidemic in their municipality. City-level strategies are proving to be essential, as vulnerable populations and the epidemiology of the disease are often unique in each city. In the city of Windhoek, Namibia, the most recent estimates of adult prevalence stood at nearly 15% in 2009 (89). The city found that most infections were clustered in parts of the city where informal settlements have developed because of the city's rapid growth, with poor coverage by the city's health services. Once these vulnerable populations were identified, Windhoek and its partners developed a mobile clinic strategy where clinicians visit the informal settlements twice weekly with free medicines provided by the Ministry of Health (90).

Another example is the city of Kigali is home to one third of people living with HIV in Rwanda (91). At 7.3%, it has the highest prevalence rate in Rwanda, while all other provinces have a prevalence rate below 3% (92). The city works in tandem with national-level and district-level policies and programmes, but the city focuses on key vulnerable populations. The city will expand condom provision and services for male circumcision as well as enhancing the provision of food and community-based home care for people living with HIV in the city.

ADAPTING THE END TB STRATEGY IN CITIES

TB continues as a major public health threat, particularly in large urban centres. It ranks alongside HIV/AIDS as a leading cause of death worldwide (93). WHO estimates that 9.5 million people were sick with TB in 2014. For 1.5 million people, the illness was fatal. Complicating the challenge is that the disease continues to evolve due to incomplete or inappropriate treatment. Drug resistant strains have emerged, with 500 000 cases of MDR-TB estimated worldwide. More troubling still, the emergence of extensively drug resistant tuberculosis (XDR-TB) means that most second-line therapies are no longer efficacious for affected patients, treatment can cost up to half a million dollars and cure rates are very low (94).

TB has managed to proliferate in large urban areas, particularly among densely populated, deprived communities. In some larger cities of low-burden, higher-income countries,

Figure 13.
Comprehensive Correct
Knowledge of HIV/AIDS
by educational attainment
and wealth

Source: Global Health Observatory
2015 (*21*).
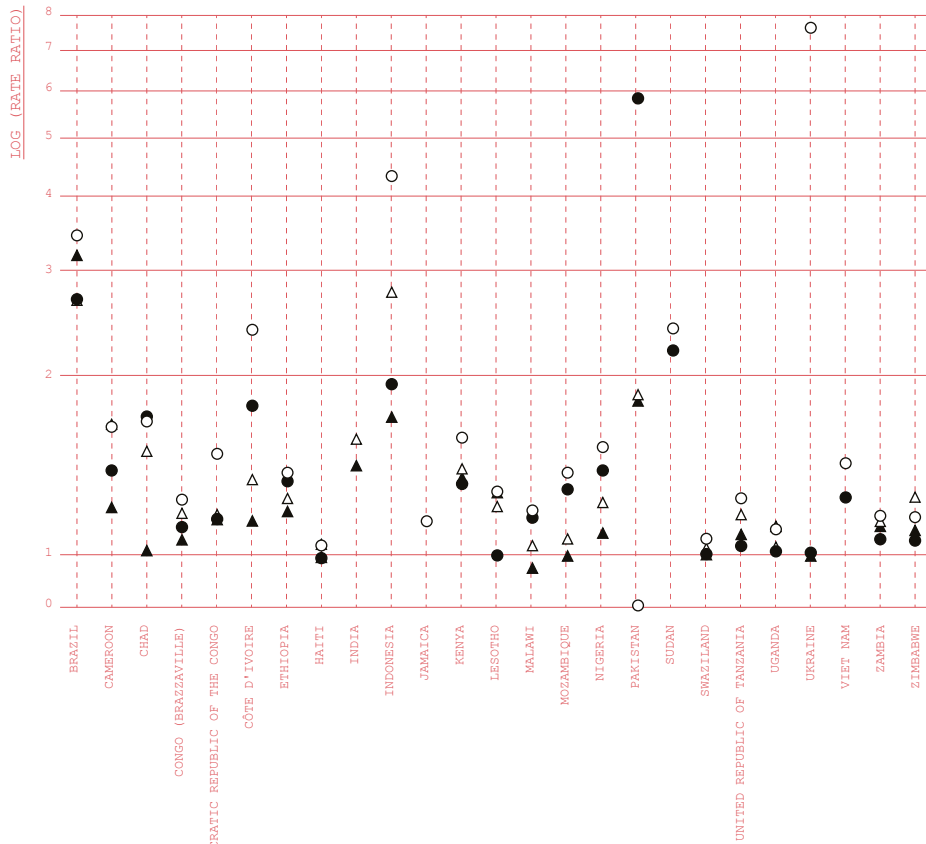
VISUAL KEY

RATE RATIO BY
EDUCATIONAL ATTAINMENT

People with 12+ years
of education

People with 0 to 5
years of education

△ Males

○ Females

RATE RATIO BY WEALTH

Wealthiest quintile

Poorest quintile

▲ Males

● Females

TB incidence can be several multiples or more of the national average *(95)*. TB incidence in Toronto, Canada, and Osaka, Japan, is three times their respective national averages. At least 15 large cities in Europe have been found to have more than double the national incidence rate, even as national rates are falling in Europe *(17)*. TB tends to thrive in the more deprived communities within cities. In the United Kingdom, more than 70% of all TB cases come from the 40% most deprived areas *(96)*. Mapping the epidemic in Rotterdam, the Netherlands, and London reveals similar patterns of high TB concentration in focused pockets of the city (Figure 14).

TB continues to be more widespread in large cities in the developing world, where rapid urbanization, poverty and inadequate living conditions exist on a far greater scale without commensurate capacity in the health system to cope. Over 95% of global TB incidence and mortality is carried by developing countries *(97)*. The growth of slum housing contributes to the disease's perpetuation in urban centres. Up to one third of all urban housing in the developing world may be classified as slums. These homes often suffer from crowding, poor hygiene and ventilation, and indoor air pollution. Homes in informal settlements often have inadequate access to health facilities and services. These areas not only enable the transmission of TB between residents, but also have poor access to care and costs that can undermine treatment. A study in three slum districts of Abia and Anambra States in Nigeria found the prevalence of TB to be 6.4% *(98)*. Similar studies have shown lower, but still unacceptably high TB prevalence in slums in Bangladesh (0.3%), Cambodia (0.2%) and Uganda (3.5%) *(99)*. At the same time, widespread access to medicines without prescriptions from pharmacies or informal providers can contribute to the emergence and spread of MDR-TB.

There can be no doubt that the challenges in rolling back the disease are significant, but cities and their partners, including WHO, are pushing forward with new initiatives to drastically reduce the number of TB-related deaths. The World Health Assembly in 2014 approved the End TB Strategy with the goal of reducing TB mortality by 90% by 2030 and an 80% decline in TB incidence. The SDGs adopted the same 90% decline in deaths by 2030. The WHO strategy proposes an approach with three mutually reinforcing focus areas to achieve its global goal. The first component of the strategy covers integrated, patient-centred care and prevention, focusing on expansion of early diagnosis and treatment as well as preventive action to care for those at high risk, including people who are HIV-positive. The second component focuses on policy and systems, including securing political commitment, advancing UHC and social protections, and addressing the social and environmental determinants of health. The third component focuses on research, ranging from basic research, to tools development and operational research.

Cities are well positioned to help deliver on the End TB Strategy. Cities in some of the highest burden countries in the world are mobilizing strategies to improve screening and diagnostic services, especially in the most vulnerable communities, expand treatment and social support, and develop policies and programmes to address the social and environmental determinants of TB.

In the fight against TB, the resource and density advantages of cities present significant opportunities for eliminating TB deaths. Cities are demonstrating that they can harness these advantages and significantly scale up their response in a short time. In India, home to the highest absolute burden of TB in the world, the city of Mumbai has been experiencing an unprecedented epidemic of MDR-TB. In 2014, Mumbai registered 2951 MDR-TB cases, over 12% of the cases in the entire country *(100)*. Mumbai

Figure 14.
**TB prevalence maps of
Rotterdam and London**

Source: de Vries et al. 2014 (*17*).

**Leverage the urban advantage to tackle
communicable diseases**
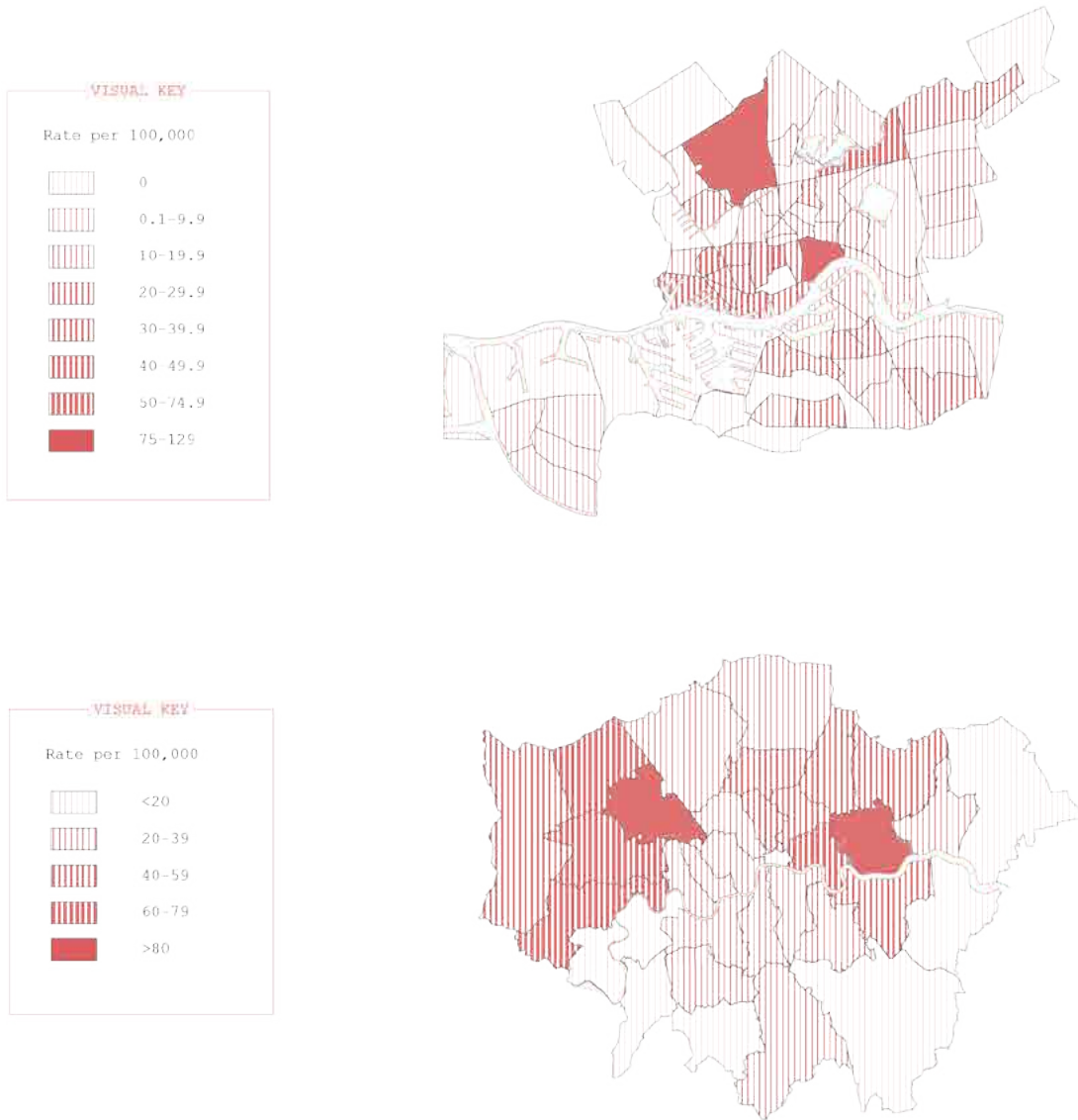
has a health system with a highly unequal distribution of essential infrastructure, expertise and other resources necessary to combat TB in places where it may be needed most. Since the launch of a city-led initiative to improve access to diagnosis and treatment, the city has scaled up the number of labs from one to 12, providing free rapid TB diagnostics. The number of hospital beds designated for MDR-TB treatment has expanded from 22 to 314. The city and its partners have trained 1500 informal health-care providers to administer quality diagnostics and treatment and vastly expand the system's reach in the slums. These broader systems have enabled the city to more than double the number of MDR-TB patients identified each year, and quickly get them under treatment.

City leaders are demonstrating that they can coordinate TB policy up and down the various levels of government, and more effectively engage with communities. Programmes coordinated by WHO and partners in the WHO Region of the Americas are facilitating these new dynamics. Cities in the region are among the most unequal in the world, with one fourth of the urban population living in poverty, and over 100 million people living in slum conditions. These conditions create an environment in which TB can proliferate, and barriers to accessing and staying in care for those who fall ill are great. As a first step, WHO is bringing together national-level managers and local authorities to deliver political commitment at all levels of government to end TB in their cities. WHO is working with national and local authorities to facilitate coordination on urban TB strategies. Fragmentation of providers across cities, between public and private providers, medical colleges, specialist hospitals and prison health services, has historically constrained coordination at the city or national levels. These programmes have mapped providers across cities in the region, and developed new frameworks to coordinate and unify their services and reporting. In order to reach the most vulnerable people in the region's cities, these systems must be coordinated with community-based networks of care. Community-based care delivery programmes in the most vulnerable areas of Lima have been able to deploy DOTS (Directly Observed Treatment, Short-

A patient receives an HIV test

Source: by Arne Hoel / World Bank is licensed under CC BY 2.0, https://creativecommons.org/licenses/by/2.0/legalcode

Leverage the urban advantage to tackle communicable diseases

A portrait of Dr. Abdoul

Course) and DOTS-plus at the community level, at low cost and with 83% cure rates (67). Coordination between community-based and formal care systems is another level of integration that has been crucial to efforts to bring TB under control.

Cities are also developing the analytical capacity to identify vulnerable groups of people and, as a result, deliver more targeted programmes to control TB. In the Philippines, a country with a high burden of TB and MDR-TB, the city of Manila and its partners are working towards new analytical approaches to identify at-risk communities and people. For the first time, the city is using geographical information systems to map the disease and identify where it clusters in neighbourhoods across the city. Subsequent analysis of the social determinants has been able to link specific housing characteristics and educational status to neighbourhoods with high rates of TB. This will ultimately help the city to develop more targeted interventions and determine where to expand services.

HEALTH EMERGENCIES IN CITIES

With increasing globalization and connectivity of human settlements, city populations are exposed to infectious diseases that, in most cases, can be effectively controlled with basic public health measures and functioning health systems. Occasionally, however, even common endemic diseases can lead to infectious disease outbreaks. In recent years, several rare diseases have also landed in cities with devastating effect. The Ebola virus, Middle East respiratory syndrome (MERS), severe acute respiratory syndrome (SARS) as well as new variants of influenza arrived and spread in urban environments, resulting in great loss of life.

The existence of abysmal living conditions for millions creates vulnerabilities through crowding, poor building construction and ventilation, malnutrition, inadequate access to safe water, sanitation and waste removal, among other unacceptable conditions that can create environments that quickly propagate communicable diseases. Resolving the inequities of urban living will be central to any city's strategy to build

resilience to outbreaks, as well as other health conditions.

No two outbreaks are the same, and in the absence of well-functioning health systems, there are no silver bullets. For example, the Ebola virus has landed in urban areas before. In 1995, Ebola broke out in Kikwit in the former Zaire (now the Democratic Republic of the Congo), and in 2001 it entered Gulu, Uganda, with populations of 400 000 and 100 000, respectively (*101*). In both cases, there was significant loss of life of about 250 people, but on a considerably smaller scale than the 2014 Ebola outbreak in West Africa. Neither city would have had substantially better social conditions or health system capacity than the cities affected in 2014, nor were they immune to urban poverty. Lagos, one of the most crowded cities on the subcontinent, was able to contain the virus in 2014. An important question is what can we learn from the myriad of experiences with these and other outbreaks to make cities more resilient?

City contexts and the evolving nature of outbreaks are diverse, but it is certain that city governments must be able to communicate effectively with their residents about outbreaks. Communication from government officials, community leaders and health professionals helps to prepare the public for the actions they need to take. Often in an acute emergency, people need to make decisions in a short time, the decisions may be irreversible, and yet information can be incomplete or uncertain. Equally importantly, people and their communities need to trust the messenger and the information that they receive. Such trust is more likely to be absent or weak in places where health and other forms of inequities are prevalent.

Officials need to communicate to the public what they know about the disease and how to prevent its further spread. Communication is vital to ensuring that community members change behaviour when required and follow necessary precautions. Experience and research have taught that uncertainty is a given, that community members need help to accept it and that communicating honestly about it can build trust and

Maouloud festival in Mali, January 2015

Source: by UNMEER/Pierre Peron is licensed under CC BY 2.0, https://creativecommons.org/licenses/by/2.0/legalcode

confidence, which must be earned. During an outbreak, people likely will turn to sources they already trust. When people do not trust certain officials, it is critical to identify whom they do trust and would listen to and how to reach them with information. Conversely, overly reassuring the public leaves them unprepared for difficult situations and, ultimately, reduces the trust in communication from those leaders.

During the Ebola virus epidemic in Guinea, local leaders, Ministry of Health officials, the International Federation of the Red Cross and Red Crescent Societies, WHO, local NGOs, universities and religious leaders worked together to communicate broadly with the city's residents about prevention of Ebola (*102*). The communication campaign used multiple channels and trusted sources. Tailored to the literacy level of the population, prevention messages were communicated by bullhorn in crowded markets and other public places, door-to-door visits that included giving out bleach and radio and television messages in multiple languages.

In Nigeria, in addition to aggressive contact tracing, the Ministry of Health and other partners utilized social media and television programmes, drawing on its internal resources of Nigerian movie stars (*103*). They developed and delivered public education programmes and engaged traditional, religious and community leaders to disseminate messages to communities. Similarly, in Liberia, where legacies of conflict and mistrust may have frustrated communications about the outbreak and prevention, civil society organizations, along with community radio stations, were trusted arbiters of information. Combined with community leaders conducting door-to-door visits, they were able to deliver important information from WHO and the government so that information resonated (*104*).

Communications are crucial in times of outbreaks. Building confidence in communities and identifying trusted messengers and information channels is a critical undertaking that should be prioritized before outbreaks occur so that they can be relied upon during times of emergency.

SUMMARY

Cities have become the focus of much of the international community's efforts to eliminate deadly infectious disease epidemics. There is good reason for their urban focus. The unique characteristics of the modern urban environment promise both vulnerability and opportunity at a significant scale. These vulnerabilities can be addressed. Urban health inequity, by its very definition, is avoidable and solvable with the resources and capabilities that already exist. New technologies and medical advances could catapult these efforts forward, but there is much that can and should be done at present. Ending deadly disease epidemics such as HIV and TB will depend on cities to control transmission and ensure that those who are already dealing with infections are affordably accessing and adhering to treatment. This will depend on building capacity to identify those who are at risk and those who are already infected as well as extending the reach of treatment and prevention for all, particularly for vulnerable people and communities. Importantly, cities must address the social and environmental determinants that contribute to the persistence and spread of these diseases. Enhancing urban health risk management, reinforcing local health systems and preparedness can reduce the impact of new communicable disease outbreaks, as well as other disasters and health emergencies.

CHAPTER 4 — NONCOMMUNICABLE DISEASES: OVERCOME THE NEW URBAN EPIDEMIC

KEY MESSAGE • **NCDs present not only a threat to human health, but also have significant economic implications for cities.**

Cities face a multitude of health challenges, not least the risk posed by communicable diseases. However, there is a new urban epidemic emerging – NCDs – shaped by the lifestyle and working patterns of urban residents. CVD, cancer, chronic respiratory conditions and diabetes have replaced communicable diseases as the leading causes of death in many settings, and are the primary focus of this chapter. Mental health is also examined, while violence and injuries and related interventions are dealt with in more detail in the chapter on safety in Section 2.

THE DOUBLE BURDEN OF DISEASE

NCDs have rapidly emerged as a 21st century health threat and present a challenge to policy-makers, who are now tasked with addressing the double burden of communicable and noncommunicable disease. Approximately 38 million people die annually from NCDs, representing 63% of the total global deaths from all causes. NCDs also impact longevity and the ability of people to age well, with more than 16 million people dying prematurely before the age of 70. CVDs account for most NCD deaths (17.5 million people annually), followed by cancers (8.2 million), respiratory diseases (4 million) and diabetes (1.5 million) (105).

In LMICs, NCDs now coexist with communicable diseases, representing a significant challenge to disease prevention and control efforts. The burden of NCDs in LMICs is disproportionately high and accounts for almost three quarters (28 million) of NCD-related deaths (105). In India, for example, urbanization and its associated lifestyle changes have triggered a health transition in favour of NCDs. CVD and cancer are now the top two leading causes of death in urban areas (106). Similar transitions have been observed elsewhere. In Kenya, CVD and injuries significantly increased and mortality related due to HIV/AIDS declined among the urban poor of Nairobi between 2003 and 2012. Cardiovascular deaths steadily increased from 2% in 2003 to 8% in 2012, and peaked at 14% in 2005, with women more frequently affected (35).

While NCDs are not confined to cities, the city environment is conducive to lifestyles and behaviours that contribute to their development, including greater consumption of unhealthy foods, use of tobacco and alcohol, and physical inactivity. Demographic shifts associated with population ageing also have implications for NCD prevention and control – not only are people living longer, in many contexts they are also developing NCDs at an earlier age. With up to 80% of older people expected to be living in LMICs by 2050, urgent action is required to ensure that health and social systems are ready to address the growing burden of NCDs (107). Governments must seek solutions beyond the health sector to address the burden of NCDs on the human capital and economic productivity of cities.

THE ECONOMIC COST OF NCDs

NCDs present not only a threat to human health in cities, but also have significant economic implications. It is estimated that, if intervention efforts were to continue in their present form in the face of the growing burden of NCDs, the cumulative economic losses to LMICs from CVD, diabetes, cancer, chronic respiratory diseases would exceed US$ 7 trillion during 2011–2025. These loses equate to an average of nearly US$ 500 billion per year and are equivalent to approximately 4% of these countries' current annual output. On a per-person basis, the annual losses range between US$ 25 and US$ 139, depending on a country's level of development (*108*).

The lifestyle and working patterns of urban residents have the potential to fuel an increase in NCDs in cities. It will come as no surprise then that the cost of NCDs is substantial in urbanizing economies. China and India are rapidly urbanizing: between 2014 and 2050, China is expected to add an additional 292 million people to its cities, while in India that figure is estimated at 404 million (*2*). The cost of CVD, diabetes, cancer, chronic respiratory diseases and mental health conditions has been estimated at US$ 27.8 trillion for China and US$ 6.2 trillion for India, respectively, during 2012–2030 (Table 2) (*109*).

Table 2.

Cost of NCDs in China and India: estimated losses during 2012–2030 (2010 US$ trillions)

Source: Working paper No. 19335, August 2013, National Bureau of Economic Research (NBER), cited in Bloom et al. 2013 (*109*).

	China	India
CVD	8.25	2.25
Diabetes	8.25	2.25
Respiratory disease	5.71	1.17
Cancer	3.97	0.31
Mental health	9.43	2.28
total	27.85	6.16

In both countries, CVD and mental health conditions present the greatest economic threats, followed by respiratory diseases and cancer. China's losses exceed those of India's as the impact of lost labour and physical capital is greater in higher-income countries.

NCDs can also have an adverse effect on the economic position of individuals and their families. NCDs can be an additional burden to those already facing financial hardship. In China, 73% of stroke survivors reported experiencing catastrophic health expenditure, whereby their out-of-pocket health-care costs exceeded 30% of their annual household income (*110*). Out-of-pocket expenses, ongoing costs related to treatment, loss of employment and the need for care and lifestyle modification all contribute

to the overall cost of NCDs and can contribute to the vicious cycle of poverty, particularly in underinsured populations.

The evidence of ruinous and long-term economic burdens borne by many households indicates that effective prevention and management of such diseases will help achieve the wider objective of global poverty reduction. Poverty alleviation can be promoted through programmes that strengthen financial protection from ill-health. In the context of NCDs, this means not only protection from the burden of user fees associated with illness, but also providing the means to cope with the ongoing costs of long-term treatment, rehabilitation and prevention. In LMICs, incomplete or absent health insurance can force households to employ a wide range of coping strategies that call upon their financial reserves. Even for countries that have ostensibly achieved UHC, chronic illness can still be a major source of economic hardship (*111*).

UNDERSTANDING THE RISK FACTORS AND DETERMINANTS OF NCDs

The four leading risk factors for the development of NCDs are physical inactivity, an unhealthy diet, smoking and alcohol consumption. In the urban context, a significant body of research has examined the relationship between urban form, physical activity and healthy eating. While these issues are covered in further detail in Section 2, it is important to underscore how cities contribute to health-harming behaviour. Poor transportation and an over-reliance of motorized transport have resulted in people spending longer periods of time commuting, the availability of affordable healthy food is restricted by poor urban planning policies and longer working and commuting hours, coupled with increased female participation in the workforce, has contributed to dietary changes in favour of convenience foods. The interaction of these factors is reflected in the rising rates of overweight and obesity, particularly in urban areas and, increasingly, for the urban poor.

　　Rising rates of overweight and obesity have the potential to fuel an increase in the burden of NCDs. Trend data from LMICs showed that the prevalence of urban female overweight and obesity has increased substantially over time (Figure 15). Critically, the burden of overweight and obesity favours urban areas, where one in three women are overweight or obese compared to one in five in rural settings. Of the countries examined, the fastest increase in overweight and obesity was observed for Bangladesh, Benin and Nepal, while substantial gains also occurred in Egypt, Jordan and Zimbabwe.

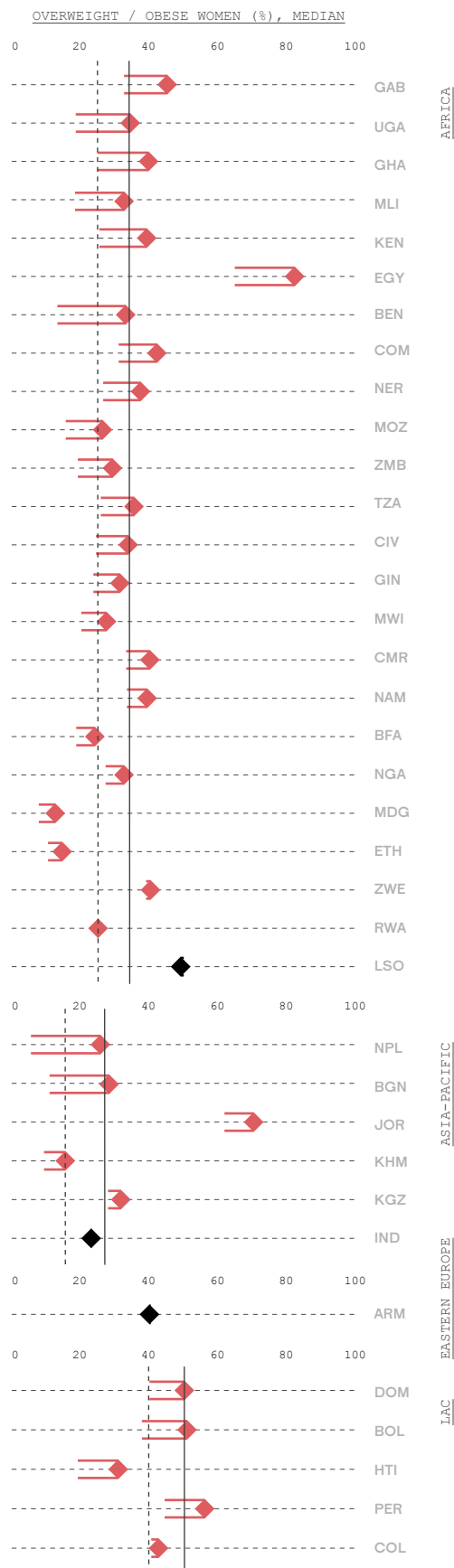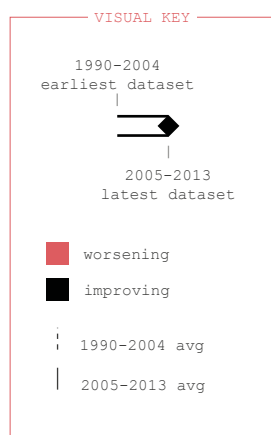　　Similarly, smoking is a risk factor for NCDs and remains a significant concern. Globally, one in five men smoke.

OVERWEIGHT / OBESE WOMEN (%), MEDIAN

However, there is substantial regional variation: in the Asia-Pacific region, one in two urban men smoke compared to one in six in the African and LAC regions (Figure 16). The poorest one fifth of urban men are nearly twice as likely to smoke as the richest one fifth. The prevalence of smoking among the poorest one fifth of urban men, compared to the richest one fifth, is even higher when examined at the country level for Cambodia (4.8 times), Sierra Leone (4.9) and Malawi (8.8). Smoking is particularly high among the urban poor in Bangladesh and Indonesia, where seven in 10 and eight in 10 urban men in the poorest one fifth of households smoke.

The rise of overweight and obesity and persistent levels of smoking, especially among the urban poor, across all regions is a worrying trend for the future of NCD prevention and control. In the African region alone, the prevalence of NCDs is projected to increase by 27% in the next 10 years. The burden is already high, with the prevalence of hypertension ranging between 30% and 60% in western and southern Africa (*112*). With low awareness, late presentation and weak health service readiness, there is a need to act at the primary care level to address the impact of NCDs, particularly in LMICs. An urban survey from Mozambique revealed that 80% of cervical cancers were diagnosed at late, inoperable stages. Only one tenth of people with diabetes knew they had the condition, and only 18% of people with hypertension were aware of their condition (*113*).

However, addressing health system readiness is not the only need resulting from the NCD epidemic – consideration also must be given to the physical and social environment. Poor infrastructure, high levels of insecurity and weak legal systems interact with poverty and social exclusion to create unsafe living and working conditions. In Nairobi, injuries were the second most frequent cause of death (21%) reported during 2003–2012. Injury deaths were four times more likely among men and the prevalence doubled over the 10-year period (*35*). Section 2 of this report provides a more detailed discussion of violence and injuries and the strategies to improve interpersonal safety in cities.

The environment can also interact with individual characteristics, meaning some people are more vulnerable to poor health outcomes due to their living and working conditions. Violence and harassment are common occurrences for migrant girls living in slums, where they may be limited in their capacity to seek assistance from health and social providers (*44*). The built and social environment of urban areas can also significantly impact mental health outcomes (*114*). For example, analysis of the World Mental Health Survey in the metropolitan area of Sao Paulo, Brazil, revealed high levels of mental health disorders, with one third of respondents reporting a mental health condition in the past 12 months (*115*).

THE BEST BUYS – COST-EFFECTIVE STRATEGIES TO TACKLE NCDs

Addressing the conditions and risk factors associated with the development of NCDs requires multilevel, multisectoral responses. Globally, the need to address the social, economic and public health burden of NCDs has been recognized through the adoption of the United Nations Political Declaration on the Prevention and Control of Noncommunicable Diseases in 2011 as well as the adoption of the WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2020. As part of these global efforts, a core set of NCD interventions – the "best buys" – have been identified

─ VISUAL KEY ─

1990–2004
earliest dataset

2005–2013
latest dataset

worsening

improving

1990–2004 avg

2005–2013 avg

Get Healthy Philly

Source: reproduced with permission from the Philadelphia Department of Public Health

QUINTILE DISTRIBUTION

How you should read the data

In this visual model, levels of service coverage or prevalence are given for urban populations by wealth quintile. Rates for the poorest 20% of urban residents in a given country are represented by the bar labeled I in the first row of each grid. Each subsequent bar represents rate for each of the next four wealth quintiles, ending with the wealthiest 20%, labeled V. Levels of coverage can be read by the height of the bar, or its precise value at the end of the row.

The bars are also oriented from right to left, according to their approximate value. This helps to visualize the differences between the wealth subgroups. When there is a difference of more than 20% between two consecutive income groups, that portion of the grid is highlighted in order to underscore the gap.

A coloured bar indicates the difference between the poorest 20% and the wealthiest 20% of urban residents in a given country. For indicators where higher values denote more desirable results, such as access to an improved water source, the gap is yellow. For indicators where higher values denote poorer results, such as smoking rates, the gap is indicated in red.
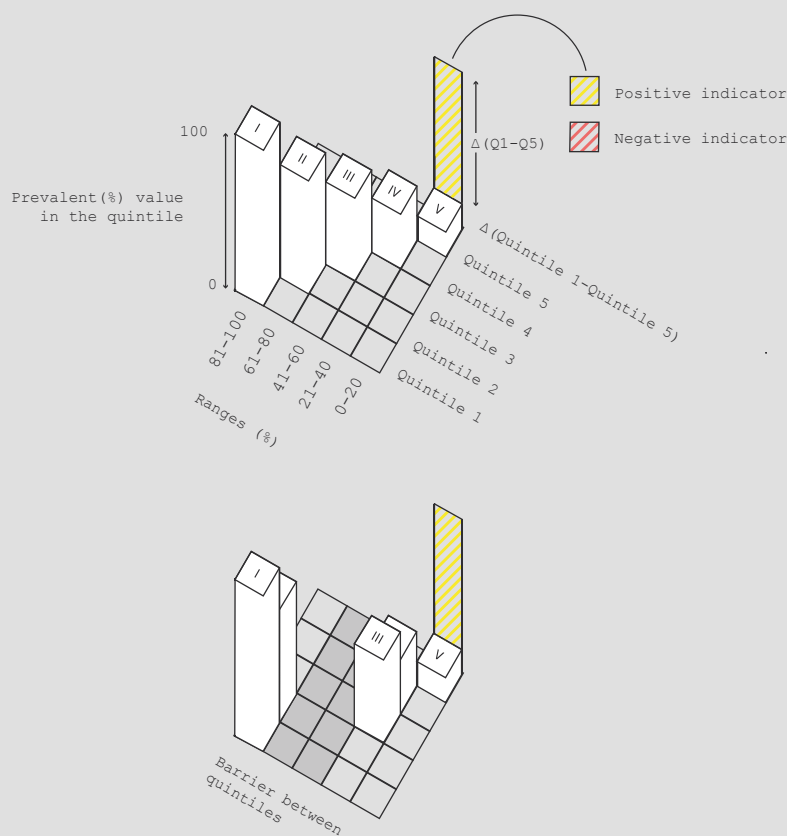
Africa

Malawi — 18 / 97.7 / 93.7 / 89.1 / 88.6 / 79.7

Democratic Republic of the Congo — 15.6 / 92.8 / 87.4 / 96.9 / 83.2 / 77.2

Mozambique — 13.9 / 91.0 / 90.0 / 88.8 / 83.6 / 77.1

Lesotho — 19.2 / 75.3 / 71.7 / 66.1 / 64.0 / 56.1

Gabon — 12.4 / 84.3 / 80.0 / 79.4 / 74.3 / 72.9
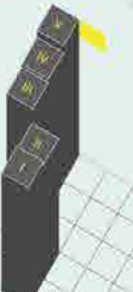
Zimbabwe — 11.6 / 84.7 / 89.1 / 83.7 / 83.3 / 73.1

Kenya — 10.9 / 88.9 / 84.9 / 83.5 / 76.0 / 78.0

Côte d'Ivoire — 11.5 / 86.5 / 73.6 / 77.0 / 75.2 / 75.0

Uganda — 8.5 / 91.9 / 97.5 / 90.8 / 90.1 / 83.4

Congo (Brazzaville) — 10.8 / 88.9 / 82.8 / 85.4 / 75.2 / 78.1

Comoros — 10.8 / 81.2 / 84.4 / 76.6 / 78.2 / 70.8
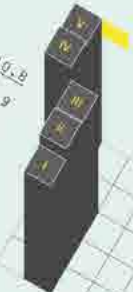
Madagascar — 7.7 / 69.3 / 68.0 / 64.6 / 66.7 / 61.6

Swaziland — 9.3 / 87.5 / 90.0 / 87.5 / 83.8 / 78.2

Sao Tome and Principe — 7.6 / 96.4 / 97.6 / 98.2 / 95.6 / 88.8

Burkina Faso — 2.4 / 82.3 / 77.4 / 75.3 / 72.4 / 79.9

Benin — 6.9 / 95.1 / 96.0 / 93.7 / 96.0 / 88.2

Cameroon — 5.2 / 88.6 / 89.6 / 89.8 / 86.9 / 82.9

Nigeria — 2.1 / 94.3 / 93.1 / 91.8 / 93.8 / 93.2

Niger — -0.6 / 78.8 / 79.5 / 77.8 / 77.5 / 79.4

Namibia — -0.9 / 80.6 / 75.9 / 75.6 / 81.2 / 81.5

Figure 16. Inequalities in smoking rates among urban men by wealth quintiles and by region

Asia - Pacific

Cambodia
33.2
91.2
78.7
74.5
71.0
60.0

Indonesia
27.8
46.8
33.5
27.7
23.5
19.0

Pakistan
23.4
87.2
71.9
67.0
72.3
63.8

India
21.4
80.6
76.4
72.4
66.6
59.2

Nepal
16.6
81.2
74.3
76.7
73.0
64.6

Timor-Leste
10.4
42.6
41.3
32.3
32.9
32.2

Maldives
1.5
55.7
55.8
48.9
51.3
54.2

Eastern Europe

Ukraine
16.8
58.6
53.6
47.0
42.4
41.8

Republic of Moldova
15
61.2
59.3
49.7
47.1
46.2

Bosnia & Herzegovina
13.7
67.9
59.6
58.3
55.3
54.2

Kazakhstan
-2.2
44.6
49.0
44.7
47.1
46.8

Kyrgyzstan
-19.6
42.5
40.2
46.7
55.1
62.1

Armenia
2
33.3
35.1
41.7
37.1
31.3

Albania
13.1
66.6
53.9
60.0
51.4
53.3

Azerbaijan
5.4
54.2
53.3
45.1
44.9
48.8

Belarus
1.3
44.6
44.1
40.5
43.9
43.3

LAC

Haiti
11.2
93.9
90.6
90.6
88.1
82.7

Dominican Republic
8.9
93.4
93.7
92.9
88.2
84.5

Guyana
16.7
84.5
80.0
75.1
75.0
67.8

Honduras
15.4
81.4
76.0
81.3
71.0
66.0

Note: For the full country names, see Annex 1, Table A1.2. Q2, 2nd quintile; Q4, 4th quintile

Source: Global Health Observatory 2015 (*21*).

to assist policy-makers, members of civil society and business leaders in responding to the challenges posed by NCDs. The intervention strategies include taxation, advertising restrictions and public information, and are aimed at the risk factors and diseases associated with NCDs, namely tobacco use, harmful use of alcohol, unhealthy diet and physical inactivity for CVD, diabetes, cancer and chronic respiratory diseases (108).

The price tag for scaled-up implementation of a core set of NCD "best buy" intervention strategies is comparatively low, with the potential to be highly beneficial. Population-based measures for reducing tobacco and harmful alcohol use, as well as unhealthy diet and physical inactivity, are estimated to cost US$ 2 billion per year for all LMICs – less than US$ 0.40 per person. Individual-based NCD "best buy" interventions, which range from counselling and drug therapy for CVD to measures to prevent cervical cancer, bring the total annual cost to US$ 11.4 billion. On a per-person basis, the annual investment ranges from less than US$ 1 in low-income countries to US$ 3 in upper-middle-income countries. Investing in these strategies will help avoid many millions of premature deaths and result in significant economic savings. For example, reducing the mortality rate for ischaemic heart disease and stroke by 10% would reduce economic losses in LMICs by an estimated US$ 25 billion per year – a cost-effective investment when just one third of this amount is required to achieve these benefits (108).

EXPLOITING THE URBAN ADVANTAGE

Tackling the burden of NCDs presents an opportunity for government, the private sector and civil society organizations to work together to an unprecedented degree and make life-saving, life-enhancing differences for entire city populations. It is a chance for cities to show their true worth and to exploit the urban advantage to maximum effect.

The WHO "best buy" strategies provide a starting point for NCD prevention and control efforts. Local governments often exercise policy and legislative control over many of the strategies to reduce the risk factors for NCDs. Tax increases, consumer information and health warnings, smoking prohibitions in public spaces and cessation programmes have been used effectively to reduce tobacco consumption. In New York City, a comprehensive antismoking programme bundled tax increases, smoke-free workplace legislation, public and health-care provider education, and cessation services saw a 19% drop in tobacco consumption from 2002 to 2006. This is approximately a 5% annual decline on average (116). The health outcomes of smoke-free legislation are substantial, particularly for child and maternal health. The implementation of smoke-free legislation in England has been associated with a reduction in stillbirths (7.8%), low-birth-weight (3.9%) and neonatal mortality (7.6%). Furthermore, in the first four years after legislation, it was estimated that 991 stillbirths, 5470 cases of low-birth-weight and 430 neonatal deaths were prevented (117). A worldwide meta-analysis study of the impact of smoke-free laws found both immediate and sustained reductions in hospital admissions for a range of cardiovascular and respiratory diseases, including an average reduction of heart attacks, by 15%. Notably, the study found a dose-response relationship between smoke-free laws and disease and expense. In other words, more comprehensive smoke-free laws are associated with greater health and cost effects (118). Comprehensive approaches applying both to increased prices as well as nonprice interventions, have been shown to substantially impact smoking cessation as well as the initiation of smoking (119).

Box 6.	WHO Smoke-free cities guide

More than 600 000 people die from second-hand smoke each year *(120)*. **Local governments have the capacity to influence smoking in public spaces and workplaces through the implementation of smoke-free legislation. The evidence for action is compelling – compliance with legislation is high, it has high levels of public support and it is good for business. The WHO guide Making cities smoke-free** *(121)* **is designed to assist mayors and local government officials in the preparation and implementation of effective smoke-free legislation. The guide draws on the experiences of cities in widely different contexts – from Almaty to Liverpool to Mecca and Medina – to provide practical information about how cities can become smoke free.**

Source: WHO Centre for Health Development 2016 *(122)*.

Cities can benefit from reducing alcohol-related harm. Both taxation and restrictions on availability and use have been shown to be effective in reducing alcohol-related harm *(123)*. To be effective, both types of interventions should be targeted with higher-risk drinkers in mind. For example, a tax programme in Thailand balanced risk reduction with revenue generation by taxing lower-quality beverages by alcohol content, while also taxing higher-quality drinks by value. Restrictions of the sale of alcohol (e.g. restricted opening hours; reduced density of outlets; safe service practices) have also been effectively tailored to high-risk groups, as well as high-risk locations *(124,125)*. Such restrictions can help to reduce harmful alcohol consumption, and have also been used as a mechanism to reduce urban violence. Restrictions on harmful use, such as those targeted at motor vehicle operators, have also been found to be effective, when enforced. These restrictions have been found to reduce fatal vehicle crashes using sobriety checkpoints and blood alcohol limitations, particularly for younger drivers *(124)*.

Strategies to improve diet and physical activity levels of urban residents are discussed in the next chapter on urban food security and nutrition. In addition to the best buy strategies, governments must also consider the environmental and social conditions associated with the development of NCDs and the capacity of communities to respond, particularly in informal settings.

Box 7.	The impact of the built environment on health equity in cities

Many of the most cost-effective measures are population-based programmes for NCDs that encourage healthy lifestyles and behaviours. The built environment – including buildings, streets, neighbourhoods and their amenities – have a significant role in shaping lifestyles and behaviours. There is strong evidence for the effectiveness of environmental approaches to support physical activity, since inactivity is one of the four leading risk factors for NCDs. Interventions, including the development of walkable streets and neighbourhoods,

connected sidewalks, and adequate lighting and visibility have been shown to increase regular physical activity up to 161%. Within buildings, simple environmental measures such as placement of point-of-decision signage at elevators and stairs have been shown to increase stair use by a median of 50% (126). Improving stairwells through increased visibility, music and art, and natural lighting have also been shown to be associated with increased stair use (126,127). Importantly, environmental interventions can have multiple co-benefits across sectors, helping governments to achieve wider goals, including environmental sustainability and universal accessibility. Evidence from New York City reveals that improvements to the physical environment to promote physical activity also resulted in improved safety, air pollution and economic outcomes. The introduction of protected bicycle lanes in the Manhattan area of New York City resulted in a 35–58% drop in injuries to all street users and increased retail sales in the area by 49% (128).

Turning to the health sector, the double burden of disease necessitates an integrated approach to health care. This has become increasingly important as more patients present with coexisting communicable and noncommunicable diseases. In Khayelitsha, the largest informal settlement in Cape Town, South Africa, comorbidity of HIV, TB and NCDs has become commonplace among adults attending primary health care services (129). To address this growing reality throughout the country, the national government of South Africa is introducing a new integrated health-care delivery strategy (Box 8).

Common risk factors for communicable and noncommunicable diseases also call for a shift in the disease prevention and control paradigms away from the traditional, disease-specific approaches to care to health-centred, all-inclusive models of care (130). Models developed specifically for the underresourced and fragmented health systems of LMICs, such as the Innovative Care for Chronic Conditions Framework, focus on the need to improve health-care delivery by developing multilevel synergies between patient and families, community and health-care organizations and coordinated policy and health systems for effective long-term interventions in primary health care. The participatory role of the community and patients in the prevention of NCDs is considered essential to the success of such an approach (131).

Box 8.	Integrated health-care delivery in South Africa

The strategic plan for the control of NCDs in South Africa recognizes the need to integrate chronic infectious diseases and NCDs in health-care delivery. The Integrated Chronic Disease Management model was developed and is being introduced by the National Department of Health in response to the changing pattern of disease. Building on the strengths of the HIV programme, this health systems strengthening model uses a systems approach to improve health outcomes by restructuring health-care delivery across the continuum of care, integrating prevention, treatment and care of chronic diseases at the primary care

level. The model also focuses on assisted self-management by empowering chronic disease patients to take responsibility for their own health. The chronic diseases in this model include HIV, TB, diabetes, hypertension, epi- lepsy, asthma, chronic obstructive pulmonary disease and mental health illnesses.

Source: Department of Health, Republic of South Africa 2013 (132).

While integrated, effective health system functioning is a necessary component of NCD prevention and control, it is only part of the solution. Data systems are required to ensure evidence-informed policy and decision-making at all levels of government. At the local level, data utilization is critical to ensuring that interventions are responsive and timely to community needs, particularly in poor urban settings where there is a scarcity of information for NCDs and risk factors. Urban HEART, for instance, has been used to collect and use health and determinants of health data for NCDs.

SUMMARY

NCDs are changing the landscape of urban health by becoming the dominant cause of morbidity and mortality in many cities regardless of whether they have conquered communicable diseases or not. The urban environment, especially those characterized by poor urban planning, heavy reliance on personal motorized transport and lack of access to healthy food options, enhances NCD risk factors such as physical inactivity and poor diet. NCDs have typically been thought of as diseases of affluence, but they are now killing more people in the developing world than anywhere else, including in the urban slums. They take a heavy toll on people's health as well as on the economy.

The urban health system needs to be better oriented towards dealing with NCDs. Integrated health-care delivery systems that provide seamless prevention, early detection, treatment and management of NCDs along with communicable diseases will be essential both at national and local levels. Moreover, actions must be taken in various other domains of the urban environment in order to address the primary causes and risk factors of NCDs. The other chapters in this report show how the urban food environment, the spatial layout of the city, transportation systems, housing conditions and safety all play a role in shaping the urban NCD burden, as do other social determinants such as education and income.

In responding to NCDs, it is clear that action by the health sector alone is not sufficient, and that collaboration across sectors is essential. Such collaboration will increase the likelihood that resources are used efficiently and that the outcomes will not only benefit the health sector, but also contribute to achievements in other areas. Local governments often have the policy and legislative control over key issues affecting NCD risk. Thus, they are poised to exploit the urban advantage to reduce the health and economic burden of NCDs. Encouraging active participation of multiple stakeholders and critically, the communities themselves, is a necessary component of effective, sustainable solutions.

CHAPTER 5 — TACKLE 21ST CENTURY MALNUTRITION

KEY MESSAGE • **Cities increasingly face the unprecedented dual challenge of undernutrition and overnutrition.**

From the very beginning of life, good nutrition influences individual health and well-being across the life course as well as many other determinants of health, including education and employment. Rapid urbanization has led to a fundamental shift in the way we live our lives, including how and what we eat. Cities, by their very nature, influence the quality and quantity of food, its availability, price and consumption patterns. The food system is inherently related to the city dynamic, from how cities are planned and the policies governing land use, to social norms around food consumption.

In the evolution of cities worldwide today and over recent decades, two outstanding trends are occurring almost side by side. Both have profound implications for the health of urban populations everywhere. The first is the "epidemiological transition" in which the main causes of disease have been shifting steadily from infectious to noncommunicable conditions, even though some infectious diseases continue to flourish (as discussed in the previous chapter). The second trend, closely related to the first, is the "nutrition transition", or the *mal*nutrition[ii] transition, in which overnutrition is increasingly a problem, while undernutrition is being brought under control, though modestly and unevenly across countries. Overweight, obesity and increased risks of chronic diseases are thus on the rise. Yet, here too, there is a "double burden" – both may coexist in communities and even within the same household, with parents who are overweight, while their children are stunted.

Rapid urbanization coupled with lifestyle trends, socioeconomic development and generally improved health status have led to the growth of this relatively new pattern of malnutrition in cities. This chapter takes a close look at nutrition outcomes in urban areas, which have profound implications for the burden of communicable and noncommunicable diseases discussed earlier, and explores the cross-sectoral approaches available to cities for improving food and nutrition for its citizens.

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ii   Malnutrition encompasses both undernutrition (includes underweight, stunting, wasting and micronutrient deficiency) and overnutrition (overweight and obesity). Different standards apply for children and adults. See: A manual: measuring and interpreting malnutrition and mortality. Atlanta and Rome: Centers for Disease Control and Prevention and World Food Programme; 2005 (http://www.micronutrient.org/nutritiontoolkit/ModuleFolders/13.Manuals_and_resources/WFP_Measuring_and_Interpreting_Malnutrition_and_Mortality/3)_Chapter_1_-_Defining_&_measuring_malnutr_(pgs_15-32).pdf); and WHO Indicator and Measurement Registry for indicator definitions (http://www.who.int/whosis/indicators/en/).

South View

INCREASING OVERWEIGHT AND OBESITY IN CITIES

Overweight and obesity have more than doubled since 1980 and are linked to more deaths worldwide than underweight. In 2014, more than 1.9 billion adults were considered overweight and, of these, more than 600 million were obese (133) (Figure 17). The left panel of Figure 17 shows how overweight, including obesity, has increased in the urban areas of LMICs in Africa, the Asia-Pacific, and Latin America and the Caribbean between 1990–2004 and 2005–2013. In Latin America and the Caribbean, where the average prevalence is highest, about half of urban women are overweight. In the right panel of Figure 17, rising rates of overweight among urban women in selected countries over the last decade or more are highlighted. In some countries, such as Egypt and Jordan, a great majority of urban women are overweight according to most recent estimates. These trends partly explain why no country is currently on course to meet the global nutrition target of halting the rise in adult overweight and obesity (134).

Historically, in LMICs, these two conditions have been linked to high-income status, while the opposite has been the case in richer countries, where overweight and obesity are more common among low-income groups (135,136). However, this pattern in developing countries is changing, with overweight and obesity increasing even among the lower-income groups, including in urban areas.

Urban overweight and obesity in seven African countries increased by about 35% over at least a 10-year interval during 1992–2005. This growing health burden is much greater for the poor, with a 50% increase among the urban poor, compared to only 7% in the richest group. Furthermore, there was an increase of 45–50% among the non-educated and primary educated women, compared to a reduction by 10% among women with secondary education or higher (137).
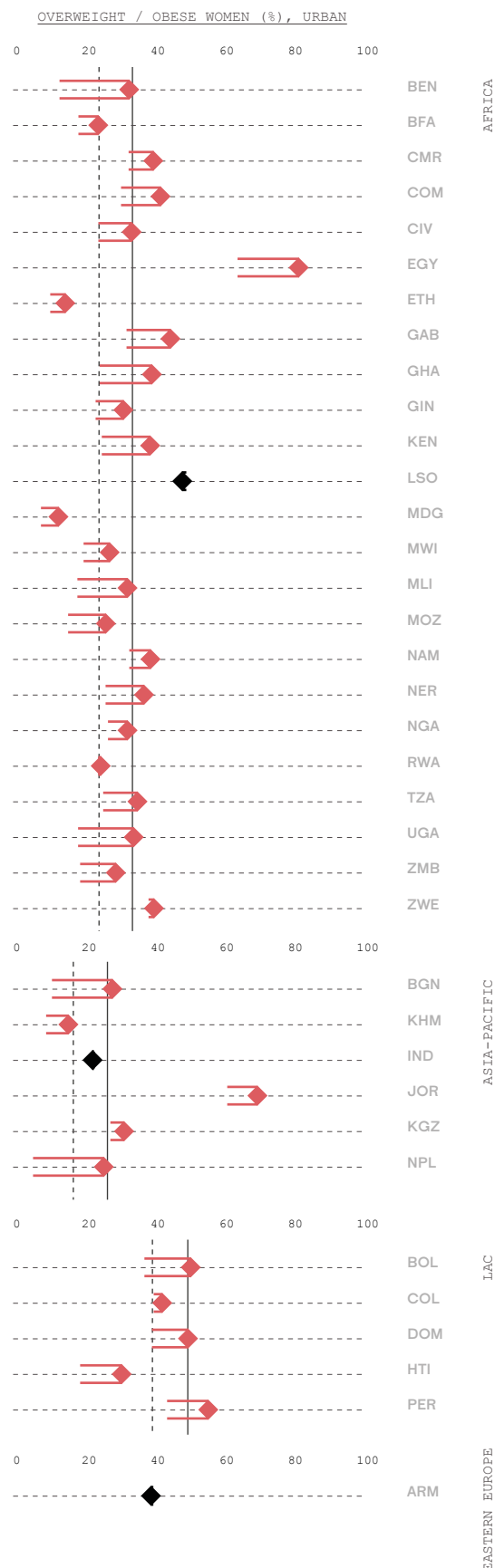
Another analysis of 36 developing countries found that among adult women living in urban areas, overweight exceeded underweight by a factor of 5.8, compared to 2.1 in rural areas. In this case, too, a considerable burden was borne by the poor. In the relatively more developed countries, half (51%) of urban women of low socioeconomic status are overweight (138).

Worryingly, children, including in LMICs, are also

Figure 17.

Trends in prevalence of overweight (including obesity) among urban adult women, 1990–2013
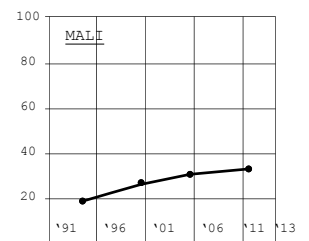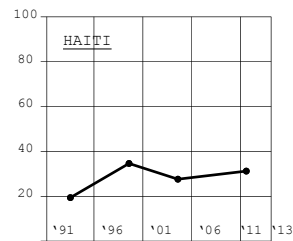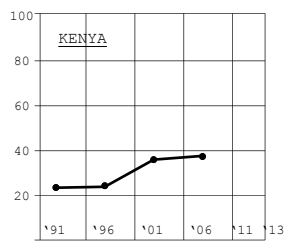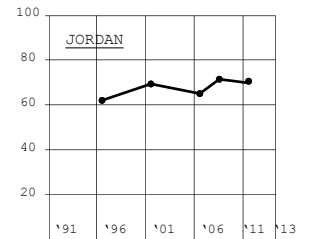
Note: For the full country names, see Annex 1, Table A1.2.

Source: Global Health Observatory 2015 (21).

BANGLADESH

BOLIVIA

BURKINA FASO

BENIN

EGYPT

GHANA

COLOMBIA

JORDAN

KENYA

HAITI

MALI

NEPAL

MALAWI

UGANDA

ZIMBABWE

PERU
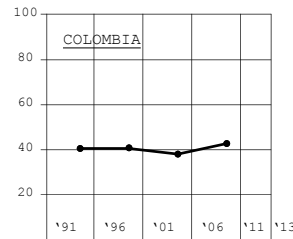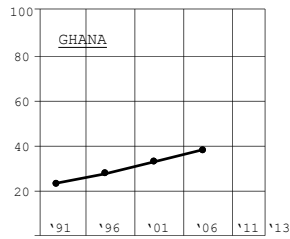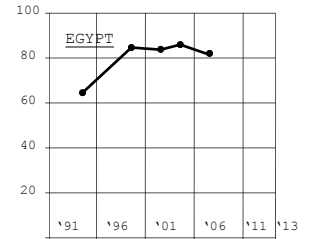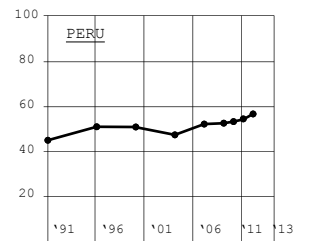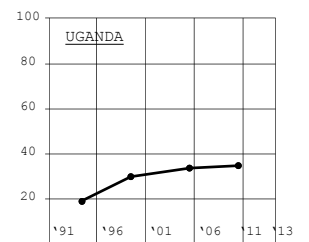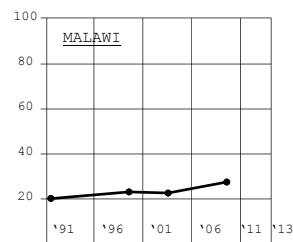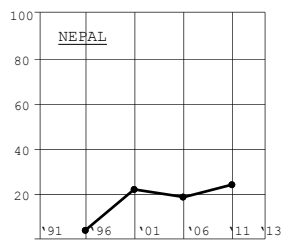
becoming part of a worldwide rise in obesity due largely to poor nutrition in early childhood and exposure to energy-dense, micronutrient-poor foods (133,139). However, most countries still tend to focus primarily on undernutrition in the under-5 age group. Many countries do not collect or utilize data on childhood overweight and obesity beyond the age of 5 and into adolescence, which is a critical time when nutrition-related habits are formed and unhealthy food marketing is often targeted.

INEQUITIES HAMPERING PROGRESS ON UNDERNUTRITION

At the same time, evidence shows that undernutrition and micronutrient deficiencies, or "hidden hunger", is still common in many LMICs. Overall, the number of people with inadequate dietary energy intake (i.e. undernourished) in the world is down by 167 million over the last decade, and 216 million less than in 1990–1992. The decline is more pronounced in developing regions, despite significant population growth. However, of about 795 million people in the world who are still undernourished, 780 million are in developing countries (140).

In urban areas, undernutrition is also commonly associated with socioeconomic status. From 1990 to 2013, while child stunting – an indicator of sustained poor dietary intake, repeated infections, or a combination of both – had generally declined over the years in urban areas, most dramatically in the Asia-Pacific and LAC (Figure 18, left), the inequity in stunting had not improved. On average, the relative difference in prevalence of child stunting between the poorest one fifth and richest one fifth of urban households only slightly decreased among countries in Africa, and in countries in the other regions it increased (Figure 18, right). The latest data from the DHS showed that in LMICs in LAC, stunting was about five times higher in the poorest one fifth of urban children than in the richest one fifth.

Such inequities limit progress on reducing stunting in urban areas that, in turn, can hold back progress at the national level. Figure 19 shows trends in stunting rates among urban children in four countries in South-East Asia over different periods. In each country, prevalence of stunting among the richest one fifth of urban children was between 10% and 20%, according to the latest DHS in each country. Child stunting rates among the richest urban households improved since the earliest survey undertaken in each country in the 1990s, with the exception of Bangladesh. On the other hand, stunting still affected 40–60% of the poorest one fifth of urban children in these countries according to surveys conducted since 2000. In Pakistan, there was hardly any reduction in stunting among the poorest one fifth between 1990 and 2012. Thus, large gaps remain to be filled in order for all urban children to have stunting rates as low as those of the richest urban children.

Figure 18.
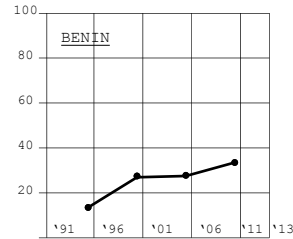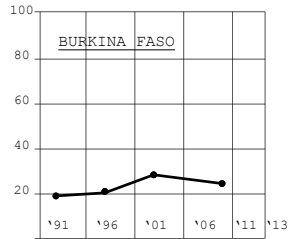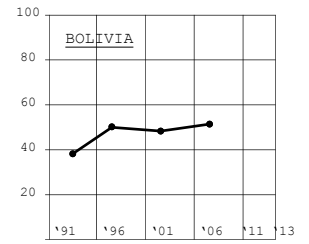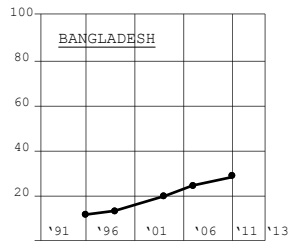**Trends in prevalence of stunting among urban children under 5 years, 1990–2013**

Note: For the full country names, see Annex 1, Table A1.2.

Source: Global Health Observatory 2015 (21).

VISUAL KEY

RATE RATIO [Q1/Q5]

1990-2004
earliest dataset

2005-2013
latest dataset

■ worsening

■ improving

| equality

VISUAL KEY

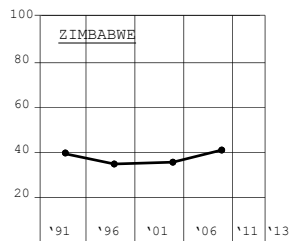STUNTING (%), URBAN

1990-2004
earliest dataset

2005-2013
latest dataset

■ worsening

■ improving

┊ 1990-2004 avg

| 2005-2013 avg

RATE RATIO [Q1/Q5]

0   2   4   6   8   10

STUNTING (%), URBAN

0   10   20   30   40   50   60

AFRICA

- BEN
- BFA
- CMR
- CAF
- TCD
- COM
- CIV
- EGY
- ETH
- GAB
- GHA
- GIN
- KEN
- LSO
- MDG
- MWI
- MLI
- MOZ
- NAM
- NER
- NGA
- RWA
- TZA
- TGO
- UGA
- ZMB
- ZWE

ASIA-PACIFIC

- BGN
- KHM
- IND
- JOR
- KAZ
- KGZ
- NPL
- PAK

EASTERN EUROPE

- ARM

LAC

- BOL
- COL
- DOM
- HTI
- PER

Source: Global Health Observatory 2015 (*21*).

VISUAL KEY

WEALTH QUINTILES

Q5 median

Q1 median

PERCENTAGE

100%
50%
0%
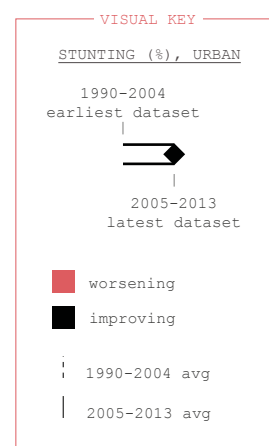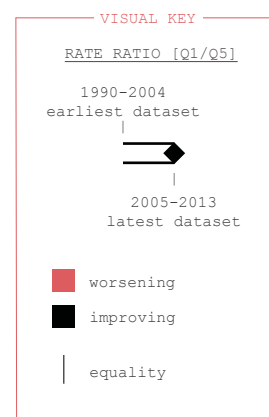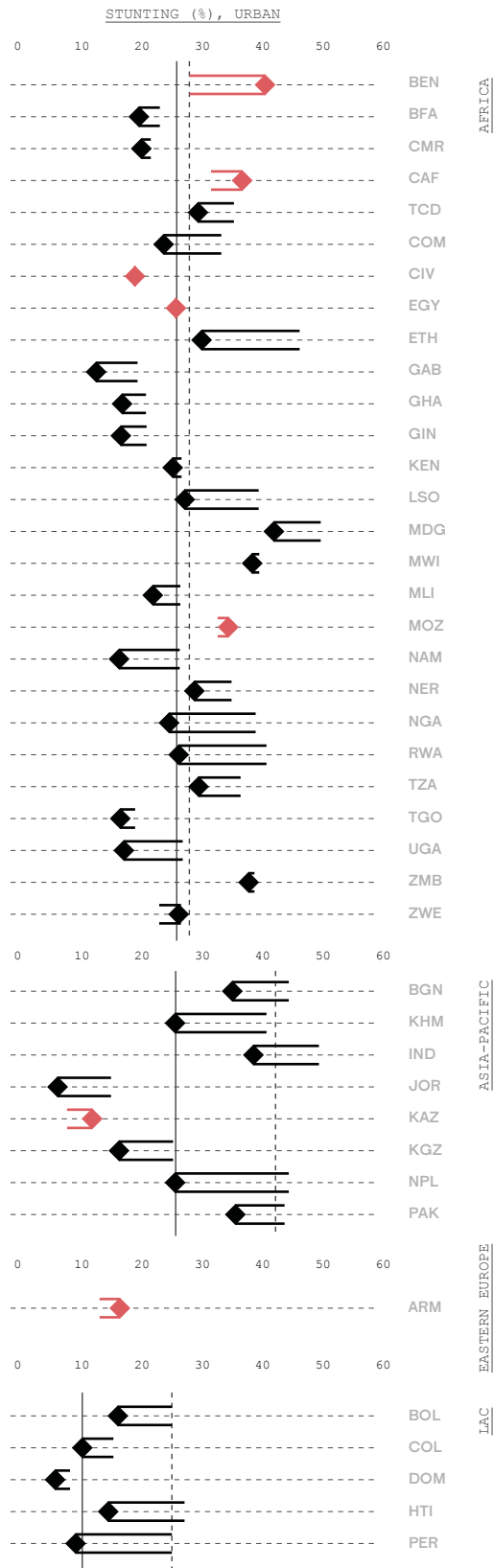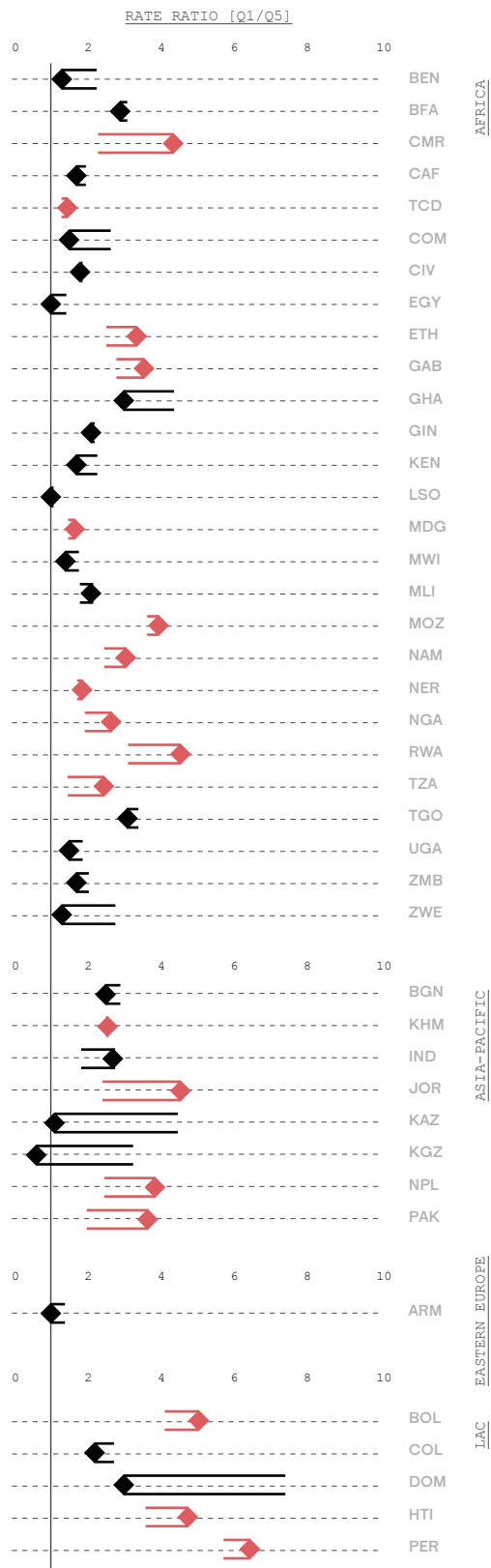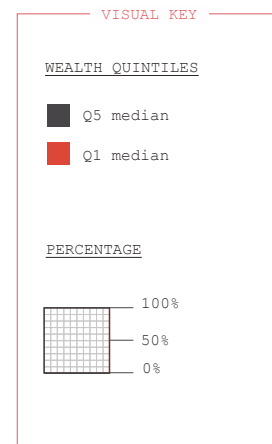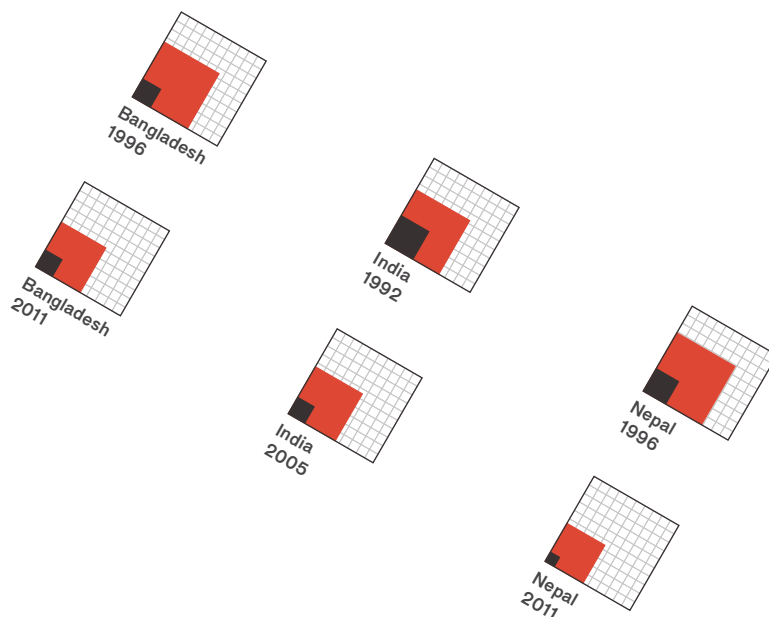
CO-EXISTENCE OF OVERNUTRITION AND UNDERNUTRITION IN CITIES

With the changing patterns of malnutrition associated with urbanization, wealth and development, an increasing number of LMICs are now experiencing the simultaneous burden of both undernutrition and overnutrition, especially in urban areas. Figure 20 shows that, in general, the prevalence of overweight and obesity among adult women declines with increasing levels of child stunting in the urban areas studied. However, several countries, clustered in the centre of the graph, carry a double burden in terms of a moderate level of both child stunting and adult female overweight. The countries in the first (upper-right) quadrant have an especially heavy double burden, with levels of both stunting and overweight above the urban median.

Other global studies have found similar trends of an increase in overacquisition (or excess consumption) of nutrients in the face of declining undernourishment (*134*). Even in households of urban slums in Nairobi, a study of 3335 children and their mothers showed that only 7.5% of the mothers were underweight, while 32% were over-

Note: For the full country names, see Annex 1, Table A1.2.

Source: Global Health Observatory 2015 (21).

VISUAL KEY

UN REGION

○ Africa

◆ Eastern Europe

✦ Asia-Pacific

▲ LAC

OVERWEIGHT MEDIAN

STUNTING MEDIAN

weight or obese. Moreover, 43% of the overweight mothers and 37% of the obese mothers, respectively, had stunted children (141). Thus, the dual challenge of overnutrition and undernutrition manifest not only at the population level of cities and countries, but even within households. The specific causes of this coexistence is yet to be fully understood.

MANY POTENTIAL COSTS TO CITIES FROM MALNUTRITION

Malnutrition in all its forms presents several interlinked challenges in cities. First, there is the human cost of children and adults who are kept from reaching their full potential and may have shortened lives – malnutrition is a risk factor for increased mortality and morbidity from noncommunicable and infectious diseases as well as psychological disorders. Second, there is the cost to the health system in terms of treatment and care. Third, there is the cost to economic and social progress. Altogether, these issues create a fourth challenge for city leaders and policy-makers: how to prioritize actions that prevent and reduce malnutrition.

Malnutrition, which includes undernutrition and overnutrition, is a risk factor for both communicable and noncommunicable diseases (134). The toll it takes on people's lives is substantial. Globally, undernutrition alone is responsible for 45% of all deaths in children under 5 years, approximately 3.1 million deaths per year (142). It is the leading risk factor for poor health outcomes in sub-Saharan Africa, and fourth highest in Asia (143). Overweight and obesity cause more deaths than underweight worldwide because they are major risk factors for the development of NCDs, which are responsible for about 63% of all deaths worldwide (144). Globally, 44% of diabetes, 23% of ischaemic heart disease and 7–41% of certain cancers are attributable to overweight and obesity. A large proportion of NCDs lead to premature death, particularly in
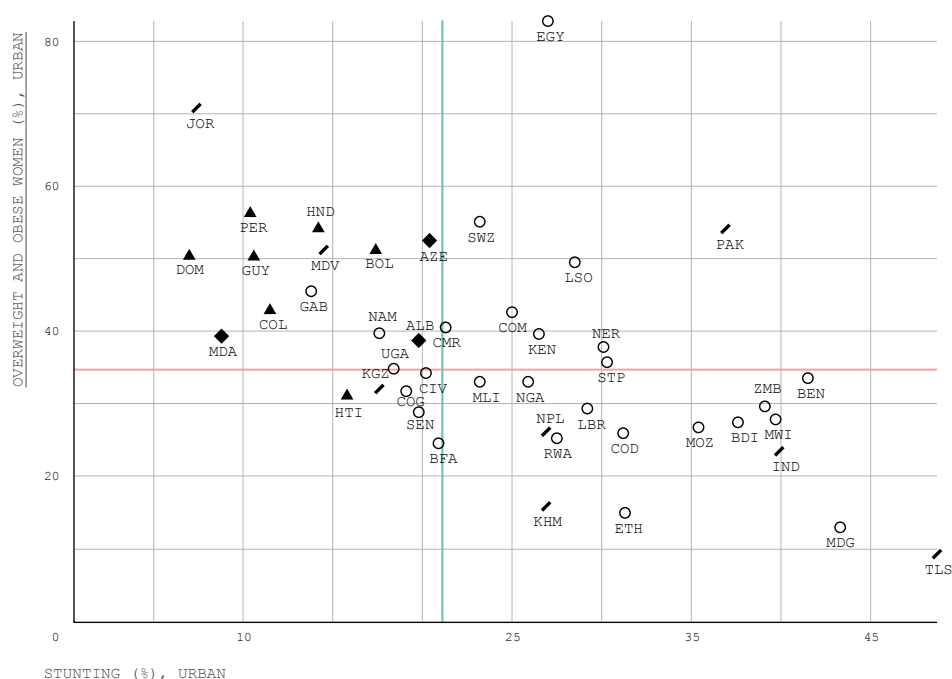
LMICs. A higher proportion (29%) of all NCD deaths in LMICs is estimated to occur in people under the age of 60 than in high-income countries (13%).

Malnutrition also creates huge costs to the health system. In a country such as Egypt, where undernutrition is associated with 11% of all child mortalities, the health system costs of treating pathologies related to undernutrition (e.g. diarrhoea; respiratory infections; anaemia; low-birth-weight) generated an estimated cost of 1.14 billion Egyptian pounds, based on 2008 data (145). While the families are thought to bear around 72% of this health-care cost, it is still an important component of public expenditure, consuming approximately 1.6% of the total budget allocated to health. In New York City, obesity is epidemic, and it starts early in life. More than half of adult New Yorkers are overweight (34%) or obese (22%) as are nearly half of all preschool and elementary school children (146). As a result, more than 50 000 deaths per year are caused by obesity and overweight, which cost the city US$ 4.0 billion in medical costs alone (147).

In Canada, evidence shows that people with more severe food insecurity (a contributing factor to malnutrition) use more health services and incur higher health-care costs of between 23% and 121% compared with adults in food-secure households (148). The 3.4 million Canadians affected by food insecurity in 2013 – including nearly 1 million children – are vulnerable to the physical and emotional hardships that characterize the experience of food insecurity and the associated compromises to health and well-being (149).

The social and economic costs of malnutrition are not negligible. Malnutrition impacts the individual's capacity to engage in education and employment opportunities, and contributes to poorer educational outcomes. Adults affected by malnutrition are less able to work, contribute to local economies and provide care for their families. This perpetuates a cycle of poverty and economic stagnation.

A study in Guatemala, for example, demonstrated this cycle, showing that adults who were stunted as children had less schooling, lower test performances, lower household per capita expenditure and a greater likelihood of living in poverty (150). It has also been estimated that malnutrition can result in a decrease in earning capacity in adulthood of up to 2.9% (151).

An extensive study in Egypt showed that stunted children are more likely to drop out of school and that this disadvantage in the labour market led to losses in potential productivity. A large proportion (40%) of Egyptian adults are also stunted, representing more than 20 million people of working age that are not able to achieve their potential as a consequence of child undernutrition. Furthermore, an estimated 857 million working hours were lost in 2009 due to absenteeism from the workforce due to of nutrition-related mortalities. This represents an economic loss equivalent to 0.5% of the country's GDP (145).

Altogether, malnutrition costs US$ 3.5 trillion per year to the global economy. Undernutrition and micronutrient deficiencies cost up to US$ 2.1 trillion per year, and the cost of NCDs related to obesity and overweight was estimated at US$ 1.4 trillion in 2010 (152).

These costs are partly supported by studies from around the world. In Asia, malnutrition reduces human productivity by 10–15% and GDP by 5–10% (153). In the USA, obesity alone is estimated to result in productivity losses equivalent to US$ 668–4299 per person per year (154). In Egypt, the annual costs associated with child undernutrition is estimated at 20.3 billion Egyptian pounds (US$ 3.7 billion), which is equivalent to 1.9% of GDP (145).

DIFFERENT PATHWAYS FOR CITIES TO TACKLE THE CAUSES OF MALNUTRITION

Evidence from cities and nations around the world about the human, health system, socioeconomic and other costs bolsters the argument for cities to tackle the widespread roots of malnutrition. The SDGs also spur cities with a call for action to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture.

The large body of evidence and experience on effective nutrition interventions demonstrates that they can have a lasting impact on multiple aspects of people's life. Primary health care is a logical and critical setting for conducting food and nutrition interventions alongside other health promotion activities, and much work is already under way in these areas.

However, in order to adequately and fundamentally address the challenges of food and nutrition in cities, broader interdisciplinary and intersectoral actions are required. This chapter thus focuses on the many ways that urban services and planning can contribute to improve food and nutrition in cities. This also provides a bridge to Section 2, which directs attention to urban sectors beyond health.

One important area of urban management that has strong ramifications for nutrition is water, sanitation and hygiene (see also the chapter on water and sanitation in Section 2) (155). Repeated episodes of diarrhoea or intestinal worm infections due to unsafe water, inadequate sanitation or insufficient hygiene are associated with half of all malnutrition cases globally (156). Diarrhoea, in particular, is a leading cause of death of children under 5 years worldwide, and its constant presence in low-income settings contributes significantly to undernutrition (157). Repeated parasitic infections can result in anaemia and inhibit physical and cognitive development. Over 2 billion people worldwide are infected each year, while an estimated 4.5 billion people are at risk of infection (158,159). The burden of undernutrition can thus be reduced with adequate provision of basic urban services such as safe water, sanitation and hygiene.

In addition, city planning and design that promote physical activity can be effective in preventing and reducing unhealthy weight gain that is important for NCD prevention. Urban planning also influences access to healthy food sources (discussed later in this chapter). While these areas of urban services and planning – water, sanitation, hygiene, active city design, distribution of healthy food sources – are typically dealt with independently, coordinated action can generate valuable synergies that can make a real impact on improving nutrition outcomes in cities.

SUSTAINABLE FOOD SYSTEMS TO ENSURE FOOD SECURITY IN CITIES

The growth of cities poses a challenge for all aspects of the food system. It increases competition for land use, contributes to the demand for food supplies and shifts food consumption habits towards convenience foods. Moreover, the growing impacts of climate change can affect availability of food, resources required to produce food, access to and utilization of food, and stability (e.g. price fluctuation) (160). Between 2003 and 2013, natural hazards and disasters such as flooding and drought in developing regions affected more than 1.9 billion people and resulted in nearly half a trillion US dollars

in estimated damage. The agricultural sector absorbed up to 22% of the total economic impact of these events (140).

Some countries are struggling to improve the availability, access and utilization of food in the face of rapid urbanization and economic instability (161). Many cities across all levels of development are similarly affected. In rapidly urbanizing cities, uncontrolled urban expansion can lead to the loss of nearby agricultural land, strain transportation and logistics systems for distribution and thereby exacerbate problems with access and utilization of food. In contrast, already highly urbanized places are faced with concentrations of poverty that are inextricably linked to food insecurity and sprawling development that results in more expensive locally produced goods and heavier reliance on more distantly grown products (162). For example, in Zambia's capital, Lusaka, 69% of households in the poorest neighbourhoods are severely food insecure; only 4% are considered to have total food security (163). In the USA, the most recent national survey of household food security revealed that 14% (or over 17 million) of households are food insecure, and 81% (or over 14 million) are in metropolitan areas, of which 40% (nearly 6 million) live in principal cities. The health impact of such food insecurity includes malnutrition and reduced diet diversity (164).

All stakeholders need to work together at global and local levels for advocacy and project implementation as well as for raising awareness on urbanization and food security as one of the key issues of our times. A more localized food system approach can and should be promoted in connection with national and international food systems. Interactions of local and global food supplies should be governed in ways that promote trade and local procurement to improve the conditions for small and limited resource farmers in all regions. Local authorities can act to improve the food security of their cities by adopting city-region food systems: creating a diverse food supply geographically close to population centres and improving local management of food systems, while strengthening linkages with rural producers (160).

Although local authorities are key players in developing policies and interventions that support sustainable food systems in city regions, often they have not considered the food system as an important issue when designing, planning and managing cities. The perception has been that because food is there, and one can easily buy it in supermarkets or on the streets, food will always be there (160). This perception, however, is rapidly changing.

There is good evidence that many cities are now firmly committed to action. In April 2015, 100 cities from around the world signed the Seoul Declaration, which calls for the development of sustainable urban production and resilient city-region food systems (165); and, in October 2015, another 115 cities, including several from LMICs, signed the Milan Urban Food Policy Pact, which calls for the development of food systems based on the principles of sustainability and social justice (166).

URBAN AGRICULTURE

The implementation of urban agriculture – the cultivation, processing and distribution of food within the city – could prove an important response to anticipated food shortages, while also providing several economic and health benefits (167). Urban and peri-urban agriculture offer many potential benefits to cities: supply and distribution of fresh food;

increased dietary diversity; lower food costs for consumers resulting from reduced distribution costs; income generation for producers and distributors; and contributions to environmental sustainability by reducing pollution, stabilizing soils and absorbing excess rain water (*168,169*).

Other specific actions that can be taken at the local level include legislation regulating land use practices, zoning, transportation and permitting urban and peri-urban agriculture as well as enhancing land use security for food production and sale (*168*).

For example, in Beijing, China, urban agriculture is integrated into its strategic development plan. Five specialized agricultural zones have been created to promote urban agriculture to produce food as well as to attract tourism and to use as an educational tool. Farmers are encouraged to establish cooperatives to take advantage of their combined scale and bargaining power. Through the cooperatives, the government delivers subsidies to incentivize growth, including selling organic fertilizers and less polluting pesticides at lower prices, reducing farmers' costs and enhancing food safety. The city government estimates that this urban agriculture practice is worth RMB 340 billion a year, with a growth rate of 6.1%, not just in terms of products, but also in contributions to the social and environmental fabric of the city (*170*).

The Participatory Urban Agriculture Project, founded in Quito, Ecuador, in 2002 (*171*), supports more than 12 000 individuals (86% of them women) and 380 community-based organizations in urban and peri-urban farming. It is inclusive of all community members, including those who would often be excluded or marginalized – older people, single mothers, abandoned children, migrants and refugees, and people with disabilities. More than 1000 active gardens have been established, including 140 community gardens. Annual food crop production is estimated at 400 tonnes, with 47% of produce sold and the remainder kept for home consumption. Participants earn at least US$ 55 per month from the sale of surplus produce and make a further saving of at least US$ 72 per month on food purchases by consuming what they grow. The programme has helped diversify the diet of urban farmers and their families, and supported the establishment of produce markets across the city.

In the Democratic Republic of the Congo, government support for urban and peri-urban horticulture since 2000 has created over 16 000 producers across five cities. This has generated some 60 000 jobs and produces 150 000 tonnes of vegetables per year for a total urban population of 11.5 million. Between 2000 and 2010, the project disbursed loans worth US$ 1.08 million to market gardeners for investment in crop production and other income-generating activities. Most of that credit was channelled through "microbanks" managed by development NGOs and growers' associations. Each microbank serves 50–75 growers, who contribute 20% of the loan amount for approved activities. The loans, averaging US$ 60 per grower, are used mainly to buy inputs and farm tools, or invested in small-scale enterprises, such as seedling nurseries, composting units and small-scale animal production (*172*).

Bringing attention to the fact that urban agriculture contributes towards many city-wide health, social, economic and ecological benefits as well as to the goals of municipal agencies and elected officials may help overcome challenges in mobilizing resources and multiple stakeholders.

ACCESS TO SAFE AND HEALTHY FOODS

The availability and accessibility of safe and healthy foods are essential for good nutrition, but there are many obstacles to this in cities. Local authorities have an influential role in determining the location of outlets stocking fresh fruit and vegetables and ensuring that healthy food is available, accessible, safe and utilized, not only where people live, but also in other spheres of urban life such as school, work or recreational places. Poor urban planning and sprawl combined with dysfunctional transportation networks can make healthy food outlets hard to reach. It can also lead to increased hours of commuting for working people, leaving them with less time for food preparation. In poorly constructed housing, there may be no kitchen space, refrigeration or water, all necessary for safe food preparation. These conditions increase reliance on processed or prepared foods, which tend to be higher in calories and lower in nutrition, especially among people with fewer resources. Food safety is also a concern especially with foods prepared in unhygienic conditions in urban street markets and by street vendors.

These situations can sometimes lead to what are called "food deserts". Food deserts appear when residents of low socioeconomic status are unable to access nutritious, affordable food in the vicinity of their home (173). For example, some 43 000 households in Houston, USA, many of them in neighbourhoods with the greatest poverty, are located more than half a mile from a supermarket and do not have access to a car, leaving them vulnerable to malnutrition (Figure 21).

Figure 21.
Urban food deserts in Houston, Texas

Source: McMillan 2014 (174).

Households lacking a car and located more than half a mile from a supermarket

500   250   100

Dark orange: Households in neighborhoods with the greatest poverty

City of Houston

43,000

households in Houston, Texas, have no car and are more than a half mile from a supermarket.
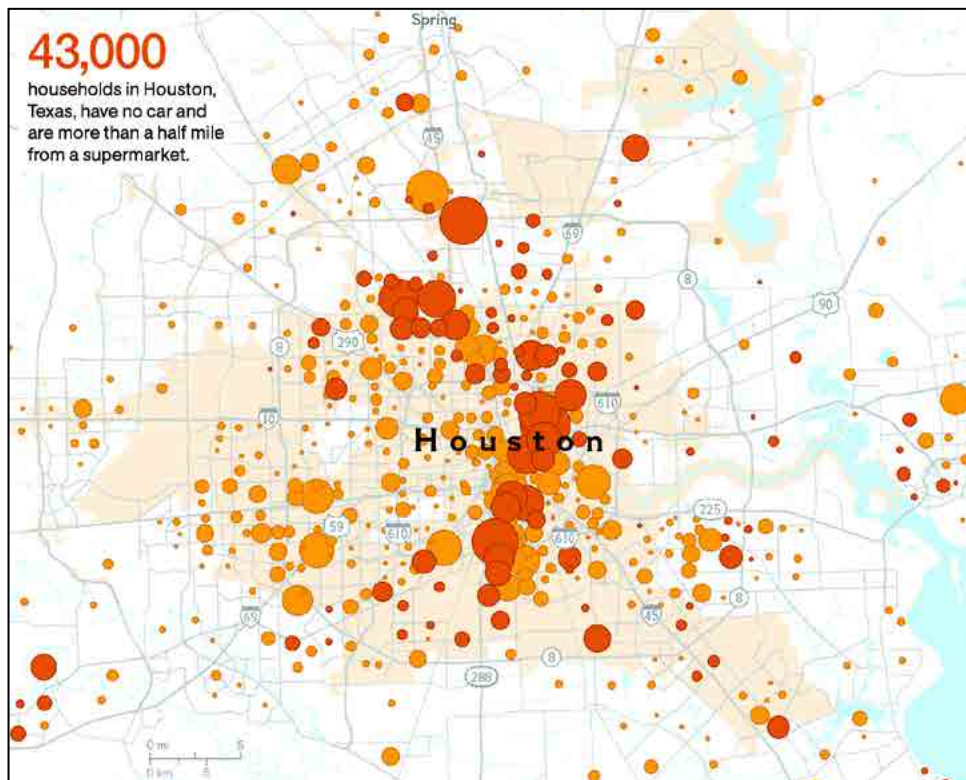
Such problems could be addressed by: (i) legislation that supports local food production (e.g. informal markets; famers markets; community gardens; urban agriculture); (ii) linking social protection schemes to food purchase; (iii) integrating food security considerations into transportation and spatial planning (e.g. zoning food outlets); (iv) healthy eating guidelines for schools and community organizations; and (v) policies and infrastructure on safe food storage, processing, transport and distribution, among other possible interventions.

WHO has developed an approach to improve the safety and nutritional quality of foods sold in urban markets as part of its Healthy Cities Programme. The Healthy Food Markets approach aims to achieve sustainable improvements in food markets, not only by improving the physical infrastructure and essential services, but also by changing the behaviours of various market participants, including primary producers, wholesalers, market vendors and consumers (*175*).

Box 9.	Get Healthy Philly

Get Health Philly is a city-wide approach to improving food security, tackling food deserts and reducing inequities in childhood obesity in Philadelphia, Pennsylvania.

The programme uses a range of measures, including: (i) public awareness campaigns (e.g. for salt reduction; smoking; physical activity); (ii) city-wide nutrition standards for all food served by city agencies affecting almost 64 000 residents and 20 million meals; (iii) supporting corner stores to stock and promote healthy food options; (iv) incentives for food subsidy recipients to spend money on fruit and vegetables; (v) healthy vending machine standards; and (vi) increasing the number of farmers markets. The city pioneered new financing strategies to bring back full-service grocery stores to underserved neighbourhoods and improve food and physical activity in schools, and was one of the first jurisdictions in the country to remove all sugar-sweetened drinks from public school vending machines. Urban planning policies focus on making it easy and appealing for people to walk and bike throughout the city.

Since the programme began in 2010, a 6.3% decline in childhood obesity has been reported compared to the baseline in 2006–2007. Importantly, significant improvements are reported among the African-American and Asian racial/ethnic minorities who live in the city.

Source: Deparatment of Public Health, City of Philadelphia 2015 (*176*).

COST OF FOOD IN CITIES: A REMOVABLE BARRIER TO BETTER NUTRITION

The impact of food cost is closely tied to socioeconomic status and nutrition outcomes. When food prices go up, there are at least two consequences: those most affected suffer a loss in the quality of their diet; and then go on to eat less. This may be especially true of women and mothers who eat less in order for there to be more for other members of

the family. Other consequences may be that families make less use of health services, and their children go less often to school (*177*). When food prices go up, policy attention tends to focus on rural food insecurity and agriculture. But this approach misses a large part of the problem as there is evidence that urban food insecurity exceeds or equals rural levels in many LMICs (*178*).

The reduced quality of food intake as a result of high food prices in cities is partly due to greater consumption of street foods, with potentially unhealthy consequences. As vendors can buy produce and fuel in larger quantities than individual households, street foods can be cheaper than cooking at home, making it especially attractive to low-income families. For example, in Accra, Ghana, street foods account for 40% of food purchases by low-income families, and even 25% of those by high-income families (*178*). But street foods everywhere are often high in starch and fat, and researchers have noted the risk that this contributes to increasing levels of overnutrition (*177*). On the other hand, reduced costs for healthy foods have been shown to achieve the opposite effect by sustaining healthy selections once new habits are established (*179*).

These issues go back to an earlier stage of the food chain. The food and agriculture sector has the primary role of feeding people well by increasing availability, affordability and consumption of diverse, safe, nutritious foods and diets, aligned with dietary recommendations and environmental sustainability. Agricultural programmes and investments can help improve nutrition if, among other strategies, they incorporate explicit nutrition objectives and indicators into their design, target vulnerable populations, and improve equity through participation and access to resources. They can also improve processing, storage and preservation to retain nutritional value, shelf life and food safety, and make healthy foods more convenient to prepare.

Food and agriculture policies can have more impact on nutrition by increasing incentives (and decreasing disincentives) for availability, access and consumption of diverse, nutritious and safe foods. They can also monitor dietary consumption on the same basis, and include measures that protect and empower the poor and women and provide safety nets that allow people on low incomes to access nutritious food during hard times. These and related recommendations have been formulated following an extensive review of available guidance on agriculture programming for nutrition conducted by FAO and through consultation with a broad range of partners, including United Nations agencies, NGOs, government officials and donors (*180,181*).

In addition, social protection programmes, such as cash transfers, can be delivered at the local level and buffer against food insecurity. The Get Healthy Philly programme (Box 9), for example, includes incentives for recipients of food assistance to buy fruits and vegetables. The case study from Brazil (Box 10) cites similar initiatives and others that can contribute to a virtuous cycle of better nutrition and higher labour productivity.

Box 10.	A city initiative on food security that led to a national programme: Belo Horizonte, Brazil
In Latin America, conditional cash transfer programmes have proven successful in improving the nutrition status of the poorest	families as well as facilitating access to health-care services and education through the empowerment of women in decision-

making (*182*). The Zero Hunger programme in Brazil, started in 2003, reached almost one quarter of the population, mainly women, and provided families with approximately US$ 100 per month if their children went to school. This programme, in combination with other schemes, has significantly reduced income inequality in Brazil and, within six years, reduced the number of people facing food insecurity from 50 million to 30 million (*140*). This national programme originated in a pilot initiative in the city of Belo Horizonte in 1992. The newly elected mayor launched a programme of inclusive development to tackle hunger and poverty. A municipal food agency was established to ensure food security that continues to deliver programmes such as food distribution, school meals, subsidized food sales and price regulations.

Under a municipal urban agriculture programme, more than 100 gardens and orchards have been established, including in areas serving vulnerable populations. School gardens have been used for environmental and food education. Since 2011, at least 30% of the food for school meals is bought directly from family farms. Other initiatives include the distribution of fruit trees, gardening education and the establishment of distribution points where families can sell their goods.

The contribution of urban agriculture to the overall food system is low (approximately 50 tonnes of a total of 45 000 tonnes), but the programme has contributed to strengthening social networks, community education and environmental sustainability. The civic forum Urban Agricultural Space was established to bring together 33 civil society organizations and government agencies. In 2013, it successfully campaigned for the municipal government to increase programme funding from US$ 160 000 in 2012 to US$ 240 000 for urban, peri-urban and rural food production. Agriculture is now integrated into municipal programmes for housing, welfare, health, education, employment, training and environmental protection.

Source: Food and Agriculture Organization of the United Nations 2015 (*171*).

HEALTHY EATING BEHAVIOUR INFLUENCED THROUGH LOCAL ACTION

Across all countries, it would be difficult to find an urban community where cheap, processed and packaged foods are not a significant part of the diet. This is especially true in many low-income urban neighbourhoods where foods are often of very poor quality, containing high levels of unhealthy fats, sugar and salt, and lacking in essential nutrients. Eating food from restaurants and street vendors is also common in urban areas. While some serve healthy foods, most serve unhealthy foods, or even unsafe foods, with a higher concentration of such food outlets in lower-income areas.

In Mexico, overall, 58% of caloric intake is from processed foods. This proportion goes up to 66% in Mexico City. China is at an earlier stage of the retail food sector growth and, hence, an earlier stage of consumption of consumer-packaged foods and beverages. Nevertheless, already one third of total calories consumed comes from processed foods. The consumption of calories from processed foods and restaurants increases with the size of the urban area. In Chinese megacities, 35% of total calorie intake is based on processed foods and 19% on restaurants (*183*).

Different measures have been taken to promote healthier eating behaviour in cities as well as nationally, including policy measures to alter the food environment,

public awareness campaigns and skills training, and programmes within specific settings such as schools and workplaces.

Regulatory and taxation measures have been used to influence the availability and consumption of unhealthy foods. For example, in 2006, New York City passed the first regulation in the USA restricting the use of trans-fats, a risk factor for coronary heart disease, in restaurants and fast-food chains. This resulted in a decrease in average trans-fat per purchase by 2.4 grams, with restaurant patrons from high- and low-income areas benefiting equally (184). In Mexico, purchases of sugar-sweetened beverages fell by about 10% within three months after a one peso per litre tax on the products was introduced nationally in 2014 (comparing the first quarter of 2014 to that of 2013), in combination with a 7% increase in purchases of non-taxed beverages (185). Importantly, though, taxation alone can be regressive. Individuals may not be responsive to price increases if the cost of the desired product is already high or the tax is a small proportion of their income. As such, additional targeted strategies, including tax redistribution measures, subsidies, behaviour change campaigns and regulatory restrictions, are also required to improve health outcomes.

Public awareness campaigns aim to influence consumer choice through improved nutrition knowledge and food utilization. Dietary guidelines and messaging as well as cooking recipes or demonstrations can all promote healthy eating. While food labelling is another potentially effective strategy, its success depends on the audience – the use of nutrition labelling is considerably lower among people of lower socioeconomic status and people who have little nutritional knowledge (186). In general, public awareness strategies are most effective when delivered as sustained components of a larger intervention strategy (179).

While national governments are often responsible for the rollout of such measures to promote healthy eating, such approaches have also been incorporated into local-level approaches. This includes programmes within schools, workplaces, marketplaces and other specific community settings. School-based nutrition programmes are especially important for child development and forming healthy eating habits that will affect their health over the life course. The WHO Global Strategy on Diet, Physical Activity and Health recommends that school policies and programmes support the adoption of healthy diets and physical activity (187). Furthermore, the WHO Nutrition Friendly Schools Initiative provides a framework for addressing the double burden of malnutrition (described at the start of this chapter). It includes components relating to school-based healthy eating policies, staff and community engagement in nutrition and health-related issues, and supportive school environments and curricula (188).

The evidence consistently shows that multicomponent interventions are effective (179). For instance, in northern India, a controlled trial evaluating a multicomponent, school-based, nutrition intervention with urban adolescents found that the intervention group had improved knowledge, lower consumption of sugar-sweetened beverages and energy-dense goods, greater fruit consumption and lower BMI (189).

In northern France, EPODE (Ensemble, Prévenons l'Obésité des Enfants – Together Let's Prevent Childhood Obesity), a school-based nutrition education programme that began in 1992 in two towns, has now scaled up internationally, promoting a community-based model of a multisectoral, multipronged intervention to tackle obesity. The initial programme was expanded in scope over 12 years to eventually address physical activity and nutrition in the town populations as a whole through a series of com-

munity-based actions. Over the years, downward trends in mean BMI and obesity have been observed among children. In the years following the scale-up of the intervention to incorporate multiple components both in and out of the school setting, the prevalence of overweight children was found to be about half (8.8%) that of a comparison town (17.8%) *(190)*.

The original programme has now been adopted and expanded to over 300 European cities and towns as well as overseas. The EPODE model is an innovative methodology that enables the entire community, to create a healthy environment that facilitates social change *(191)*. It promotes the involvement of stakeholders across different sectors and at both local and national levels to ensure consistency with national legislation.

SUMMARY

The burden of ill-health associated with malnutrition is significant in cities worldwide. Overweight and obesity, both indicators of overnutrition, are growing while undernutrition still remains a challenge for many of the world's urban poor. As a result, the coexistence of overnutrition and undernutrition, even within the same household, is occurring in urban settings. This is especially the case in LMICs undergoing a transition from undernutrition to overnutrition as the main malnutrition challenge. All of these forms of malnutrition contribute to the burden of communicable and noncommunicable diseases and conditions, and threaten the economic and social foundations of sustainable city development. Overall progress on a broader level is further impeded by persistent inequities in nutrition outcomes.

Malnutrition in cities is largely the result of a complex web of interactions between the physical, economic and social environments of cities. On the one hand, this presents a daunting challenge for cities. On the other hand, it offers multiple avenues for cities to make incremental, but sustainable change to improve food and nutrition outcomes in cities. While primary health care is a key setting in which food and nutrition interventions should be delivered, this chapter goes beyond the boundaries of the health sector to highlight approaches that take advantage of the link between the urban environment and malnutrition. Water and sanitation services are an essential complement to nutrition interventions aimed at reducing undernutrition. Land use regulation and transportation planning can promote urban agriculture and equitable access to safe and healthy food. Active city design can increase physical activity that is a key to preventing overweight and obesity along with nutrition. Other actions that can be taken at the city level to tackle malnutrition include integrating food security considerations into social protection programmes and promoting healthy food choices through education and regulation. The various factors that strongly influence each of these aspects, whether they lie with the private sector or at national and global levels, must also be taken into consideration. Furthermore, without an explicit focus on ensuring equity, large portions of the community will continue to suffer from the lifelong implications of poor nutrition.

The multifaceted nature of urban malnutrition thus requires an overarching framework relying on multidisciplinary approaches in which resources are combined and policies are coherent and integrated to holistically improve urban food security and health and nutrition outcomes.

The adoption of the SDGs in September 2015 has created a new framework where global, national and city goals can align. The adoption of a goal and targets for cities in the SDGs has brought city leadership onto the global development agenda and implicates city leadership to take action. It also links them to other global goals, including health, where they can have significant influence. The population scale of cities, the unique nature of diseases and vulnerability in cities and the resources they wield for prevention and care endows cities with the power to move the needle on global priorities as well as local. For the first time, many global health and

SECTION 1 — CONCLUSION

development agencies are focusing their attention on the city venue for their work. These dynamics present cities with the opportunity and the obligation to take on a leadership role in rolling back many of the world's most challenging diseases and creating environments that actually produce good health.

Cities should embrace their leadership position. It is not only a moral imperative to tackle these sources of premature mortality, reduced quality of life and health inequity, but also an economic imperative. These conditions are eminently preventable

and treatable, and the cost of their prevention or swift treatment overwhelmingly outweigh the costs of hospitalization and preventable death. Disease and premature mortality also have implications for the loss of economic productivity. Most importantly, these are human beings, who along with their families are a part of the fabric of the city and deserve the opportunity to live a long and healthy life. Cities have the power to grant them this opportunity.

      A frequent problem in cities is more often one of not using adequately the tools and resources that exist than a lack of usable solutions. Cities are nested in nation–states that share their health priorities and these priorities and strategies need to be aligned and accountable. Nation–states should have urban health strategies, and they should coordinate with city leadership to ensure alignment and feasibility. In order to tackle these health issues at the scale required of them, cities need to recognize the cost of health inequity. They need to understand the groups in their city that are more vulnerable and why, whether it is due to gender, education or even the location of homes within the city. This depends on increasing the quantity and quality of city-level data for health. An urban data revolution is overdue and will give city officials much needed capacity to determine empirically health-related policies and programmes. Armed with better data, cities will be better equipped to deploy solutions that efficiently distribute access to better health and its determinants. Cities are, therefore, capable of leading on UHC. Cities are capable of eliminating preventable, premature death for all people, and that is eminently within reach.

Why this matters

While the Millennium Development Goals [MDGs] have now been replaced by the Sustainable Development Goals [SDGs], we take a look back at how people in urban areas fared with respect to the MDG targets. There are two main objectives for doing so:

1. To recap our focus on MDGs in the first Hidden Cities report in 2010. In particular, we claimed that rapid progress was needed for the more disadvantaged sections of the urban populace to achieve the MDGs. Therefore, we will examine progress with reference to inequalities in health-related MDGs;

2. To prepare a baseline for the SDGs since all of the health-related MDGs are included within the framework of the new global goals. For example, targets 3.1 – 3.3 of SDG 3, focused on health, are aligned with MDGs 5, 4, and 6 respectively.

How you should read the data

Indicators for MDGs 1.C and 4.A indicate a worse outcome with increasing values, e.g. under-five mortality. These indicator values for the highest and lowest income quintiles are given by black and red squares, as in the figure below. The contrasting differences in size between these squares depict inequality in progress toward the MDG target. The MDG target is represented by a blue line.
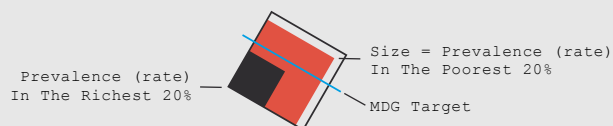
For all other indicators a higher value denotes a more desirable result, e.g. skilled birth attendance. These indicator values for the highest and lowest income quintiles are given by black and yellow squares, as in the figure below.

MDG TARGET IN URBAN AREAS
62.00%

MDG TARGET IN URBAN AREAS
19.00%
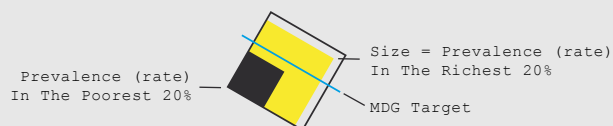
MDG TARGET IN URBAN AREAS FOR THE POOREST 20%
15.00%
67.00%
18.00%
20.00%

TARGET 1.C
Halve, between 1990
and 2015, the proportion
of people who suffer
from hunger
INDICATOR 1.8
Prevalence of underweight
children under five
years of age

VISUAL KEY
50%
0%
Q5
Q1
Country-specific
MDG target

● Africa
■ Eastern Europe
▲ Asia-Pacific
◆ LAC

TARGET MET

WITHIN 25% OF TARGET

FAR FROM TARGET

MET

▲ BGN
● CMR
◆ COL
◆ COD
◆ HND
▲ LAO
● COD
● TUN
● MWI
◆ DOM
● ETH
● UGA
▲ MNG
● GHA
▲ VNM
● MOZ
● GIN

FAR
◆ BLZ
● CAF
● NAM
◆ HTI
● COM
● CIV
▲ NPL
▲ IRQ
▲ KAZ
◆ PER
● RWA
◆ JOR
● NER
▲ PAK
● NGA
● SEN
◆ ZWE

WITHIN 25%

MDG TARGET IN URBAN AREAS

21.00%

MDG TARGET IN URBAN AREAS

39.00%

6.00% 6.00% 88.00%

MDG TARGET IN URBAN AREAS FOR THE POOREST 20%

60.00%

VISUAL KEY

250

0

Q5

Q1

Country-specific
MDG target

● Africa
■ Eastern Europe
▲ Asia-Pacific
◆ LAC

■ TARGET MET

▨ WITHIN 25% OF TARGET

□ FAR FROM TARGET

MET

WITHIN 25%

FAR

ARM ● BEN ▲ BTN ▲ KHM ● COM

◆ PER ▲ BGN ● BFA ● GIN ● MLI ▲ NPL

● SEN ● UGA ▲ AFG ● BDI ● ETH ▲ IDN ● NER

● COD ● CIV ● CMR ▲ LAO ● LBR ● MOZ

▲ KAZ ◆ DOM ● CAF ● TCD ◆ COL

▲ KGZ ● GAB ● GHA ● COG

● SLE ● MWI ■ MDA ◆ HTI

● SDN ● NAM ◆ HND ▲ IRQ

● SWZ ● NGA ● PAK ▲ JOR

● TZA ● TGO ▲ PHL

● ZWE ● RWA

MDG TARGET IN URBAN AREAS
36.00%

MDG TARGET IN URBAN AREAS
27.00%

MDG TARGET IN URBAN AREAS FOR THE POOREST 20%
59.00%
53.00%

20.00%
5.00%

TARGET 4.A
Reduce by two-thirds,
between 1990 and 2015,
the under-five
mortality rate
INDICATOR 4.3
Proportion of 1 year-old
children immunised
against measles
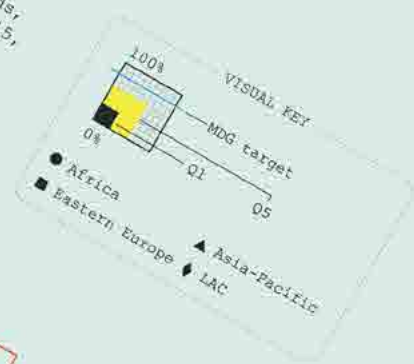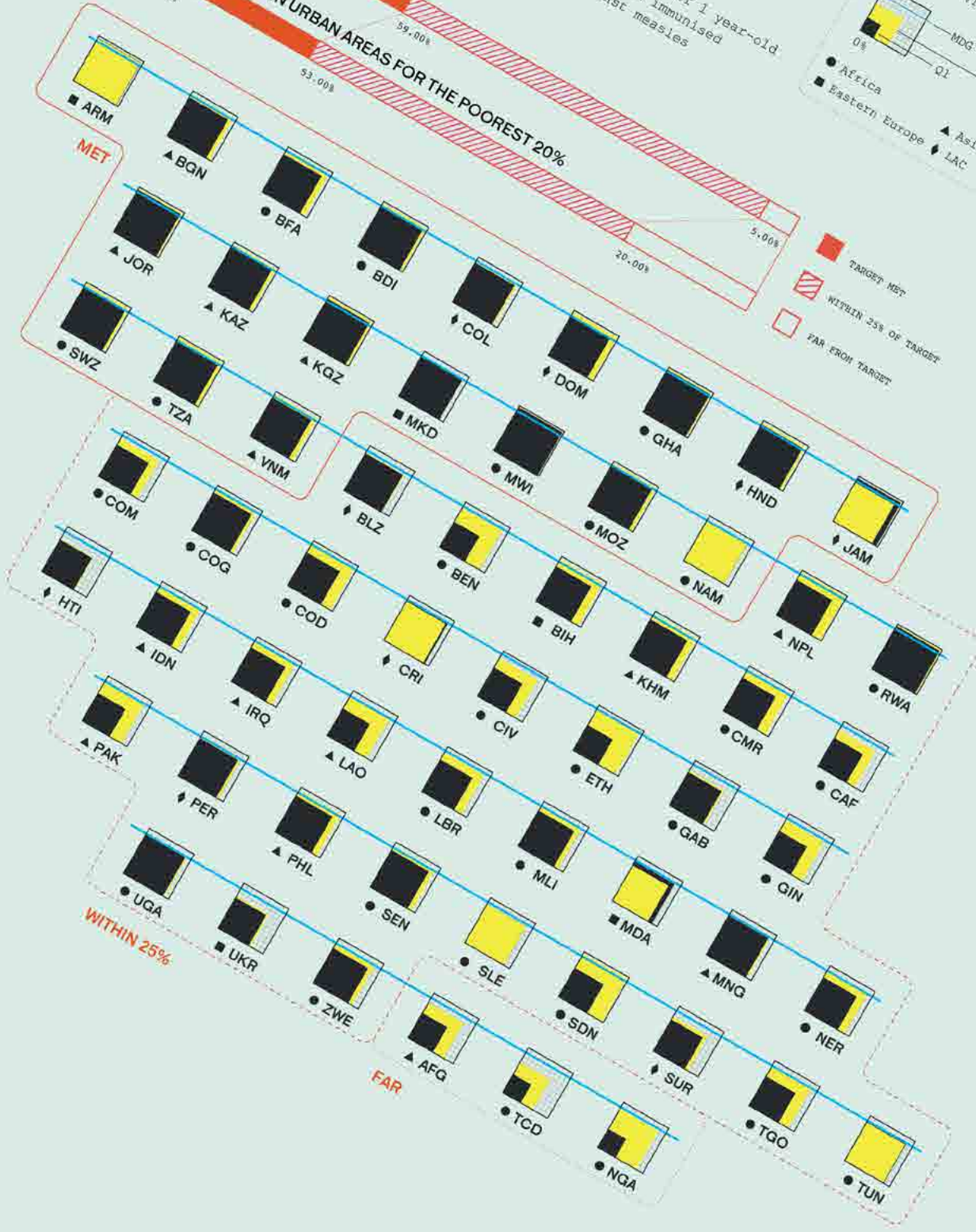
VISUAL KEY
100%
0%
0%
MDG target
Q1
Q5

● Africa
■ Eastern Europe
▲ Asia-Pacific
◆ LAC

TARGET MET
WITHIN 25% OF TARGET
FAR FROM TARGET

MET

WITHIN 25%

FAR

■ ARM
▲ BGN
● BFA
▲ JOR
● BDI
▲ KAZ
◆ COL
● SWZ
▲ KGZ
◆ DOM
● TZA
■ MKD
● GHA
▲ VNM
● MWI
◆ HND
● COM
◆ BLZ
● MOZ
◆ JAM
● COG
◆ BEN
● NAM
● NPL
◆ HTI
● COD
■ BIH
● RWA
▲ IDN
◆ CRI
▲ KHM
▲ PAK
▲ IRQ
● CIV
● CMR
● PER
▲ LAO
● ETH
◆ CAF
▲ PHL
● LBR
● GAB
● GIN
● UGA
● MLI
■ MDA
■ UKR
● SEN
▲ MNG
● ZWE
◆ SLE
● NER
▲ AFQ
● SDN
● SUR
● TCD
◆ TGO
● NGA
◆ TUN

MDG SCORECARD

MDG TARGET IN URBAN AREAS

50.00%

MDG TARGET IN URBAN AREAS

36.00%

MDG TARGET IN URBAN AREAS FOR THE POOREST 20%

34.00%

36.00%

30.00%

6.00%

VISUAL KEY

100%

0%

MDG target

Q1

Q5

● Africa
■ Eastern Europe
▲ Asia-Pacific
◆ LAC

TARGET MET

WITHIN 25% OF TARGET

FAR FROM TARGET

MET

WITHIN 25%

FAR

■ ARM
◆ BRB
■ BLR
◆ BLZ
● COM
● COG
◆ BEN
■ BIH
● JAM
● COD
◆ CRI
● BFA
▲ JOR
▲ KAZ
◆ DOM
▲ KHM
◆ PER
▲ KGZ
● GAB
◆ COL
▲ VNM
■ SRB
■ MKD
◆ HND
▲ AFG
◆ LCA
● MLI
▲ IDN
▲ BTN
● SDN
■ MDA
▲ IRQ
● LBR
◆ SUR
▲ MNG
● MWI
◆ BDI
● TGO
● NAM
● SEN
● MOZ
● CMR
▲ TUN
● SLE
▲ NPL
● CAF
● UGA
● SWZ
◆ NER
● CIV
● GHA
● ETH
● TZA
● NGA
● GIN
▲ HTI
● ZWE
▲ PAK
▲ LAO
▲ BGN
▲ PHL
● TCD
RWA
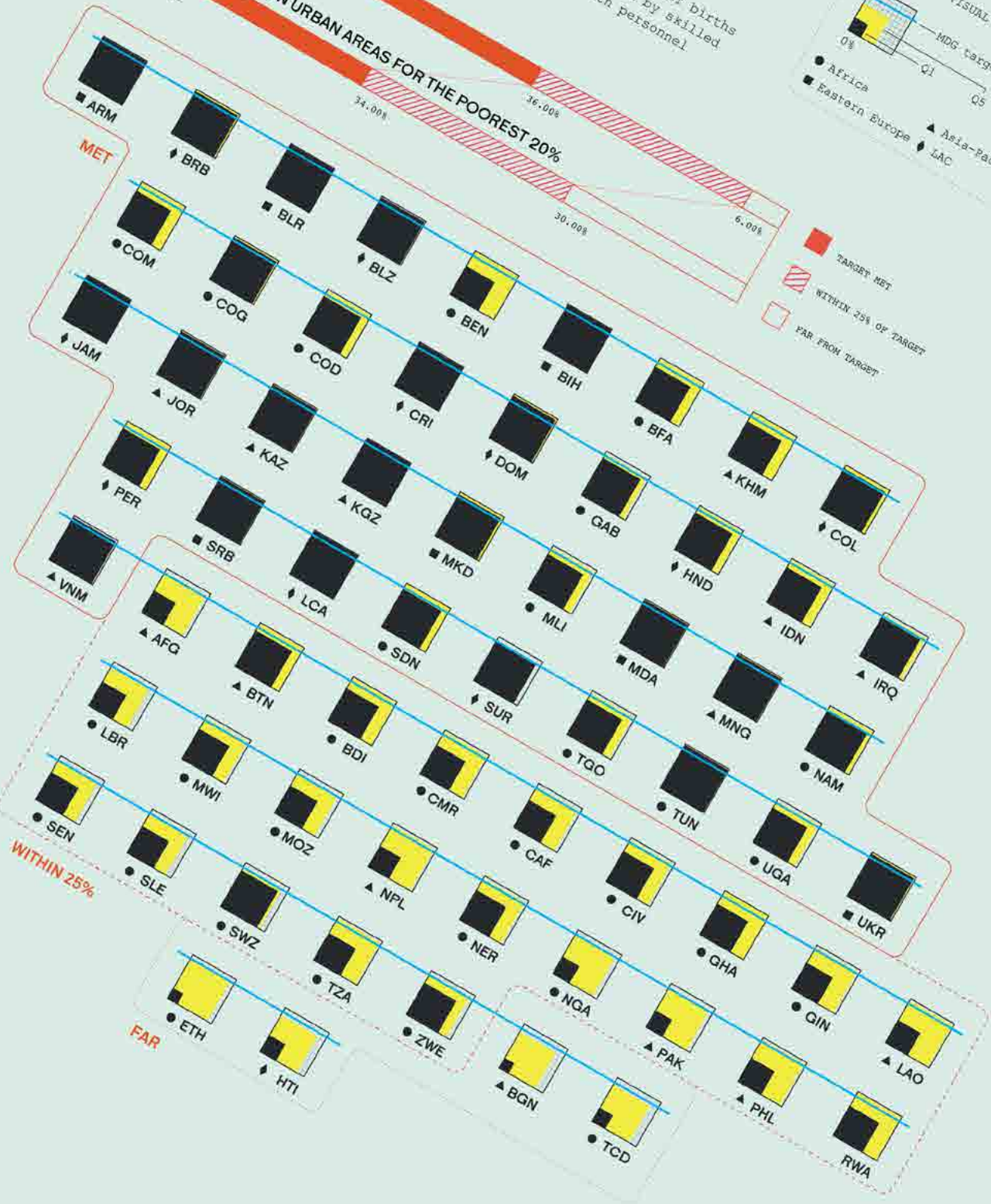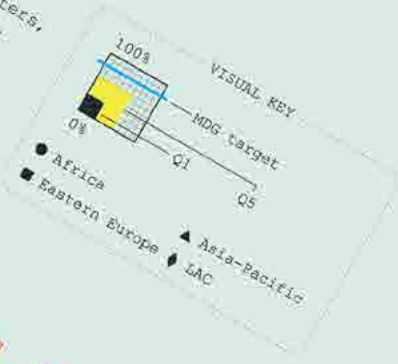
TARGET 5.B:
Achieve, by 2015,
universal access
to reproductive
health

INDICATOR 5.5
Antenatal care coverage
(at least four visits)

MDG TARGET IN URBAN AREAS
34.00%

MDG TARGET IN URBAN AREAS FOR THE POOREST 20%
17.00%
32.00%
34.00%
51.00%
32.00%
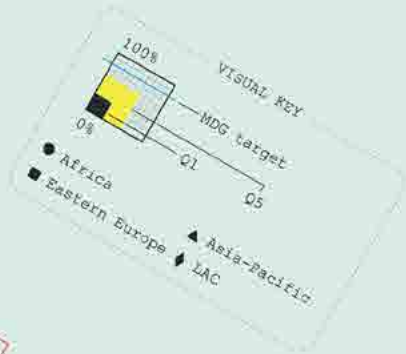
VISUAL KEY
100%
0%
Q1
Q5
MDG target
● Africa
■ Eastern Europe
▲ Asia-Pacific
♦ LAC

TARGET MET
WITHIN 25% OF TARGET
FAR FROM TARGET

MET

♦ ARG
■ ARM
♦ BRB
HND
■ BLR
▲ IDN
♦ BLZ
▲ MNG
♦ PER
♦ JAM
♦ COL
■ SRB
▲ JOR
♦ CRI
● CMR
● SLE
▲ KAZ
♦ DOM
COG
● GAB
■ UKR
KGZ
■ MKD
♦ GHA
● NGA
● GIN
● BEN
■ MDA
▲ MDA
▲ PHL
● LCA
♦ HTI
▲ BTN
BIH
▲ KHM
▲ AFG
● SDN
▲ LAO
● LBR
● NAM
▲ BGN
♦ SUR
● SWZ
● ETH
● BFA
● TGO
● TUN
▲ NPL
● IRQ
● BDI
● CAF
● MWI
● MLI
● TCD
▲ VNM
● SEN
● MOZ
● COM
● TZA
● NER
● COD
● UGA
● PAK
● CIV
● ZWE
● RWA

WITHIN 25%

FAR
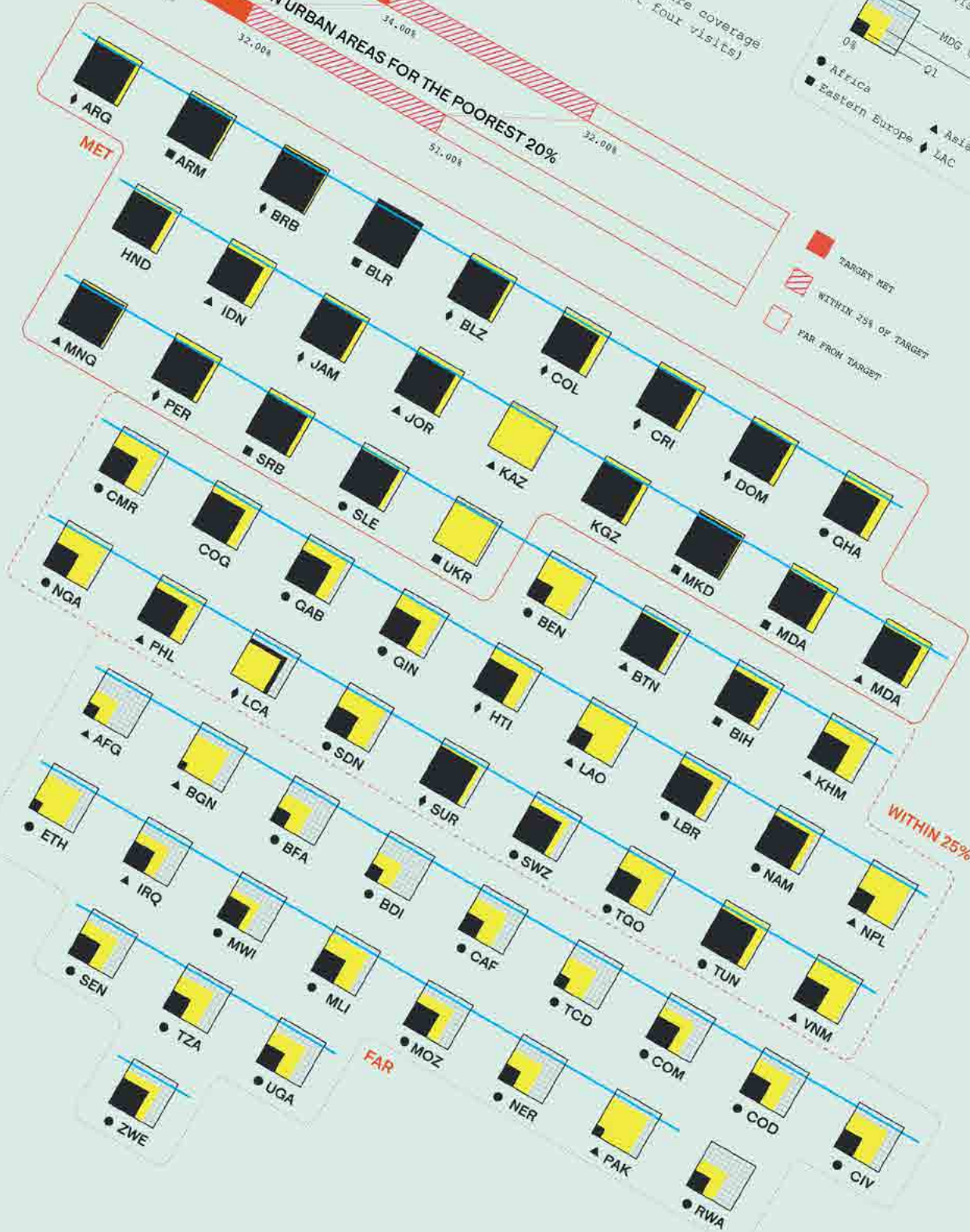
MDG TARGET IN URBAN AREAS

13.00%
65.00%

MDG TARGET IN URBAN AREAS

10.00%
54.00%

MDG TARGET IN URBAN AREAS FOR THE POOREST 20%

36.00%
22.00%

VISUAL KEY

100%

0%

MDG target
Q1
Q5

● Africa
■ Eastern Europe
▲ Asia-Pacific
◆ LAC

TARGET MET
WITHIN 25% OF TARGET
FAR FROM TARGET

MET

◆ BRB
■ BIH
● BDI
◆ ARG
■ ARM
● RWA
● SRB
● CAF
◆ COL
● BLR
◆ BLZ
● SWZ
■ UKR
● COM
● BEN
▲ VNM
● GHA
● COG
▲ BTN
● GIN
◆ CRI
● BFA
■ MDA
↑ HTI
● CIV
▲ KHM
▲ MNG
◆ HND
◆ DOM
● CMR
◆ MOZ
▲ KAZ
● ETH
● TZA
● NAM
▲ LAO
● GAB
● TGO
▲ NPL
● LBR
● UGA
↓ PER
◆ MWI
▲ IRQ
ZWE
● SEN
● MLI

WITHIN 25%

▲ JOR
▲ AFG
● SLE
FAR
▲ KGZ
▲ BGN
◆ LCA
● NER
● TCD
◆ SUR
● SDN
● NGA
● COD
◆ TUN
▲ PAK
▲ IDN
▲ PHL

MDG TARGET IN URBAN AREAS

86.00%

MDG TARGET IN URBAN AREAS FOR THE POOREST 20%

50.00%

30.00%

12.00%

2.00%

12.00%

TARGET 7.C
Halve, by 2015, the
proportion of people
without sustainable
access to safe drinking
water and basic sanitation

INDICATOR 7.8
Proportion of population
using an improved drinking
water source
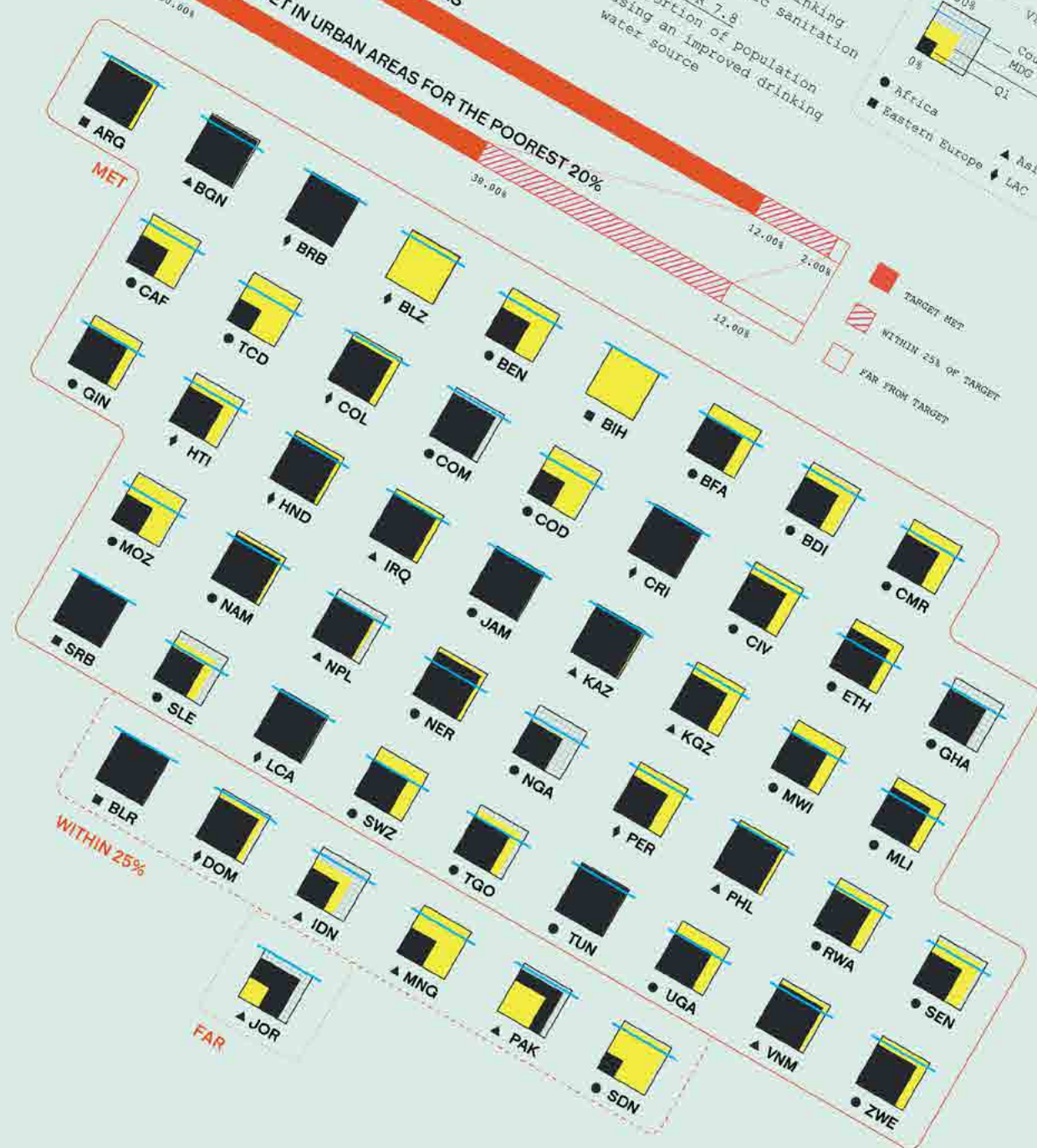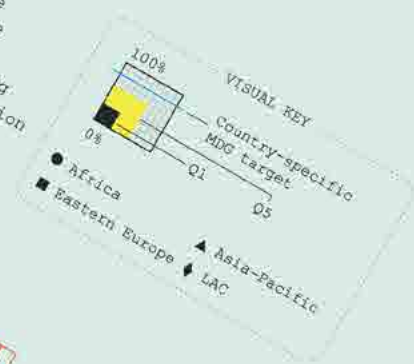
VISUAL KEY

100%

0%

Country-specific
MDG target

Q1

Q5

● Africa
■ Eastern Europe

▲ Asia-Pacific
◆ LAC

TARGET MET

WITHIN 25% OF TARGET

FAR FROM TARGET

MET

■ ARG
▲ BGN
◆ BRB
● CAF
◆ BLZ
◆ TCD
● BEN
● GIN
◆ COL
■ BIH
◆ HTI
● COM
● BFA
● MOZ
◆ HND
● COD
● BDI
▲ IRQ
◆ CRI
● CMR
● NAM
◆ JAM
● CIV
■ SRB
▲ NPL
▲ KAZ
● ETH
◆ SLE
● NER
▲ KGZ
● GHA
▲ LCA
▲ NGA
● MWI

WITHIN 25%

■ BLR
● SWZ
◆ PER
● MLI
◆ DOM
● TGO
▲ PHL
● RWA
▲ IDN
● TUN
● UGA
● SEN
▲ MNG
▲ VNM
● ZWE

FAR

▲ JOR
◆ PAK
● SDN

SDGS:

PVRTY
1

HNGR
2

HLTH
3

EDUC
4

GNDR
5

WATR
6

ENRG
7

ECON
8

INFRA
9

INEQ
10

CITY
11

CNSUM
12

CLCHG
13

OCNS
14

BIODV
15

PEACE
16

PARTN
17

SECTION 2

PLAN CITIES FOR PEOPLE

KEY MESSAGES

Despite significant global progress, lack of access to safe and sustainable water and sanitation continues to pose an urgent challenge for cities.

•

Cities can be designed and managed in ways that enable healthier behaviour and achieve better health outcomes.

•

Urban transport can be transformed to be healthier, safer and more sustainable.

•

Targeted housing interventions, greater use of clean energy and improved affordability can help tackle the global challenge of healthy and sustainable urban housing.

•

Poor safety and urban violence come at a significant cost to the health of urban residents and the societies where they live.

INTRODUCTION

As the populations of cities around the world have surged in recent decades, this demographic change has challenged cities and their leaders to adjust to the new reality of ever-growing urban populations. Their cities would have to grow in order to accommodate more people – either with denser housing and workspaces or by stretching the boundaries of cities. Cities need to plan for these growing populations to live their lives and contribute to the city. Doing so would entail planning for residential areas and transportation to get people to and from work and other daily needs. It requires planning for water provision, energy and other basic services provision such as education, health and safety.

Many cities simply grew too quickly, outpacing their capacity to cope with planning and resources. They are often challenged by the proliferation of informal settlements, substandard housing, inaccessible basic needs and undrinkable water, among many other challenges for urban inhabitants. There has been large-scale development of urban slums, where hundreds of millions still live. Twice as many people are projected to live under these conditions by 2050, unless there is fundamental change in the way cities absorb growing populations. The effects of living under these conditions on residents' health are powerful. As discussed earlier in this report, people living under these conditions often have significantly worse health outcomes, sometimes even worse than their rural counterparts who have no access to the benefits of the city at all.

In many other places, while cities have managed to keep pace, too often the focus has prioritized economic vitality, and not the people themselves. They present familiar scenes of urban sprawl, traffic-clogged streets and polluted air. Even in the most prosperous cities, neighbourhoods are deprived of green spaces. Many are burdened with longer commute times or inaccessible or unusable mass transportation, among other forms of intra-city inequality in planning and resources. Residents of such cities or neighbourhoods may struggle with NCDs, the result of one or more environmental factors such as exposure to pollution or insufficient physical activity.

The ways that cities are planned can profoundly affect the ability of their residents to live long, healthy and productive lives. There is no reason why these effects should be negative. Planning for commerce and planning for people are not mutually exclusive parts of a zero sum game. Cities can be planned for both. People can be enabled to move about the city affordably and safely. They can be enabled to be physically active and to access the things they need. There is nothing inevitable about unsafe drinking-water, even in the fastest growing cities. Practical standards, policies and programmes can enable people to live in safer, healthier homes. Cities can be safer.

Cities can be planned for people and there are great opportunities to do so. There are practical solutions to fix the features of cities that have already been built. Furthermore, since half of all people who will live in cities by 2050 do not live there yet, there is an opportunity, with currently available evidence, to plan healthier cities for these future residents.

Section 2 investigates in more detail the evidence on how people's lives and health are affected by the physical characteristics of the cities they live in. It examines the ways that these characteristics are inequitable in cities. The very fact that the distribution of healthy environments is inequitable clearly indicates that healthier living environments are indeed attainable. This section discusses practical solutions that can be deployed for people living in cities now, and which can also inform planning for future city residents. It focuses on four of the most important aspects of urban planning that have direct implications for people's health and the quality of urban life: water and sanitation management; spatial planning and land use; transport; and housing, including energy-related issues, and safety.

CHAPTER 6 — PROVIDE SAFE WATER AND SANITATION FOR ALL

KEY MESSAGE • **Despite significant global progress, lack of access to safe and sustainable water and sanitation continues to pose an urgent challenge for cities.**

Access to water and sanitation is a human right, as explicitly recognized by the United Nations General Assembly in July 2010 (*192*). It acknowledged that clean drinking-water and sanitation are essential to the realization of all human rights. Water and sanitation is also one of the most significant urban services related to health outcomes, poverty alleviation and sustainable development. Thus, urban management must ensure equitable provision of safe, clean, accessible and affordable drinking-water and sanitation, with provisions to accommodate urban expansion and population growth.

Rapid population growth especially puts an enormous strain on the sanitation and solid waste management capacities of cities, more so in the developing world where such infrastructure is already weak or stretched. Inadequacies in urban environmental health infrastructure and services increase the transmission of diseases acquired through contact with contaminated water, soil and waste (see the chapter on communicable diseases in Section 1), and can have broader, long-term impacts on people's health and well-being.

RENEWED AGENDA ON WATER AND SANITATION FROM THE MILLENNIUM DEVELOPMENT GOALS (MDGS) TO THE SDGS

The world achieved the MDG target of halving the proportion of people without access to improved sources of water in 2010, five years ahead of schedule. Between 1990 and 2015, 2.6 billion people gained access to improved drinking-water sources. In the same time, 2.1 billion people gained access to improved sanitation (*193*).

Despite progress, 2.4 billion people are still using unimproved sanitation facilities. A further 1.9 billion people are estimated to be using either an unimproved water source or an improved source that has faecal contamination (*194*). Continued lack of access to clean and safe water and sanitation puts people at risk of a wide range of diseases such as dysentery, cholera, typhoid, schistosomiasis, trachoma and intestinal worms (*195,196*). These are major contributors to ill-health and preventable mortality, which likely held back progress on other related global goals, such as on maternal and child health, nutrition and education.

Although the number of deaths attributable to inadequate water, sanitation and hygiene was halved between 1990 and 2012, 502 000 diarrhoea deaths were still estimated to be caused by unsafe drinking-water, 280 000 by inadequate sanitation and 297 000 by inadequate personal hygiene. In total, there were an estimated 842 000 diarrhoea deaths caused by this cluster of risks globally in 2012 (197). And these are likely to be underestimates, in part because the global burden of disease estimates do not take into consideration the possibility of exposure to drinking-water that is contaminated at the source

(*194*). Even when diarrhoeal diseases are not fatal, frequent diarrhoea in early childhood can contribute to malnutrition and potential long-term consequences for child development (*19*). The safe management of human excrement and effective removal and treatment of solid waste are also an integral part of the sanitation service chain as one of the most vital urban environmental services. These services are often focused on downtown and higher-income areas, while poor people, especially in unplanned areas, have to rely on onsite systems. The management of faecal sludge from these facilities is typically unregulated and in the informal sector, as it may be officially regarded as a temporary solution (*198*). In areas where waste is not collected frequently, the incidence of diarrhoea can be twice as high and acute respiratory infections six times higher than in areas where collection is frequent (*199*).

Clearly, water and sanitation is an unfinished MDG agenda goal, which is why it is prominently placed among the new SDGs for 2016–2030.

WATER AND SANITATION A PARTICULARLY URGENT PROBLEM IN CITIES

The lack of access to safe water and sanitation is a problem for both rural and urban areas. Although it is generally the case that these services are more developed in urban areas, it is often a particularly pressing problem in cities due to rapid urbanization that outpaces cities' coping ability, the size and fluctuation of demand for the services due to migration, and the huge pockets of poor and un-serviced populations.

The density of cities also increases the potential population health impact of exposure. In crowded urban environments, pollution created by any single individual has the potential to reach many others, placing all residents at risk from poor sanitation and not just disadvantaged communities. One manifestation of this is the effect of poor sanitation on child stunting (a result of chronic malnutrition strongly associated with frequent diarrhoea), which is much stronger in urban than in rural areas. An analysis of data from a multicountry study showed that eliminating open defecation thus has a much greater positive effect on child height in urban areas than in rural areas (*200*).

The successes and challenges of increasing access to improved water sources in urban areas is shown in Figure 22. On average, urban access to improved water sources has exceeded the UHC target of 80% in all regions examined, based on the most recently available data from the DHS. The greatest improvement in urban water access between 1990–2004 and 2005–2013 was ob-

AFRICA: BEN, BFA, CMR, CAF, TCD, COM, CIV, EGY, ETH, GAB, GHA, GIN, KEN, LSO, MDG, MWI, MLI, MOZ, NAM, NER, NGA, RWA, SEN, TZA, TGO, UGA, ZMB, ZWE

ASIA–PACIFIC: BGN, IND, IDN, JOR, KAZ, KGZ, NPL, PAK, PHL, UZB, VNM

EASTERN EUROPE: ARM

LAC: BOL, COL, DOM, HTI, PER
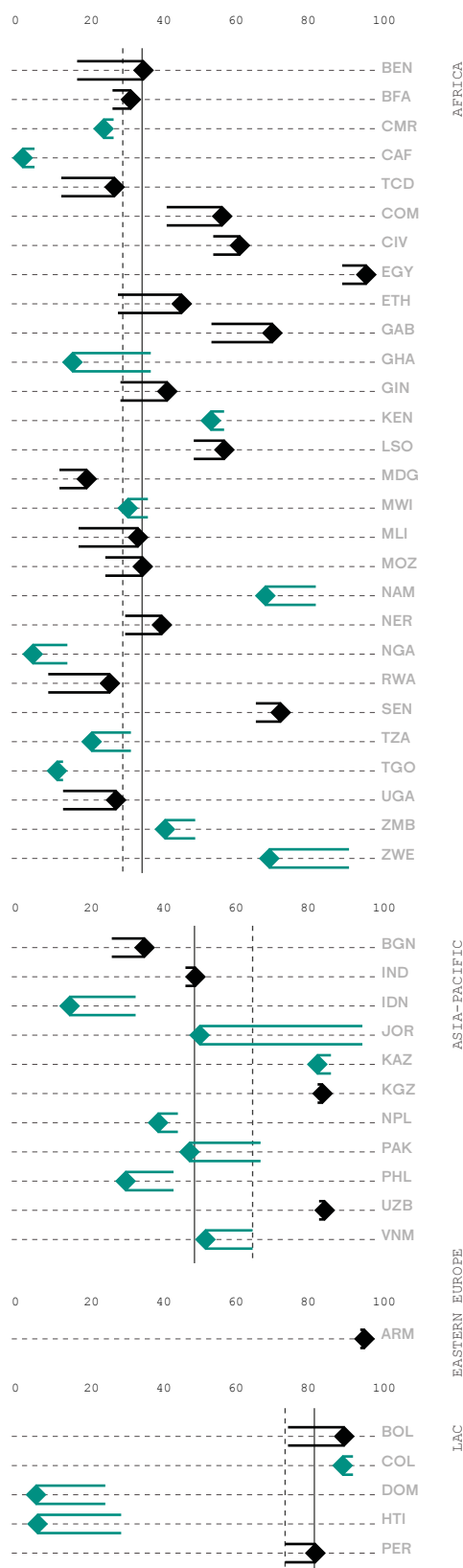
Figure 22.

Trends in country-level urban prevalence of access to improved water sources comparing 1990–2004 to 2005–2013, by world region

Note: Median lines are provided for each time period and region in the graphs.

Source: Global Health Observatory 2015 (*21*).

served in countries in Africa. Countries in Africa and LAC also improved equity in urban access to water in this period, as seen in the narrowing of the gaps between the countries. However, in the Asia-Pacific, household access to improved water sources in urban areas actually declined during these periods, and the disparity between the countries widened. In terms of sanitation, since 1990, 1.2 billion people have gained access to improved sanitation in urban areas, increasing coverage from 76% in 1990 to 80% in 2012. Nevertheless, the population without sanitation in urban areas increased significantly from 215 million in 1990 to 756 million in 2012 (*201*).

Sanitation coverage for urban residents in the world's least developed regions remains very low at 47%, and particularly in sub-Saharan Africa where only 40% of its urban population has access to improved sanitation (*193*). Even when individuals have access to sanitation options such as community toilets, usage of these facilities remains low and many households continue to practise open defecation. Between 20% and 30% of urban populations in the regions mentioned above use shared sanitation facilities, and open defecation rates ranged from 6% in east Asia to 14% in south Asia (*202*). One potential explanation for the persistence of this practice is that it has become an ingrained habit that individuals continue to engage in despite having a better alternative.

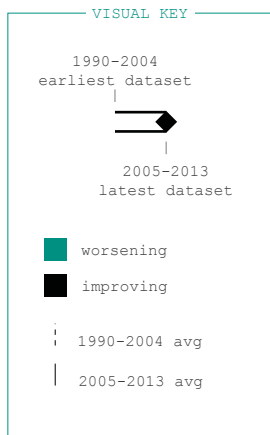With the urban population expected to double globally in the next 40 years, most cities already lack adequate wastewater management due to ageing, absent or inadequate sewage infrastructure. Low-income countries have only 8% of the required capacity to treat waste water effectively (*203*). This will not only lead to severe damage to the ecosystems and biodiversity, but also pose a major threat to human health, economic activity and water security if left unaddressed.

As for municipal solid waste, cities currently generate roughly 1.3 billion tonnes per year worldwide (*204*). For many cities in LMICs, solid waste management is already the single largest budget item, and biggest employer. Yet, as societies get wealthier and urbanize, solid waste production generally increases. It is estimated that solid waste production from cities will increase by 70% to 2.2 billion tonnes per year by 2025 (*204*).

Solid waste management is a critical matter for public health and environmental quality. Poor waste management can lead to clogged drainage ditches that can cause flooding and stagnant water. Blocked storm drains and pools of stagnant water provide breeding and feeding grounds for mosquitoes, flies and rodents. These, in turn, can increase the risk of diseases such as dengue, leptospirosis, gastrointestinal disorders, dermal infections and respiratory infections. Waste left to accumulate in private or public areas and disposed of in open landfill can also be sources of disease vectors. Burned waste can emit hazardous substances into the air. Proper management of solid waste can thus have a great impact on people's health. The sanitation service chain must be developed, financed, managed and maintained continuously and sustainably as services, with a focus on outcomes (e.g. how much solid waste is safely managed) rather than inputs (e.g. construction of latrines and sewers).

INEQUITABLE DISTRIBUTION OF QUALITY WATER AND SANITATION SERVICES

Most countries generally achieve an increase in access to water and sanitation, as well as a narrowing of inequality in coverage, with improved development. The practice of

open defecation also appears to decline, for example, with increasing levels of education (*201*). Yet, major differences in access to water and sanitation between rich and poor in urban areas remain widely prevalent. It is the poor and otherwise excluded and marginalized populations who tend to have the least access to improved drinking-water supplies and sanitation.

Figures 23 and 24 clearly illustrate how the practice of open defecation and access to improved water sources are strongly correlated with household wealth in urban areas, albeit in different patterns. In most of the countries where open defecation is still prevalent in urban areas, it is primarily among the poorest households. This indicates the exclusion of the poorest minority of urban households from receiving the benefits of improved sanitation. This may be because these households have no access to improved sanitation, or they are accessible but not used due to reasons such as poor maintenance or behavioural preferences.

Massive investments are made in infrastructure to address urban sanitation in developing countries, including construction of household latrines and public toilets, but often in favour of richer users. The poor are frequently left to fend for themselves. Self-built onsite systems are the norm for slum households. In these contexts, wastewater and faecal sludge from rich areas are typically channelled far away to a wastewater treatment plant, while those from poor areas stay onsite near the residences (*198*). However, the location of many cities in the world in coastal or riverine areas means that even privileged areas may be affected if the area is flooded, as faecal material will mix with the floodwaters and cause widespread contamination.

Similarly, stark inequities are found in urban access to safe water in some countries where, on average, less than half of the poorest one fifth of urban households have access to improved water sources in contrast to the richest one fifth that have over 90% access (Figure 24). These countries present a very steep social gradient in urban water access whereby the level of access to improved water sources increases systematically, and quite dramatically, with increasing levels of household wealth.

The perils of poor water, sanitation and hygiene are most egregious in informal settlements. A survey of New Delhi's slums found that 44% faced water scarcity, 90% reported that the drains were overflowing and 99% reported that the nearby dumpsters were emptied less than once a month. A toilet audit in these same communities found that 83% of toilets had faecal material, or significant amounts of other waste lying around the facilities, and only 16% had soap or sanitary fluid for washing (*205*).

However, informal settlements are far from being homogeneous as unfair differences exist even within these settings. In Mombasa, Kenya, almost one third of the better-off slum residents had piped water to their homes, while the poorest relied on water kiosks about twice as much as the better-off homes. Flush toilets were used by 70% of the richest one third of households compared to 10% of the poorest one third, and none of the richest one third practised open defecation compared to more than 15% of the poorest one third (*201*). The quality of facilities was also inconsistent. In the unplanned, low-income subwards of Dar es Salaam, United Republic of Tanzania, 56% of households used sanitation facilities that technically qualified as improved, but only 8% had the functional facility that can be considered as hygienically safe and sustainable. The biggest share of this unsafe sanitation was due to unsafe pit emptying (*206*).

Even in high-income countries, there are intra-urban disparities in access to safe drinking-water. In the USA, the first study to systematically examine the role

Figure 23.
Prevalence of open defecation in urban areas by country and by household wealth quintile

Benin
92.5
0.1
1.8
19.9
54.0
92.6

Sao Tome And Principe
84.5
7.0
35.1
61.6
76.8
91.5

Chad
75.3
0.7
5.5
8.3
33.7
76.5

Burkina Faso
74.3
0.0
0.6
2.3
14.6
74.3

Namibia
64.7
0.0
0.1
4.8
32.3
64.7

Mauritania
47.5
0.0
0.0
2.3
10.9
47.5

Niger
46.0
0.0
0.6
1.7
10.2
46.0

Madagascar
41.3
0.1
0.5
3.2
12.3
41.4

Ethiopia
40.7
0.0
0.3
2.1
14.1
40.7

Mozambique
39.6
0.0
0.1
3.4
13.0
39.6

Nigeria
32.4
0.3
5.9
16.2
19.7
32.7

Sierra Leone
25.9
0.5
1.7
3.3
7.8
26.4

Africa

Asia -Pacific

Cambodia
58.7
0.0
0.0
2.2
8.3
68.7

Timor-Leste
58.8
0.1
1.2
7.0
24.8
58.9

Nepal
57.5
0.0
0.0
1.0
12.7
57.5

India
56.3
0.2
0.5
3.7
14.7
36.5

Indonesia
27.8
0.3
0.5
5.8
12.5
28.1

Lao People's
Democratic Republic
39.2
0.0
0.6
0.7
6.9
39.2

LAC

Haiti
21.3
0.0
1.2
6.7
15.3
21.2

Note: For the full country names, see Annex 1, Table A1.2. Q2,
2nd quintile; Q4, 4th quintile
Source: Global Health Observatory 2015 (*21*).

Figure 24.
Household access to improved water sources in urban areas by country and by household wealth quintile
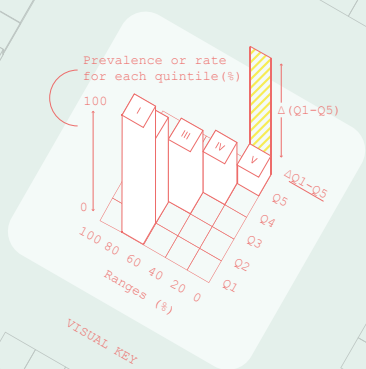
Guinea-Bissau

46.2
94.4
91.4
85.0
73.2
48.2

Zambia

48
97.3
91.4
84.6
67.6
49.3

Chad

51.1
97.6
88.9
86.6
71.7
46.5

Somalia

51.4
90.3
73.0
55.1
39.5
38.9

Sudan

61
96.3
84.4
61.5
41.8
35.3

Africa

Prevalence or rate for each quintile(%)

100

0

Δ(Q1–Q5)

ΔQ1–Q5

Q5
Q4
Q3
Q2
Q1

100 80 60 40 20 0
Ranges (%)

VISUAL KEY

of race in access to municipal water service found that access was significantly lower in African-American neighbourhoods than in some other neighbourhoods. A study in Wake County, USA, the second most populous county in the state of North Carolina and home to the state capital, showed that African-American communities are significantly less likely than Caucasian communities are to be connected to a municipal water supply system in what are known as extraterritorial jurisdictions. Moreover, every 10% increase in the African-American population proportion within a census block increases the odds of exclusion from municipal water service by 3.8%. This disparity is a legacy of racial segregation. Historically, many cities and towns drew their boundaries to exclude African-American neighbourhoods from city limits, while encompassing them within extraterritorial jurisdictions over which town councils with a Caucasian majority retained control (*207*).

Nicosia, the capital of Cyprus, another high-income country, exhibits wide variability of exposure to environmental contaminants in piped water, with lower-income neighbourhoods exposed to worse pipe quality. Historically defined geographic

Source: WHO/Anna Kari

boundaries within a city, such as those defined by the drinking-water pipe infrastructure, provide a unique opportunity for city planners, policy-makers and health professionals to formulate cost-effective urban health interventions, if environmental exposures are well clustered within each neighbourhood (*208*).

While access to improved water sources and piped water are necessary steps in the right direction, they are insufficient in themselves to prevent ill-health from unsafe water. Microbiological contamination of water between the source and point-of-use is widespread and often significant. Increased faecal and total coliform counts in stored domestic water are frequently found in urban areas with uncontaminated sup-

plies (*209*). Many systems classified as "improved" are in reality well below the standard necessary to reduce the risk of human contact with faeces. Access to an "improved source" provides a measure of sanitary protection, but does not ensure water is free of faecal contamination, nor is the level of contamination consistent between type of water source and the setting (*194*). Such evidence suggests that international estimates greatly overstate the use of safe drinking-water and do not fully reflect disparities in access. An enhanced monitoring strategy would combine indicators of sanitary protection with measures of water quality (*210*).

Similarly, sanitation is a complex service chain along which any failures will compromise safety. Providing access to "improved sanitation" alone does not necessarily ensure access to safe, sustainable sanitation. Sanitation consists not only of providing toilets, but also in making sure that people use, maintain and empty them safely. A recent systematic review found that individual psychosocial motivators, such as perceived benefit and self-efficacy, as well as interpersonal factors, such as social norms, are strongly influential in whether there is sustained adoption of safe water, hygiene and sanitation, in addition to contextual factors within the environment and characteristics of the technology itself (e.g. cost; durability) (*211*). Thus, community education and training as well as adequate drainage and solid waste management are essential complements to excreta management services.

The most effective household-level drinking-water intervention to impact diarrhoeal disease in LMICs has been shown to be a point-of-use filter in combination

with safe water storage, according to a recent systematic review and analysis (*212*). At the community level, introduction of high-quality piped water was found to be most effective. The same study also found evidence that sewer interventions are associated with a greater reduction in diarrhoea than basic household sanitation. These results are largely consistent with previously published reviews.

BARRIERS TO HOUSEHOLD INVESTMENT IN IMPROVED WATER AND SANITATION

Many cities, especially those in developing countries, suffer from inadequate supply of improved water and sanitation. Building such infrastructure is costly and may involve numerous technical, bureaucratic and legal constraints. However, even in places where the water and sanitation network exists and it is technically feasible to connect to it, there may be demand constraints that limit people's access to these services. Understanding the underlying factors that affect demand for urban services is a necessary first step in the design of the most suitable incentive mechanisms to improve access.

Evidence from different country contexts suggest that many families and households in developing country cities do not want to invest in improved water and sanitation, even if they could afford it (*213,214*). Many urbanites are also migrants who are temporary or transient and are even less likely to invest in their houses. People may simply lack the money or willingness to pay for the service, may have a poor understanding of the benefits and costs of those services or may not be fully aware of the health costs of current options, partly because such information is not communicated to them (*214*).

A common situation is that people who do not have legal property rights to their dwellings, often informal settlers, are not motivated to make major improvements to them. They see no reason to invest in homes if they are not the recognized owners. Evidence in Latin America has shown that, in fact, households with insecure property rights are less likely to invest in improvements or to use their house as collateral for a loan to invest in improvements. While strengthening property rights in urban slums has been shown to have a significant effect on residential investment, it has also created other problems. Once land rights are granted, the poor may resell the land to wealthier people (*215*), and then create new slums elsewhere, perpetuating the problem of poor water and sanitation.

There are some examples of success, however. A randomized evaluation of a social programme in Tangier, Morocco, that offered low-income households a chance to get an in-home connection to the city water system by providing technical assistance and interest-free loans found that families were willing to pay a lot to have a private tap in their home. While there was no impact on health because these families already had access to clean water at public taps, the new water connections enabled more leisure time, fewer tensions with neighbours over using a communal tap and better perceptions of quality of life. The evaluation showed that not only making credit available, but also simplifying or assisting with the application process could greatly increase families' willingness to invest in water connections. It also showed that social networks (i.e. observing the benefits enjoyed by neighbours) are an important channel for learning about new programmes and benefits (*216*).

COORDINATED, SYSTEM-WIDE SOLUTIONS ARE NEEDED AND POSSIBLE

Given the challenges to small-scale private initiatives to invest in water and sanitation solutions and the systemic nature of water and sanitation services, well-coordinated system-wide solutions are also needed to achieve efficiency and effectiveness on a broad scale. This involves coordination between the water and sanitation sectors, including public and private providers, along the chain of services within each sector, within the affected community and between relevant national and local level policies.

Community level coordination is important in mobilizing the resources needed to invest in water and sanitation infrastructure and to ensure public health safety for all. To be effective, urban water and sanitation management has to be inclusive of all residents and areas, including the poor, and implemented within a city-wide framework. When done well, it could provide a wide range of benefits, including longer lifespan, reduced morbidity and mortality, higher school attendance, lower health costs and less time and effort devoted to managing water and waste (*214*). In economic terms, it is estimated that combined water supply and sanitation interventions have a cost–benefit ratio of 4.3 (i.e. an economic return of US$ 4.3 per US$ 1 invested) at the global level, ranging from 2.0 in Oceania to more than 5.0 in LAC and East Asia (*217*).

Coordination failures, however, pose serious challenges to implementing community-wide solutions. Not all individuals in the community may approve the development of water and sanitation services. For example, small, private water service providers – tanker operators, private kiosk operators, household resellers, door-to-door vendors, and operators of small boreholes and private piped networks – have a vested interest in preventing the construction of formal network-based services. Some of these provide good quality service under competitive conditions, but the price of water is usually much higher than that of the main water utility, and they are most often informal and unregulated providers. Even when new and improved solutions are implemented, they may not be sustained if no one takes responsibility for maintenance. There is evidence that community sanitation facilities are usually poorly maintained – and the failure of one affects many. Mismatches can also occur between demand for improved sanitation and the type of services provided, often resulting in unused or underused sanitation infrastructure.

Coordination can be challenging, especially in urban areas. In contrast to rural areas, urban settlements are often heterogeneous, both ethnically and in socioeconomic status, which hinders collective action. Longer-term residents may also find it difficult to motivate new settlers, especially transient migrants, or hold them accountable to investments, norms and rules. Poor communities face the additional challenge of lacking the political influence to affect municipal decisions. Sanitary conditions in these communities may not be the priorities for policy-makers.

For larger-scale solutions beyond the household or community level, local and central government participation is necessary. Issues surrounding the accountability of elected representatives in poor neighbourhoods then become very relevant. Despite the urban poor forming a sizable proportion of the population, this voting bloc has often been unable to leverage their political weight to gain improved public service delivery.

States should adopt the necessary measures to certify that water is universally guaranteed and affordable. Households must be able to afford a basic quantity of

water for essential consumption. If the cost of water is above the financial availability of the poor, this will hinder universal access and the fulfilment of the right to the city for all. When water is unaffordable, consumption could decrease below the level of essential needs and result in serious health risks to the most disadvantaged (218). The public sector must, therefore, ensure tariff schemes that protect the most disadvantaged from disconnections due to high prices associated with weak financial capacity, without jeopardizing financial sustainability of service providers (219). At the same time, subsidy policies can ensure access for the poor, served both by formal or informal providers. If the poor are willing to pay for improved drinking-water quality, as is evidenced in some countries (220–222), volumetric rate of water service charge (instead of regressive lump sum water service charge) can be an important economic instrument and policy tool. It can increase efficiency in the water supply system by maintaining distributive justice, reduce wastage of water and ensure that the water provider has sufficient revenue to maintain safety (223).

Despite formidable challenges, coordinated system-wide solutions to deliver safe water and sanitation are achievable and sustainable. They can be successful even in urban slums as seen, for example, in Nairobi. Over the last 10 years, Kenyan government ministries, development agencies and civil society have invested considerably in initiatives to improve sanitation in urban slums. Great improvements have been made in the provision of water and sanitation facilities with corresponding improvements in health outcomes (224). Between 2000 and 2012, the proportion of Nairobi slum households buying water from vendors decreased from 74.8% to 11.4%, and those accessing water through public taps increased from 2.7% to 59.3%. The proportion of slum households using flush toilets increased six fold from 7.3% to 46.2%, while households using traditional pit latrines decreased from 78.8% to 44.0% – an almost 50% decrease. These improvements in access to water and sanitation have been linked to declines in diarrhoeal deaths (35) and in under-5 mortality (225).

SUMMARY

This chapter illustrates the pressing need to address the urban water and sanitation challenge comprehensively, with a strong emphasis on including slum dwellers and poor communities that have typically been neglected.

Lack of access to and use of safe, sustainable water and sanitation is globally one of the biggest contributors to ill-health and preventable mortality. Both access and quality will need to improve at a much faster pace and on a larger scale than in the past to meet this continuously growing demand. Currently, lack of access puts 2.5 billion people at risk of many diarrhoeal and other diseases even though, as noted, access is a globally recognized human right.

Without concerted intervention, the health, development and quality of life of all urban dwellers will be in jeopardy. There will be greater risks of diarrhoeal and other diseases and hazards that this chapter discusses and lead to significant disadvantages in education and productivity.

While water and sanitation is a problem for both rural and urban areas, it is particularly urgent in cities, and especially for marginalized populations in them. Furthermore, even though access to improved water and piped water are important steps in the right direction, they are insufficient alone to prevent ill-health from unsafe water

thus water quality deserves more attention.

There are undoubtedly many obstacles at every level, however, solutions are available, achievable and sustainable. Some of these are system wide, and require local and central government participation. Others are on a smaller scale, involving communities and households. This chapter offers evidence of these solutions and ways that city leaders and urban communities can move towards implementing them.

CHAPTER 7 — DESIGN HEALTHIER, MORE SUSTAINABLE CITIES

KEY MESSAGE • **Cities can be designed and managed in ways that enable healthier behaviour and achieve better health outcomes.**

The ways that cities are planned can profoundly affect the ability of their populations to live long, healthy and productive lives. Planning influences the layout of streets and corridors, including which parts of the city they connect. It determines where to find the various features of the city – everything from hospitals and schools to commercial spaces and public parks. It determines whether a growing city stretches towards the sky or spreads out. These are among the ways that the invisible hand of city planners plays a role in where residents live, work and play, and how they access these features of their daily lives. The combination of these factors gives each city its own identity, with its different areas and neighbourhoods, streets and transport corridors of road and rail networks. The combination of these features, or the absence of them, also influences urban residents' health and quality of life.

Many cities around the world have grown so rapidly that they have had little opportunity to keep the interests of their residents firmly in mind, much less look ahead and plan for the future. Where the pace of urbanization has allowed planning to be done, too many of our modern cities have concentrated on providing for motor vehicles, commerce, industry and economic growth. Cities have become engines for economic growth, generating more than 80% of global economic activity (*226*). So often, the people who live in cities have been left off the designers' drawing board. This is a common, recurring oversight. When people and their quality of life are not recognized as priorities, the consequences are likely to be at least unhealthy and at worst fatal.

These unintended outcomes include featureless urban sprawl, substandard housing, traffic-clogged streets, toxic air quality and underserved neighbourhoods. Like so many other elements of the city, it is often the poorest families who are most affected, and are thus further locked into poverty.

The design of a city, while seeking to create a place where people can live and thrive, also often casts a long shadow over the health of the very people it tries to accommodate. This does not have to continue. The city environment is not an inherently unhealthy place. Quite the contrary, the city ideally offers opportunities and access that

can enable people to live healthier lives. Through improved design and planning, city leaders can play an enabling role in their constituents' health. They have an incredible opportunity to do so. For the multitude of cities that are already invested in less healthy infrastructure and planning, they can still make adjustments to the city environment to enable the current cohort of urban dwellers to live healthier lives. City leaders can plan healthier environments for the 3 billion future urban dwellers that do not yet live in cities. Many elements of planning that can affect the health of urban residents. The development of slum homes and neighbourhoods is a critically important issue to address (see the chapter on housing). City streets and other elements of mobility are also instrumental in the health of city residents. This chapter looks at how cities manage urban spaces and the ways that they can either positively or negatively influence the health of city residents. It also briefly addresses how cities are increasingly being planned for the health and well-being of older adults. In addition, it looks at how better urban planning can mitigate the impact of disasters on urban populations.

A WORLD OF SPRAWLING CITIES

The growth of city populations over the last century has forced urban planners and city leaders around the world to cope with significant numbers of new residents in a short time. In most cases, cities have accommodated their new residents by pushing the boundaries of the city for expansion. These cities occupy increasing volumes of land cover – they stretch and they sprawl as they grow. Meanwhile, some cities have not coped with swelling urban populations and the new residents have pushed the city boundaries themselves, constructing informal settlements at the periphery of the city, where they lack city services and infrastructure.

Planned, or unplanned, cities have expanded significantly in response to urbanization. The problem this presents for planners is that many cities are expanding at rates that exceed their capacity to accommodate the growing population. In a global sample of 120 cities measured during 1990–2000, the geographic extent of the city grew more than twice as fast as the population (Figure 25) (227). At these growth rates, the world's urban population will double in 43 years, whereas the world's urban land cover will double in only 19 years.

Sprawling cities are among those whose outward expansion has outpaced population growth, resulting in lower density settlements. In some cities, relatively wealthy residents, seeking more space and access to the city, occupy these lower density settlements. In other cities, relatively poorer residents, often seeking more affordable housing, occupy the peripheral settlements.

In sprawling cities, the necessities of everyday life for many residents become less accessible. Public transportation requires dense populations in order to be sustainable. In the absence of density, public transportation for certain communities can be either infrequent or non-existent. Hospitals, schools, businesses, city parks and planned public spaces are all more sustainable with human density. With lower density – when cities sprawl – these institutions and infrastructure that make up the very essence of the urban advantage become unsustainable. In these cases, urban spaces often become single-use spaces – places where people live, or places where people work, play and access their daily needs, but not both.
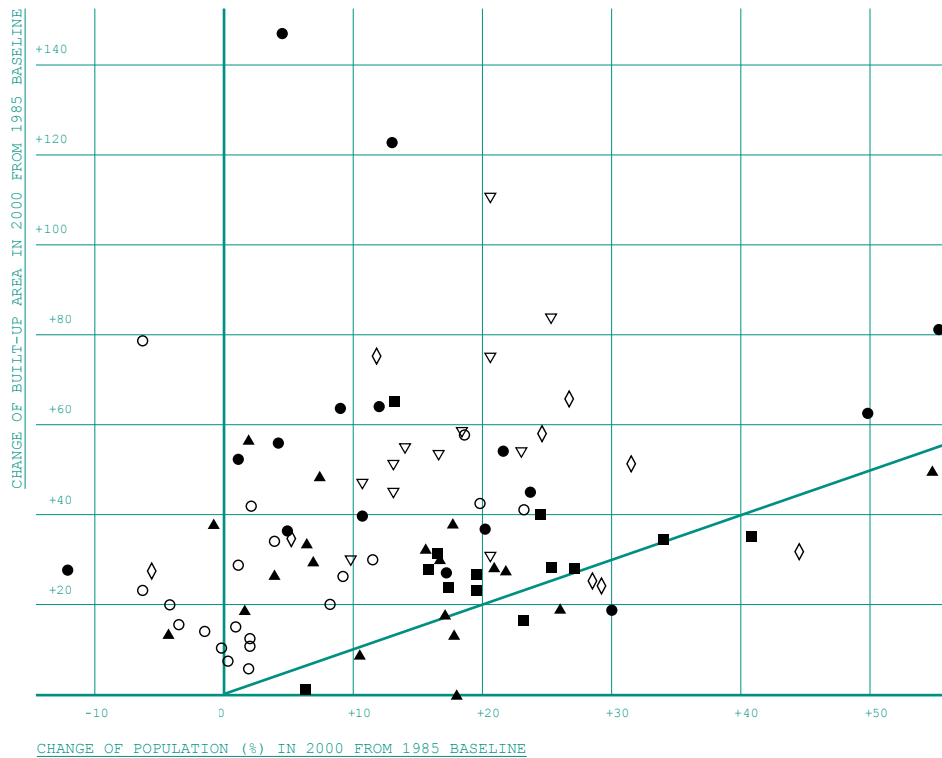
Figure 25.
Urban spatial expansion and population growth

Source: Angel et al. 2005 *(228)*.

VISUAL KEY

CITY

◇

REGION

◇ AFRO

■ EMRO

○ EURO

▲ PAHO

▽ SEARO

● WPRO

URBAN EXPANSION
COEFFICENT = 1

In these modern cities, residents become more car-dependent. As cities have grown, and more single or limited-use communities develop, many people live long distances from work and other needs. Figure 26 depicts the relationship between transportation energy use and urban density, showing clearly that less dense cities have more energy-intensive mobility. Atlanta, USA, needs 783 gallons of petrol per person per year to make its urban mobility system work. By contrast, relatively more compact cities such as Barcelona, Spain, and New York City require 64 and 80 gallons, respectively, of petroleum per person *(229)*.

Energy-intensive mobility is associated with a great proportion of the population relying on private motor vehicles and driving longer distances. Lower population density is also correlated with longer trips in private vehicles *(230)*. Importantly, greater numbers of private vehicles on the road and kilometres travelled are directly related to health problems associated with air pollution and road traffic accidents (see on the chapter on transport). It is the structure of the city that allows for longer commute times and greater distances to daily needs. It virtually ensures longer daily vehicle time, and, for many people, less physical activity and reliance on less nutritious convenience foods. When combined with single-use neighbourhoods that lack accessible commercial, public and green spaces, the planning of the city can become a significant contributor to sedentary behaviour. Annually, 3.2 million deaths are attributed to insufficient physical activity. WHO recommends at least 150 minutes of moderate intensity physical activity per week for average adults *(231)*. A person who walks or bicycles 10 minutes to and from the bus or train, from home and then to work every day, would get 200 minutes of walking just from their commute five days per week. Meanwhile, commute times and traffic congestion are worsening. In 95% of the largest cities in the USA, traffic congestion has been increasing *(232)*.

Figure 26.
Population density and transport energy use

Source: Reproduced with permission from Rode and Floater 2014 (*229*).
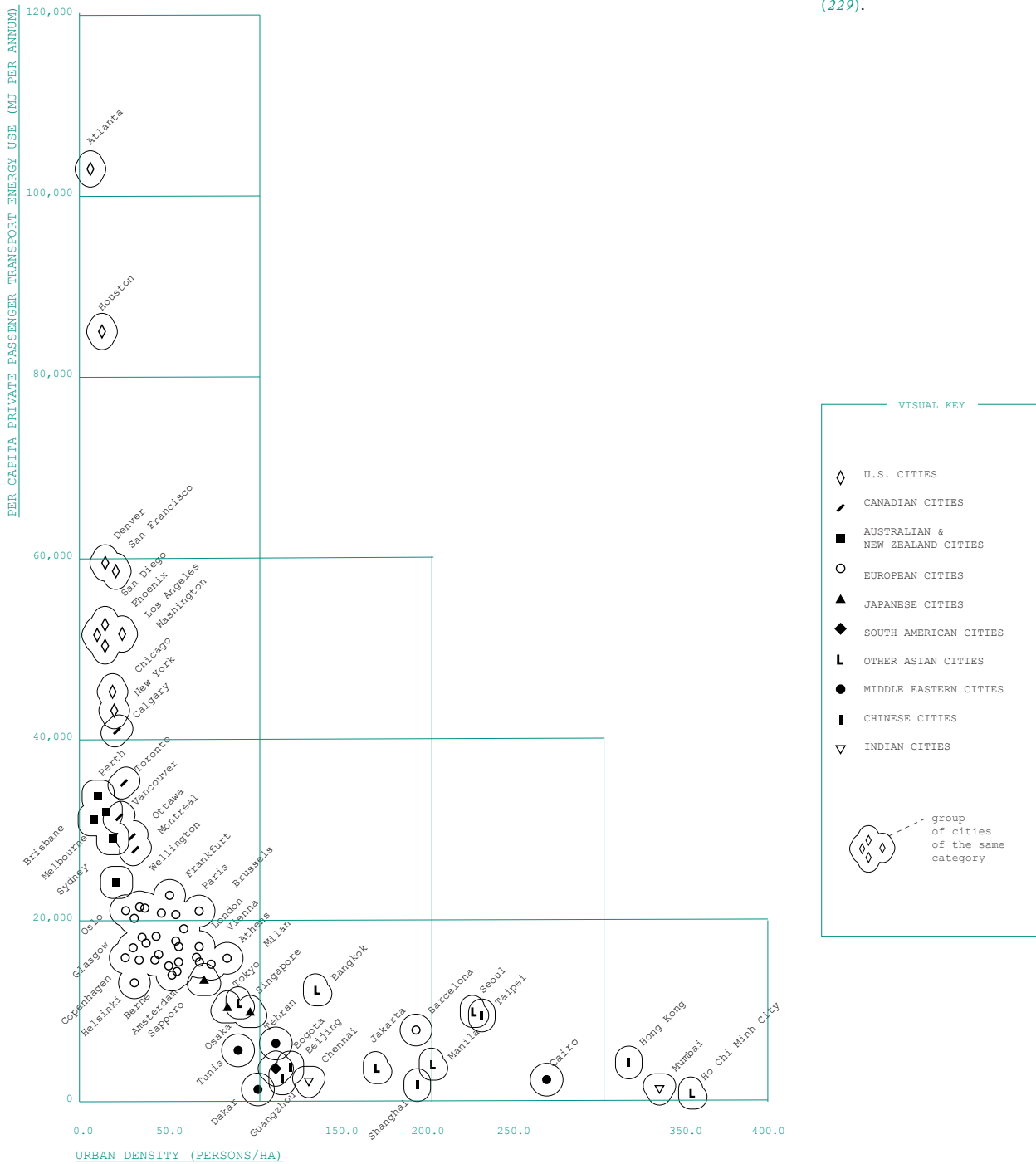
While the causal link is not yet established, the correlation between sprawl and ill-health is well documented, and there is clear value in enabling those who are constrained by the urban environment to live healthier lives if they so choose. In a 2014 update to a landmark study of sprawling metropolises, Ewing and colleagues again found a negative correlation between sprawl, health and economic opportunity across 221 cities and 994 counties in the USA (*233*). Put another way, the data indicated that in less sprawling cities people live longer and have greater economic mobility.

CITIES CAN BE DESIGNED TO IMPROVE HEALTH FOR EVERYONE

Cities can be planned for the health of their residents. It is certainly true that urban infrastructure is difficult to change once it is in place; streets and buildings live long lives with some maintenance, and cities can be difficult to rezone. However, it is possible to take steps to shape even the most sprawling cities for better health. In 2015, Los Angeles, California, passed sweeping legislation to overhaul city mobility. Rather than adding lanes to streets for more cars to alleviate congestion, the city is planning to add bicycle lanes, sidewalks and dedicated spaces for bus rapid transit (BRT) (*234*). Copenhagen, Denmark, embarked on a multi-decade project to remake completely the city with mixed-use neighbourhoods around transit-oriented development (Box 11). Not every city can do an "extreme makeover" for health, but every city can take steps in the direction of healthier planning. Furthermore, there is an opportunity to build healthier cities when it is clear that urban populations are set to more than double over the next several decades to 2050. There is a long time to plan these spaces for a better future.

Box 11.	Copenhagen: The world's best bicycle city?

The municipality of Copenhagen aims to be the "world's best bicycle city" and has a target for 75% of all trips to be by foot, bicycle or public transport by 2025. Good conditions for cycling are also part of the city's official health policy. Cycling is not a goal in itself, but a highly prioritized endeavour for creating a more liveable city. Currently, 26% of all trips to work or schools in Copenhagen are by bike. This high share is a key element of their goal to make the Danish capital carbon dioxide-neutral. More than six decades ago, Copenhagen initiated an integrated transport and land use strategy that led to the development of dense walkable urban centres connected to one another by rail-based public transport. Effective land-use regulations, considerable investments in public transport infrastructure and a clear spatial strategy, known as the Finger Plan, made this possible. The Finger Plan calls for urban growth along rail corridors (the fingers) from the city centre and protects the in-between green wedges from development. City-level land use planning promotes high-density, mixed-use developments around public transport stations and limits parking options for private vehicles.

Source: Rode and Floater 2014 (*229*).

One key principle for making cities healthier for their residents is to make their daily needs accessible by a combination of walking or cycling and public transportation. Physical activity is a critical mechanism by which the built environment can affect health, particularly NCDs. One of the ways that city design can promote physical activity is through compact city design. Compact cities have relatively high residential density. In compact cities, intra-urban distances tend to be shorter – the things people need and the places people need to go are close by. Shorter intra-urban distances reduce time spent in a vehicle and lowers travel costs. The lower cost of transport can substantially help low- and middle-income households, where transport and housing can consume a great proportion of household income. Decreased transit time yields a boost to mental health as well as economic benefits. The average urban resident in an American city spends 42 hours in traffic, or the equivalent of one working week in their motor vehicle every year commuting to work (232). This is a week that could be reallocated to more productive activity, including work, but also leisure. Higher density residential neighbourhoods with shorter intra-urban distances are associated with more walking and cycling. This all adds up to fewer kilometres travelled by car, which reduces air pollution. Studies in the USA have also shown that relatively compact cities with mixed land use have better air quality than relatively sprawling cities (235).

Cities have to give careful consideration to how they should reap the rewards of compactness. For example, at the extreme, city density can lead to crowding. Crowding can of course be a cause of ill-health. In striving to achieve a more compact city and more sustainable density, it is important that city leaders do not artificially constrain the housing stock by limiting land use (236), which limits housing supply and can drive up home prices and rents.

Furthermore, the composition of spaces in cities can determine the extent to which high-density living can positively affect health, or not. Mixed land use spaces are a key element of healthy city planning. Cities do not have to be dense everywhere, but they can plan for residential density around mixed land use spaces. Mixed land use,

together with high-density living, is correlated with increased levels of physical activity (*237*). Ideally, residential density around mixed land use means that people's needs are very close to their homes, which makes walking or cycling more attractive choices. Ensuring that corridors safely connect people to their daily needs within neighbourhoods will also encourage walking and cycling. Street connectivity and intersection density have both been found to be positively correlated with walking and cycling (*238*).

Urban density often conjures up images of concrete and metal landscapes, but green and recreational spaces are crucial additions to mixed land use planning for cities. Green spaces and recreational areas give city residents the opportunity to be physically active and promote mental health (*239*). Without them, physical activity is limited to paved spaces shared with cars and other obstacles. An international study in 17 cities found that proximity to public parks and attractive aesthetics positively correlated with leisure time physical activity among adults. The findings were similar across diverse cities on five continents (*240*). These results confirm those of prior studies and demonstrate that the importance of having parks within neighbourhoods is universal. Another significant study showed that proximity to parks was one of the most consistent correlates of children's physical activity (*241*). Parks can provide places for physical activity and favourable aesthetics of buildings and landscapes can help people enjoy being active in their neighbourhoods.

Cities can plan for smarter growth that enables their residents to live healthier lives. For cities that are more "locked in" to their current forms, it is more difficult and it can take some time to steer the city in another direction. Even then, it is possible. The Copenhagen example illustrates how a strategic approach to making the city healthier can succeed with patience and perseverance. Other cities around the world are also taking steps in this direction. The next chapter on transportation discusses cities that are making adjustments to locked-in forms in order to promote healthier transport. The payoff of creating the conditions for a healthier city is potentially significant for residents. In the Ewing cross-sectional study mentioned above of more than 200 cities and 994 counties, the researchers found that residents of relatively more compact areas performed better on selected economic and health measures. Although residents of compact cities tended to have higher housing expenses, they spent less on combined housing and transportation expenses, as savings in transportation costs outweighed higher housing costs. The more compact the area, the more these residents walked, while motor vehicle ownership and drive time decreased. People who lived in areas with more sprawl had higher BMI values, while those in areas that are more compact tended to live longer.

Box 12.	Piloting sustainable urbanization in China

Within three decades, China has experienced unprecedented urban growth unseen in any other parts of the world. China currently has 600 urban areas with populations exceeding 100 000, and it is expected to have over 1 billion urban dwellers over the next 35 years. While this has contributed to China's sustained high economic growth and overall raised living standards, the speed and scale of its urban development threatens to outpace the ability to plan and resource urbanization. High energy consumption, traffic congestion,

worsening air quality and the deterioration of quality of life have become major interrelated threats to the sustainability of China's cities. City governments have had to tear down and rebuild infrastructure no more than a few years old. Superblock style developments were designed as replicable, scalable, efficient housing to accommodate fast-growing urban populations. They were mono-functional and paired with widened roads in order to ferry residents to work and other needs, but this risks concentrating the flow of traffic, creating congestion and longer commute times. At the same time, they were significantly less accommodating to pedestrians and cyclists, which was a feature of traditional Chinese cities.

Solutions, however, are being sought. The Ministry of Housing and Urban-Rural Development has initiated a Low Carbon Eco-city Pilot programme. The city of Kunming is among those chosen for the pilot programme. The city has partnered with the Energy Foundation China in redesigning an 8-kilometre square core area of the city based on eight key principles: (i) develop neighbourhoods that promote walking; (ii) prioritize bicycle networks; (iii) create dense networks of streets and paths; (iv) support high-quality transit; (v) develop a zone for mixed-use neighbourhoods; (vi) match density to transit capacity; (vii) create compact regions with short commutes; and (viii) increase mobility by regulating parking and road use. In practice, this has led to smaller neighbourhood blocks replacing superblocks, and a transit-oriented mixed land use development pattern. The new design resulted in a compact grid of smaller neighbourhoods with multimodal transportation infrastructure. The expected environmental benefits include reductions in vehicle emissions by 72%, greenhouse gas emissions by 59% and total vehicle kilometres travelled by 67%.

While the pilot redesign is still too recent to measure outcomes, the standards from this project have been entered into the urban planning legal code, which means that all future developments in this area must follow these specifications.

Source: Energy Foundation China *(242)*.

MAKING CITIES AGE-FRIENDLY

From the latest demographic projections, the trend towards an urbanized world is expected to continue at great pace and scale. The urban population is projected to add another 2.5 billion people to cities by 2050 *(84)*. At the same time, the number of people 60 years or older is expected to more than double from 841 million in 2013 to more than 2 billion in 2050 *(243)*. As the world is becoming older and more urbanized, the population of older adults living in the world's cities is growing. The population of older adults living in Organisation for Economic Co-operation and Development (OECD) cities grew by 23.8% in just 10 years during 2001–2011 *(36)*. And while many of the most rapidly urbanizing cities in the world are still proportionately young, the number of older adults living in these same cities is nevertheless growing.

The implications of the convergence of these two demographic changes are significant for cities worldwide. It presents a compelling case for intersectoral, collaborative work across agencies in city leadership. For health sector managers, the shifting health profile of city residents requires careful planning and adjustment. The instrumental role of the city environment on the health of all residents, and particularly for older

adults, is increasingly well understood. Research in this area has sought to determine relationships between the health of older adults and such factors as the accessibility of public spaces and homes, public transportation and neighbourhood walkability as well as the myriad elements of the social environment. These are elements of city living that interact in highly complex ways to affect health, although they are often managed by a range of responsible bodies within a city administration as well as the communities and individuals themselves.

WHO and its partners have created parameters and domains of action to enable cities to take on these complex forces and to work towards making our cities more conducive to active, healthy ageing. WHO also created a Global Network of Age-friendly Cities and Communities that helps promote sharing of lessons across cities of structures and services that are accessible to and inclusive of older people with varying needs and capacities. As of October 2015, the Network includes 287 cities and communities in 33 countries, covering over 113 million people worldwide.

Age-friendly initiatives generate more physically accessible and socially inclusive environments that can help ensure quality of life and dignity for all people as they age. The WHO introductory guide outlines the requirements for needs assessment and action in specific areas: (i) outdoor spaces and buildings; (ii) transportation; (iii) social participation; (iv) civic participation and employment; (v) respect and social inclusion; (vi) communication and information; and (vii) community and health services. Cities now have a tool for tracking their progress (244). They now have a tool for monitoring progress in their age-friendliness and evaluating outcomes. The WHO Centre for Health Development has developed a framework and indicator guide that articulates core indicators as an approach to measuring physical accessibility, social inclusiveness, quality of life and, importantly, equity (245).

All relevant government departments are called to collaborate on the development and implementation of a comprehensive action plan. The establishment of a mechanism to involve older people throughout the whole development process is also an essential feature of becoming an age-friendly city.

Opportunities to make cities age friendly exist at many levels. In Brazil, for instance, a federal law enacted in 2012 established the directives for a National Policy on Urban Mobility. By the end of 2015, Brazilian municipalities with over 20 000 inhabitants are required to present their Municipal Plans on Urban Mobility. This presents a unique opportunity to develop urban transport policies that are guided by the principles of universal design and by the aspirations of their residents, both young and old. Age-friendly city initiatives have also led to aligning policies on ageing between states and municipal governments (246). In some instances, such as the state of Sao Paulo, Brazil, and the province of Quebec, Canada, the age-friendly city initiative has been foundational for the ageing policy at the state and province level.

Ultimately, an age-friendly city requires action at the local level. In late 2010, the mayor of Bilbao, Spain, joined many other mayors in committing to create an age-friendly city. Since then, the city has carried out numerous interdepartmental, cross-sectoral initiatives in partnership with the community. As in many other cities, transport accessibility is one of the city's top priorities. Access to alternatives to private motor vehicle use for transport and mobility is considered an essential feature of age-friendliness in the city. It offers a sustainable way of enabling older people to move about in the city to access essential services and to go where they want. In the case of Bil-
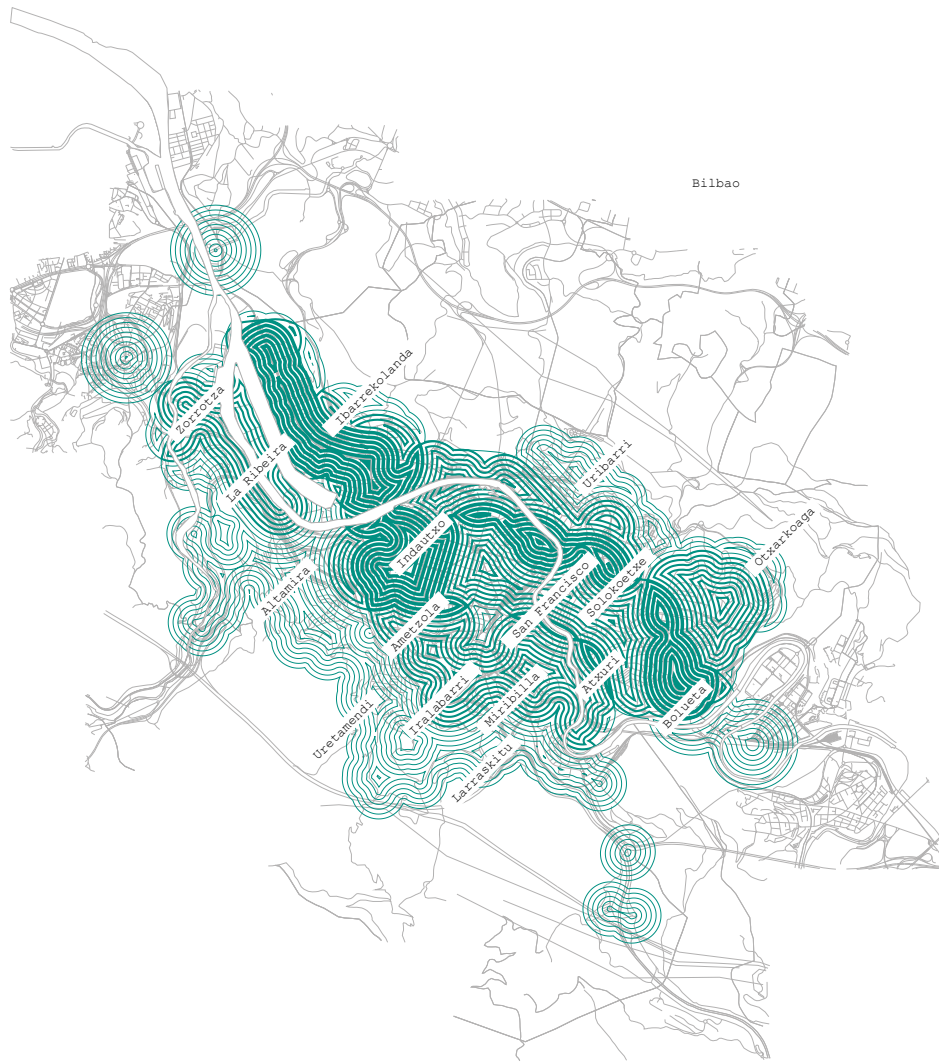
Bilbao

Zorrotza

Ibarrekolanda

La Ribera

Uribarri

Altamira

Indautxu

Otxarkoaga

San Francisco

Solokoetxe

Ametzola

Uretamendi

Miribilla

Atxuri

Bolueta

Irralabarri

Larraskitu

─ VISUAL KEY ─

Proximity to 1 transport networks

Proximity to 2 transport networks

Proximity to 3 transport networks

bao, the City Council focused on improving access to two or more alternative transport networks, including bus and metro systems and bicycle paths, within walking distance (defined as 500 metres) (Figure 27). Currently, about 84% of the population enjoys this level of accessibility, but the city is aiming for 100%.

PLANNING FOR RESILIENT URBAN ENVIRONMENTS

It is seen with increasing clarity how the environments where we live can affect our health, both in the short term and in the longer term. From the homes we live in, to where those homes are located and how we move about the city, the impact of those factors on our health is clear. These are all manageable parts of a complex urban environment that city planners grapple with when trying to design prosperous and healthy cities. In today's cities, and for the planet as a whole, there are a number of shocks to the environments that we live in, many occurring with greater frequency and impact. These shocks come in many forms, including both natural and man-made disruptive forces that can cause immediate as well as long-term harm. Many of them are social in nature, ranging from age-old problems such as violent conflict to modern problems such as stock market flash crashes. These types of shocks are often visited upon the economy and the social fabric of a city, with important implications for health. Natural phenomena, including floods, earthquakes and heat waves, among other exogenous natural forces, will impact both the built and social environment. They can destroy infrastructure. They are also exacerbated by the ways our cities are built. Rising temperatures pose both the challenge of gradual disruption as well as significant events, such as heat waves and fires. In recognition of these phenomena, cities are joining a global movement to become more resilient to these impactful events. In 2015, the global movement culminated in the 2015 Sendai Framework for Disaster Risk Reduction, a landmark document signalling the global community's commitment to reducing the impact of disasters, importantly with emphasis for action on health.

Multilateral organizations, foundations, foreign assistance agencies and legions of cities champion urban resilience as a way to help urban populations to absorb these shocks when they happen. Resilience takes on many definitions. They all generally adhere to the principle that while these shocks are difficult to prevent altogether, their impact can be mitigated. In the context of the built environment and its relationship with urban health, natural disasters are highly pertinent. This chapter focuses on two in particular. First, heat waves and urban heat island effects increasingly affect city populations as global temperatures rise and urban environments continue to have heat-producing and heat-trapping features. Second, flooding continues to impact more people worldwide than any other natural disaster. Many cities are situated near bodies of water and the features of their modern construction often cause the city to retain water, rather than ushering it away. While global temperatures and water levels are not significantly modifiable by city leaders, these are two important areas in which cities can be planned and constructed to mitigate their effects on their populations.
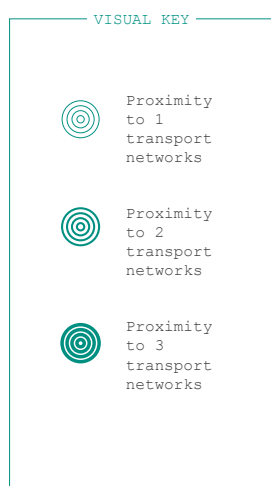
RESILIENCE TO HEAT WAVES AND URBAN HEAT ISLANDS

In 2014, the global community experienced the hottest year on record and 2015 is on pace to surpass those levels. Nine of the 10 warmest years in recorded history have occurred after 2000 (*248*). There is little doubt that global temperatures are rising, and now with 2014 being the 38th straight year of above average temperatures, it seems clear that higher temperatures are the new normal. The global rise in temperatures is one of the most evident impacts of climate change and has significant heat-related health effects, including increased mortality and morbidity.

Excessive exposure to heat is a serious health risk, with possible effects ranging from mild illnesses such as rashes and fatigue to serious disorders such as cramps, heat exhaustion and heat stroke and even death (*249*). A heat wave that struck Europe in 2003 resulted in the deaths of 70 000 people (*250*). Subsequent heat waves across the world have also claimed thousands of lives; a 2010 heat wave in the Russian Federation led to 55 000 deaths (*251*). Most recently, heat waves that hit India and Pakistan from May–June 2015 led to over 3000 deaths (*252*). Climate change and the consequent increase in greenhouse gas concentrations are expected to result in more frequent, persistent and intense heat waves.

Cities experience discernibly higher temperatures than rural areas due to what is called the urban heat island effect, the result of a combination of factors emerging from the urban built environment and human activity. Cities are composed of streets, rooftops and other nonreflective structures that absorb the sun's rays and heat. These surfaces retain heat and re-release the heat into the city environment, raising temperatures. Many cities lack sufficient trees and other types of vegetation that provide shade from the sun's rays and dissipate heat with evaporated water. People living in cities are more likely to contribute to harmful feedback mechanisms that increase city heat levels. Urban residents are more dependent on air-conditioning, cooled water and artificial lighting in shaded offices and rely more on private motor vehicles. However, by using these modern conveniences, residents increase the generation of anthropogenic heat waste and carbon emissions, further contributing to the urban heat island and global warming. The use of air-conditioners, in particular, is a difficult problem to resolve – in conditions of extreme temperatures, one person's air-conditioner can keep them from suffering from heat effects, but the air-conditioner would be exacerbating the overall heat of the city. A recent study found that a city running air-conditioners at night can experience an increase in temperature of up to 1 degree Celsius (*253*).

Heat island effects can make cities on average up to 1–3 degrees Celsius warmer than rural areas, and as much as 1–2 degrees Celsius warmer in the evening (254). This leads to chronically higher temperatures in urban areas. Evidence indicates that when a heat wave strikes, the event intensifies the heat island effect (*255*), and the temperature gap between urban and rural areas widens. The combined impact of the urban heat island effect with a heat wave can be devastating, as heat waves expose people to elevated temperatures over a prolonged period of time. In the case of the 2003 European heat wave, it lasted as long as a week in some places.

Vulnerability to heat depends on climate factors (such as the intensity and frequency of heat waves) as well as on individual medical, behavioural and environmental risk factors (*256*). People at increased risk primarily include older adults as well as infants, those confined to bed and/or unable to care for themselves and those with

Source: WHO/Anna Kari

pre-existing cardiovascular and pulmonary disease. Older adults are at especially high risk because ageing decreases tolerance to heat; thermoregulation is impaired with age. In addition, older adults often suffer from comorbidity (other diseases) and physical and cognitive impairment (249). They often take multiple medications, and certain medications – in particular, ones that affect organs involved in thermoregulation – can increase the risk of heat-related illness or death. Children and infants have a limited ability to thermoregulate because of their high volume to surface ratio and because they depend on their caregivers for the thermalregulation of their environments. Social isolation tends to be an important risk factor for heat-related health illnesses. Studies in the wake of the Chicago, USA, heat wave of 1995 and the European heat wave of 2003 suggest that isolated residents – who are more likely to be the elderly, poor or disabled – are more vulnerable to the effects of heat (257). In addition, isolation has been found to be a stronger predictor of heat-related illnesses than wealth or age in some studies (258).

The impact and causes of urban heat waves and urban heat islands are intricately linked and require concerted efforts on the part of municipal governments, civil society and international organizations to strengthen urban resilience to heat through adaptation and mitigation strategies. Resilience to heat waves and urban heat islands can be strengthened by strategies that address the short-term effects and by efforts to mitigate the broader challenges of urbanization and global warming. Ways to adapt include raising public awareness on health risks of heat waves, developing early warning systems that provide advance notice to the public about predicted high temperatures and increasing capacity among health-care workers to recognize and treat heat-related illnesses.

Longer-term initiatives must be aimed at altering the use of urban spaces and building materials in cities. City planners can intervene to encourage people to be more responsible. There are reflective, permeable pavements that can replace impermeable surfaces in cities and reduce urban temperatures (259). They can increase the share of space allocated to green spaces. They can enable residents to reduce anthropogenic heat generation.

In response to the rising threat posed by heat exposure, many cities around the world have worked to strengthen resilience to heat. Some cities have targeted interventions on rooftops. Toronto was among the first in the world to adopt a policy mandating green roofs for buildings of a certain height (260). Los Angeles has similarly mandated that buildings adopt lighter coloured reflective roofs. Paris has passed legislation to pursue green roofing and solar panel roofs. These alternative roofs can help to cool the building and reduce the overall heat retention of the city, however, recent findings indicate that reflective roofs may disrupt helpful cloud cover and they do little to cool surface temperatures at street level.

Strategically allocating more of the city to green spaces and parks can potentially have greater effects. Recent studies have shown that parks and densely planted streetscapes were up to 3–4 degrees Celsius cooler than the surrounding urban landscape at mid-day (261). Studies have also demonstrated that non-wooded parks can be even cooler than tree-filled parks at night as they allow the flow of air and the release of heat (261). Some examples include a study of 92 parks in Japan found that parks needed to be larger than two hectares before a significant temperature difference could be detected. Increasing the amount of green space in cities can pay dividends to health by enabling physical activity, but increasing the number of green spaces allocated to larger parks could also yield significant benefits by reducing urban heat. In Manchester, England, researchers have estimated that a 10% increase in green cover would keep surface temperatures stable, even with global climate change predictions for the next 70–80 years. And Stuttgart, Germany, has developed a green infrastructure strategy to mitigate urban heat island effects. The city has widened open spaces covered with vegetation to create corridors that allow large-scale air flows to reduce temperatures, bringing cooler air in from the mountains and sweeping hotter air away.

URBAN PLANNING AND FLOOD RESILIENCE

As the most common natural disaster and the second leading cause of natural disaster fatalities worldwide, floods in particular have a significant health impact (262). Flooding accounts for over two thirds of people affected by natural disasters (263). Between 1994 and 2013, approximately 2.4 billion people were affected by flooding (264) that damaged more housing, schools and hospitals worldwide than any other type of disaster. Climate change and the consequent rise in sea levels, changing rainfall patterns and increase in storm surges are expected to increase the number of floods globally. The primary health effect of floods is drowning, which accounts for two thirds of flood-related mortality. Other health concerns include injuries, physical trauma, heart attacks, infectious diseases, stress and loss of essential services (265).

Cities are especially vulnerable to flooding and its impacts. Urban flooding risks stem from a number of factors: (i) the predominance of impermeable surfaces that cause water run-off; (ii) the general scarcity of parks and other green spaces to absorb water flows; (iii) rudimentary drainage systems that are often clogged by waste and quickly overloaded with water; and (iv) the ill-advised development of marshlands and other natural buffers (266). Given the projected rise in sea levels due to the effects of climate change, coastal cities, in particular, are exposed to flooding. In a more detailed look at the hazards faced by port cities with over 1 million population, an OECD study

estimated that, in 2005, about 40 million inhabitants were exposed to what is called a 100-year coastal flood event – a flood of significant magnitude that was once a rare occurrence (*267*). The study estimated that, by 2070, climate change, subsidence, population growth and urbanization would increase this figure to about 150 million (*263*). The urban poor are disproportionately affected by the impact of flooding because they often live in hazardous areas, lacking adequate housing, services and financial means. For example, it is estimated that in metro Manila, some 800 000 people, mostly informal settlers, live in high-risk areas. In Jakarta, Indonesia, spatial analysis of slum settlements and flood-risk areas shows strong correlation between informal and high-risk areas (*268*). The urban poor are more exposed to the environmental hazards caused by flooding because the housing they can afford tends to be located in riskier areas (*266*).

An integrated strategy for managing flood risk can help cities face current and future flood risk, and many tools and techniques are available to help them do so. Urbanization can be a positive force to build resilience and protect the most vulnerable.

The impacts of climate change on poverty will most significantly affect the urban poor and highly vulnerable countries in sub-Saharan Africa and South Asia, where the number of exposed poor may reach 325 million by 2030 (*268*). Urban planning and design that takes into account hazardous areas, location of vulnerable populations and of critical assets (such as schools and hospitals) can decrease the vulnerability of infrastructure and in this way protect unnecessary human loss and economic damage. As the poor are traditionally more reliant on public infrastructure, risk-conscious urbanization can play an important role in supporting poverty reduction and protecting the lives and livelihoods of urban dwellers. Flood risk management should be part of a broader agenda to make cities more liveable, sustainable and resilient. Promoting responsible urban governance, planning and development are vital for strengthening flood resilience.

In responding to flooding disasters, many cities worldwide have employed strategies that strengthen flood resilience. The flood risk management strategies of the

Source: WHO/Anna Kari

city of Hoboken, New Jersey, implemented in the aftermath of Hurricane Sandy have been recognized by the United Nations Office for Disaster Risk Reduction (UNISDR) as a Role Model City of the Making Cities Resilient campaign (269). These strategies included plans to retain over 1 million gallons of storm water through green infrastructure initiatives such as building of "resiliency parks" as well as an emphasis on land-use regulations and public awareness of flood risks. Since the 2005 floods in Mumbai, the city has also worked to enhance its resilience to flooding through structural improvements such as widening, deepening and enhancing the capacity of the Mithi River, the flood plains that house a large number of vulnerable informal settlements (270). In addition, warnings are issued if rainfall intensity and the water level exceed critical points. Mumbai has made rainfall harvesting compulsory for larger new buildings, a concrete policy decision that municipal governments can take to reduce the burden on drainage systems and reduce the impact of flooding. UNFPA estimates that while the number of disasters attributed to flooding is on the rise, the number of people killed due to flooding remains steady (263). Moreover, the overall number of deaths due to all natural disasters is decreasing. This has been attributed to investments made in disaster preparedness, adaptation and mitigation, further demonstrating the important role effective leadership on urban resilience can play in reducing the health impact of flooding.

SUMMARY

This chapter explores the ways in which cities have grown into their modern forms and their impact on the health of their residents. In many of the fastest growing cities, more recently in the developing world, planners have struggled against the challenges of unmanageable growth. In many cities, planners have kept pace with growth, and built expansive cities fit for motor vehicles and commerce. Many of these cities have found great success. However, their residents too often live in single- or limited-use neighbourhoods, with long distances to work and lack of green spaces and other essentials of daily living. Residents of these cities often fall into sedentary behaviours, poor nutrition and mental health issues, among other precursors of NCDs. Rampant air pollution and traffic accidents are also common features of these environments. Moreover, many of these environments have not been built to adapt to demographic change and the changing climate.

These challenges can be met. This chapter discusses the ways whereby cities can adapt their current forms and be built for future urban populations to enable healthier living. Healthier urban designs can keep city residents mobile, but also keep them active and eating healthier. They can facilitate residents to spend less time in their motor vehicles and more time being productive or improving the quality of their lives. Cities can adapt to enable residents to age well in their communities. They can adapt to the changing climate. These are all achievable, while keeping cities economically dynamic and progressing forward.

CHAPTER 8 — TRANSFORM URBAN MOBILITY

KEY MESSAGE — **Urban transport can be transformed to be healthier, safer and more sustainable.**

Cities promise to bring people closer to the things they need to live their daily lives. In this way, cities deliver access. They grant better access to jobs, food, health-care providers – everything people need, including other people. Mobility is often a high priority for urban and national policy-makers because of its role in enabling economic activity and growth. Cities deliver access by densely clustering people around their needs, or offering pathways to access these needs. However, as seen in the previous chapter, more and more cities are spreading out as they grow. City densities are declining. As cities sprawl, people living in cities become increasingly further from their daily needs. Thus, for too many people, private vehicles become almost a requirement of city living.

For this and other reasons, cities are becoming more motorized. Private motor vehicles have been a tool of enablement, and for many they still are. They can be convenient. They can shepherd people from where they are to where they want to be. Motor vehicle ownership has become an aspiration now achieved by hundreds of millions of people worldwide. The annual number of new cars sold has increased from 39 million in the 1990s to 63 million in 2012 *(271)*. As national economies grow, evidence indicates that motor vehicle ownership tends to increase *(272)*. Five years ago there were an estimated 1 billion motor vehicles worldwide. In another 20 years, there are expected to be 1.6 billion cars, light trucks and other motor vehicles. By 2050, this number will exceed 2.1 billion. Most of the increase will be in Asian countries, especially China and India *(273)*. Within countries, as incomes rise, cities tend to sprawl more, while rising incomes for people are associated with increased vehicle travel *(272)*. Figure 28 charts the per capita income against motorization rates for selected cities and countries across all regions, demonstrating the positive correlation between income and the number of cars per capita.

Whether out of necessity or for convenience, transportation in the world's cities is increasingly moving towards private motorized transportation. This trend may grant increased mobility and access to many individuals who need it, but for them and the people they share the city with, it also brings the potential for substantial hazards to health. As discussed elsewhere in this report, increasing use of motorized transport and urban sprawl are commonly associated with more sedentary behaviour, which has been shown to be closely associated with the rise of NCDs in cities.

The rising use of personal motor vehicles in cities contributes significantly to urban air pollution. Outdoor air pollution has short- and long-term health consequences for people exposed to it. There are also serious consequences for the urban environment, the whole planet and the global population due to the creation of greenhouse gases from vehicle emissions. Urban travel currently constitutes more than 60% of all kilometres travelled globally and is the largest single source of global transport-related emissions and the largest local source of urban air pollution *(229)*.

Increasingly motorized cities are also exposing residents to significant risk of road traffic injuries and death. WHO estimates that at least 1.25 million people are killed in road traffic accidents per year *(274)*. There are twice as many people killed by road traffic accidents than are killed by malaria *(275)*. These numbers are trending upward with countries continuing to urbanize and private cars becoming an increasing share of urban transport.
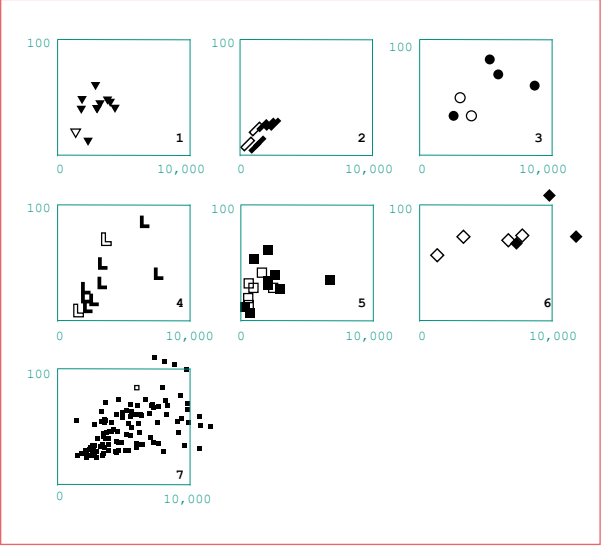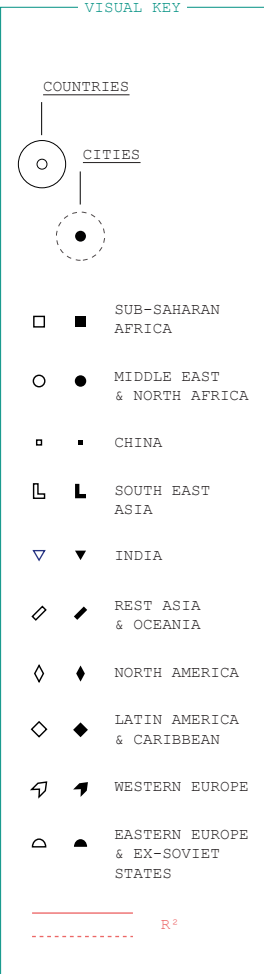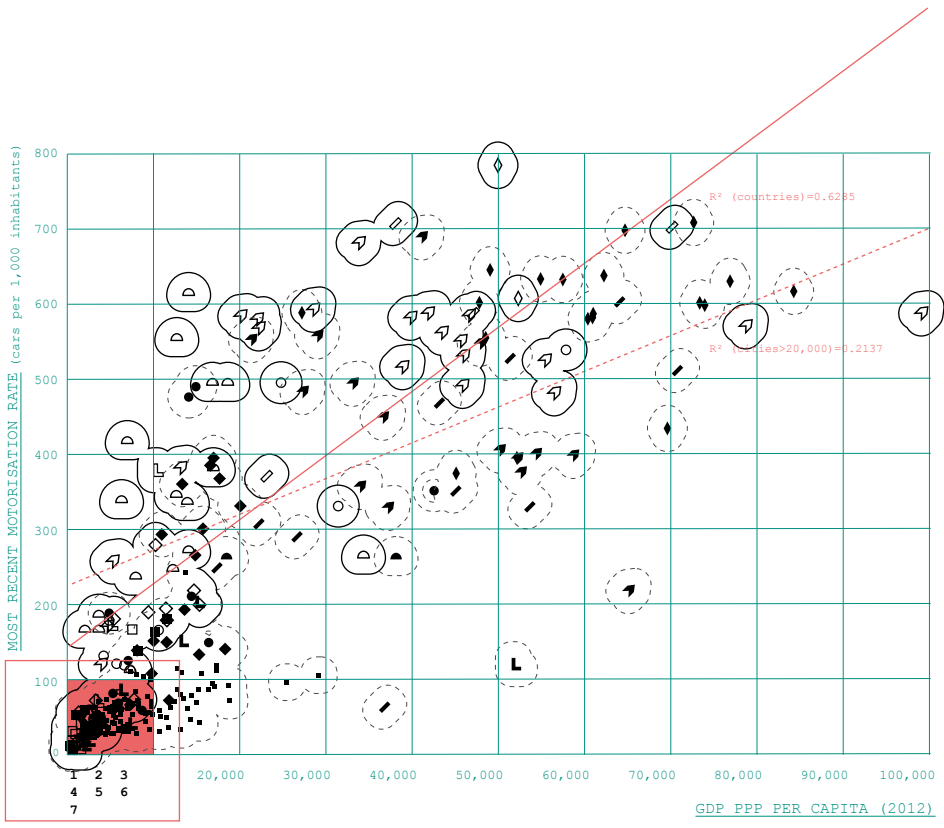
Figure 28.
Wealth and car ownership levels

Source: Rode and Floater 2014
(*229*)

This chapter discusses urban mobility and the evidence of its impact on the health of urban residents. These are significant, growing challenges for city leaders, yet they can do much to bring them under control and improve health. Cities can deliver on the promise of access for their residents and reduce the health risks of urban mobility. There are attainable solutions that can make cities more accessible and safe, even for cities that are already sprawling. While national-level policy-makers are often in the best position to set limits on fuel quality standards and vehicle emissions, this chapter looks at solutions in need of local-level leadership.

URBAN TRANSPORT AND AIR POLLUTION

City- and national-level decision-makers have long sought to enable urban mobility. Infrastructure investment has supported the construction of highways, ever-widening roads, parking facilities, bridges and railways to make motorized movement possible throughout our urban spaces. As dependence on motorized infrastructure has grown, it is also necessary to wrestle with the downsides that come with this dependence. These downsides have been manifesting for decades. Even as far back as the 1950s, motor vehicle emissions containing tetraethyl lead were identified as a global health menace. Since then, in most places leaded gasoline has been regulated out of fuel markets, but motor vehicle emissions that remain harmful to human health have otherwise continued to grow.

It has taken decades to develop, but the capacity to measure the magnitude of vehicle emissions has grown considerably. It is understood that cities are the most significant contributors to greenhouse gas emissions on a global scale. At least 70% of global carbon dioxide emissions are produced within cities (4). Much of the urban share of global greenhouse gas emissions can be explained by the motorization of transportation in cities, the fastest growing source of greenhouse gas emissions in the world (276). Within cities, transportation is already the largest source of urban air pollution (229). In developing countries cities, transport accounts for 80% of all outdoor air pollution (277).

Intensifying greenhouse gas emissions emanating from cities have important implications for the health of people living in cities everywhere, as well as for the global community. WHO set guidelines for acceptable levels of ambient air pollution, above which air pollution should be considered harmful to human health. Monitoring the air quality in 1600 cities in 91 countries, WHO found that only 12% of the monitored populations were living in cities compliant with air quality guideline levels (278). Worse yet, in larger cities less than 4% of monitored populations live in cities compliant with the guidelines (279). Figure 29 maps 1600 monitored cities, colour coded for their respective levels of air pollution with darker colours indicating higher pollution levels.

City life exposes residents to relatively higher air pollution levels, and puts them in close proximity to the source of the pollution. Research from the Health Effects Institute (HEI) finds that health impacts of vehicle tailpipe emissions are strongest within 300–500 metres of major roads (281). Proximity to major thoroughfares is a common feature of city living. For example, HEI predicts that between 37% and 45% of the city populations in the USA live within 500 metres of major roads. In New Delhi and Beijing, approximately 55–60% and 77–86% of the total city populations, respectively, live within 500 metres of a major roadway (282).

The health consequences of heavy air pollution found in cities are severe.

Figure 29.
Global map of air pollution
levels in 1600 cities

Source: World Health Organization
2014 (*280*).

Max.= 372 ug/m3
Ahwaz,
Islamic Republic of Iran

VISUAL KEY

ANNUAL MEAN
PM10*
BY COUNTRY

11.0000	64.6000	118.2000	171.8000	225.4000
64.6000	118.2000	171.8000	225.4000	279.0000

ANNUAL MEAN
PM2.5**
BY COUNTRY

5.4	16.92	28.45	39.98	51.5
16.92	28.45	39.98	51.5	63

PM10
red indicates
excess of WHO
guideline

ANNUAL MEAN PM10
BY CITY

PM2.5
red indicates
excess of WHO
guideline

ANNUAL MEAN PM2.5
BY CITY

Disputed areas
/ boundaries

Not applicable

*particulate matter
with diameter
of 10 µm or less.

**particulate matter
with diameter
of 2.5 µm or less.
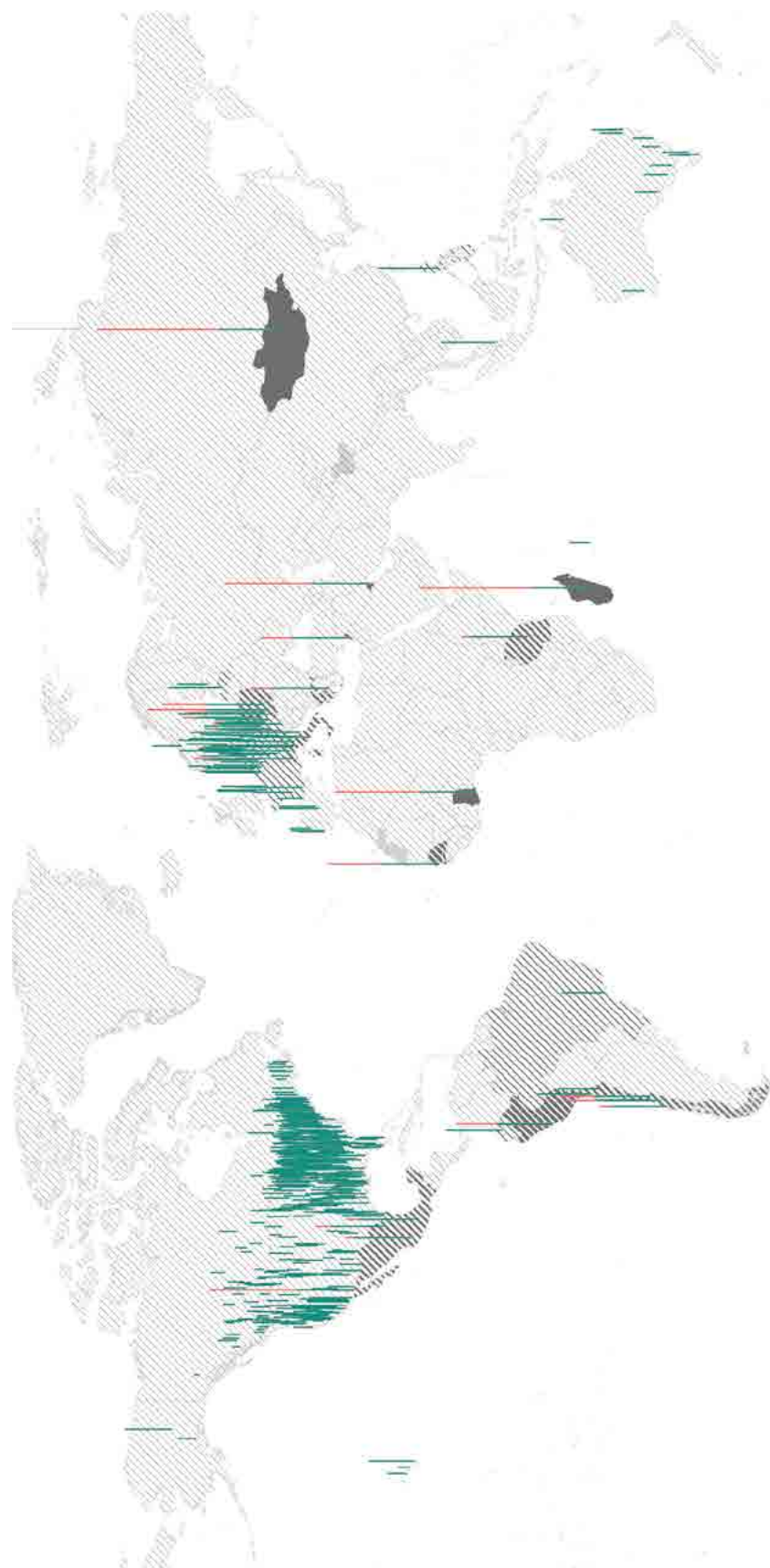
Outdoor air pollution is strongly associated with the top five causes of death worldwide. Exposure to air pollution is associated with ischaemic heart disease, stroke, chronic obstructive pulmonary disease, lung cancer and lower respiratory infections in children. WHO estimates that outdoor air pollution was responsible for the premature deaths of 3.7 million people worldwide in 2012 (*283*). Recent estimates have indicated that as many as 3.3 million people die prematurely every year from exposure to fine particulate matter (*284*) – the type of air pollution that is most strongly associated with motor vehicle exhaust and other forms of combustion. These numbers are on the rise. Deaths attributable to air pollution to which motor vehicles are an important contributor grew by 11% (*285*). Even in the European Union, where many cities are compliant with particulate matter guidelines, it is estimated that life expectancy is 8.6 months lower than it would otherwise be (*283*).

INCREASINGLY MOTORIZED CITIES AMPLIFY RISK OF ROAD TRAFFIC INJURIES AND DEATHS

One of the most tragic consequences of the motorization of urban transport has been the rise of road traffic crashes. Road traffic injuries have emerged as the eighth leading cause of death in the world. They are also the number one killer of young adults ages 15–24 (*285*). Over the last 20 years, the number of deaths attributable to road traffic accidents has increased by 46%. If left unchecked, road traffic fatalities are expected to continue to climb. Without intervention, WHO expects the global burden to increase to 1.9 million people and become the seventh leading cause of death in the world by 2030.

The weight of this burden is most strongly felt in LMICs, where nine out of 10 of these fatalities occur (*286*). Low-income countries have the highest annual road traffic fatality rates at 24.1 per 100 000. The fatality rates in the middle-income countries are 18.4 per 100 000 (*274*). Even within high-income countries, people from lower socioeconomic backgrounds are more likely to be involved in road traffic crashes than their more affluent counterparts.

Figure 31 depicts road traffic fatality rates in a selection of cities. It highlights the great extent of the challenge in relatively unsafe cities. It also calls attention

Figure 30.
Top 10 causes of death among people ages 15–29, 2012

Source: WHO 2015 (*274*).

Road traffic injuries		325736
Suicide		242903
HIV/AIDS		239228
Homicide		211519
Maternal conditions		150983
Lower respiratory infections		103006
Diarrhoeal diseases		85338
Drowning		75833
Ischaemic heart disease		67686
Meningitis		56700

VISUAL KEY

56700

Number of deaths among people ages 15-29, 2012
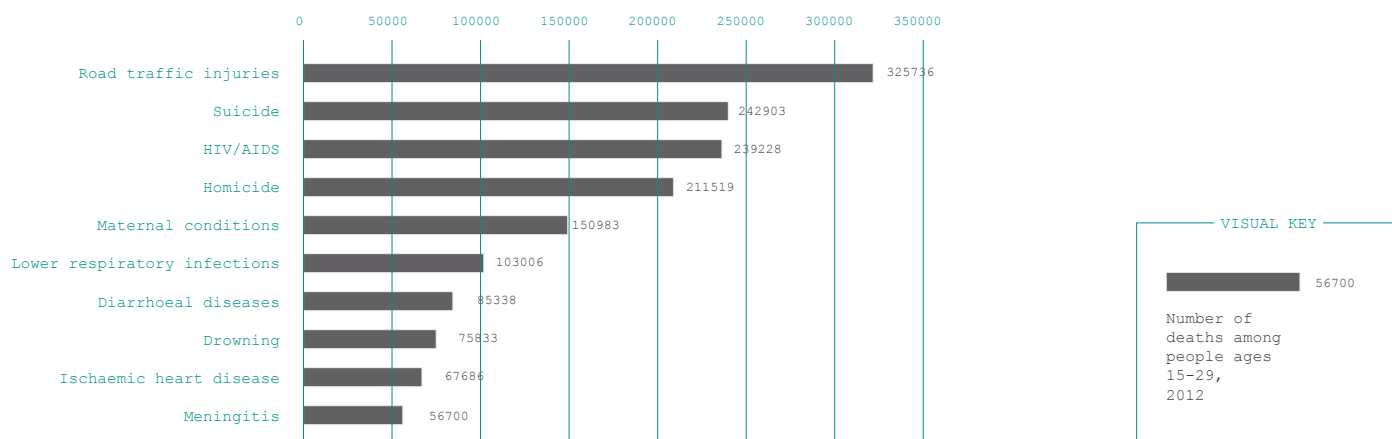
Figure 31.
Reported traffic fatalities per 100 000 inhabitants in selected world cities

Source: Reproduced with permission from Welle et al. 2015 (*287*).

City	Value
Forleza	27.2
Chennai	26.6
Guadalajara	26.3
Jaipur	25.5
Florianópolis	22.6
Belo Horizonte	22.5
Brasília	20.9
Curitiba	20.0
Nairobi	18.5
Salvador	16.7
Rio de Janeiro	16.7
Monterey	16.0
Johannesburg	15.0
Leon	13.2
Ho Chi Minh City	13.1
Indore	13.0
Puebla	12.9
São Paulo	11.8
Porto Alegre	11.6
Montevideo	10.4
Accra	10.2
Atlanta	9.7
Kolkata	9.4
Delhi	9.1
Bangalore	8.9
Dar es Salaam	8.8
Addis Ababa	7.6
Moscow	7.0
Bogotá	6.9
Jakarta	6.4
Los Angeles	6.3
Lima	5.8
Chicago	5.3
Pune	5.2
Surat	5.0
Ahmedabad	4.8
Beijing	4.4
Bangkok	4.2
Shanghai	3.8
Mumbai	3.2
New York	3.2
Amsterdam	3.2
Washington DC	2.4
Istanbul	1.8
Hong Kong	1.8
Paris	1.7
London	1.6

```
— VISUAL KEY —

          2.4

Reported
traffic
fatalities
–
per
100 000
inhabitants
```

to the clear contrast between cities that are struggling with road traffic safety and those that have been more successful. The differences between these cities could be wider still, as high-burden cities may have road traffic fatalities that go unreported (285). Perhaps most importantly, it demonstrates what is attainable. Progress on road traffic safety is achievable. Today's Chennai could be tomorrow's Stockholm. The next chapter considers how cities can enable people to be mobile and accessible, while controlling the transportation's negative impacts on their lives.

ENABLING VIABLE ALTERNATIVES TO REDUCE POLLUTION AND IMPROVE HEALTH

Everyone deserves the right to safe, convenient passage to the places they need to go for their daily needs. It is the role of the city to enable its citizens to do so efficiently and safely. Increasingly, city residents have chosen private motorized means to achieve this, and cities have played an enabling role with investments in infrastructure and policies. In many places, these choices help to shape mobility policy and city planning for motorized surface travel, but not for the health and safety of the passengers of these vehicles, or the other residents of the city who are exposed to the hazards motorized transport create. Reducing the impact of vehicle emissions and road traffic crashes on people living and working in cities is critical. It depends on reducing the number of vehicles on the road and the kilometres they travel as well as making the vehicles and roads safer for everyone. Initially, this requires cities to facilitate the use of desirable, safer alternatives. For many growing cities, particularly the relatively smaller secondary cities where most urban growth is projected to occur, there is a prospective opportunity for cities to plan around healthier alternatives. For many cities, growing or not, transportation infrastructure is in some or large part "locked in". The usable lives of many highways and wide thoroughfares cutting through and around cities project long into the future. Many consider it too expensive to replace existing infrastructure, for example, with mass transit options. However, even cities that are in the near term locked in to their current infrastructure can make adjustments to help make transportation healthier and safer.

Cities that have been planned for transit-oriented development, with multi-use spaces and residences clustered around mass transit options and walkable spaces are ideal, and many cities around the world are already on this path. Many other cities have growth projections that offer opportunities to plan and build new areas of the city with this kind of approach. When people can access what they need on foot or bicycle, or quickly and conveniently by mass transit, operating a motor vehicle becomes a less desirable choice. For many cities that are already committed to private motorized surface transport, this kind of dynamic may seem out of reach in the short term. For these cities, the arrival of BRT, an older mode of transport adapted for the modern city form, presents a compelling solution.

BRT can reduce vehicle dependency, improve mobility and accessibility and decrease exposure to air pollution in cities. It is a solution designed to make use of existing city street infrastructure to make transit by bus faster and more convenient. Using the existing streets to deliver mass transit saves on costs and disruption over the construction of surface rail and subway options. BRT capital costs can be 4–20 times lower than light rail systems, and 10–100 times lower than metro systems with similar

Daily Commute

capacity and service level (288). It can be implemented in cities that are already locked in to motor vehicle-dependent transit by reallocating existing lanes. BRT creates segregated lanes for the buses, mimicking the traffic-free experience of urban travel by rail, with competitive speed. Raised BRT platforms make on-boarding and off-boarding more efficient, particularly when the system allows for automated payment of fares.

Where it has been implemented, BRT has a demonstrated impact on air pollution and city residents' choices for transit options. For instance, a study of Trans-Milenio, the BRT system in Bogotá found that the system has measurably reduced greenhouse gas emissions in the city (289). Before and after measurements on one of the system's main corridors, Avenida Caracas, showed a 43% reduction in sulfur dioxide, an 18% reduction in nitrogen dioxide and a 12% reduction in particulate matter. The pre–post study found that the BRT system abated air pollution levels by 9.2% overall in the city, demonstrating stronger results than the policies to regulate personal vehicles and their emissions. Mexico City's Metrobús BRT system has reduced commute times by 50% (Box 13) (290). In doing so, the economic gains from reducing commute times for nearly 1 million users have been greater than the infrastructure cost of building the new bus system. Nearly 10% of trips on Istanbul's Metrobus system are a substitute for travel by private motor vehicles. The Metrobus has saved surveyed users nearly one hour of commute time per day, and nearly 40% of users choose walking as their mode of transport from the bus, while more than 20% of all users walk more than 10 minutes to and from the bus. The WHO Health Economic Assessment Tool (HEAT) model estimates that walking trips alone have saved more than 25 premature deaths per year. BRT systems are gaining momentum in cities worldwide, with systems currently implemented in 195 cities (291). China as well as the USA have implemented BRT systems in 19 cities. Even in the car- and rail-dominated USA, a Government Accountability Office evaluation found that BRT systems were able to increase bus ridership in one year, reduce commute times by up to 35% and were perceived to have contributed to economic growth with development along the BRT lines (292).

Box 13.	Remaking transportation in Mexico City

Mexico City is an economically ascendant city, home to a sprawling population of more than 20 million people. In its densest spaces, such as the *distrito federal*, 9 million people live in a 570 square mile space choked by traffic caused by 3 million cars (293). One third of these cars are at least 20 years old. Most of Mexico City's residents live at the outer reaches of the city, living along ever-stretching corridors into lower density settlements. This becomes an incentive for greater usage of cars and inefficient and informal means of public transportation. Traffic plagues the commute times of these residents, and the distances they travel to get to daily needs is elongating. Daily trips can take up to three hours. The average vehicle kilometres travelled by the metropolitan population rose 36% from 1990 to 2010 (294). This has led to unacceptably bad air pollution. Studies estimate at least 2700 premature deaths per year in the metropolitan area due to air pollution (295). Mexico City has taken major, progressive actions in the last 10 years to improve transportation and air quality conditions. It has built five high-quality BRT corridors

since 2005, which serve more than 900 000 passengers per day. Research shows that about 10% of passengers switched to using the Metrobús BRT from private motor vehicles (*290*). The Metrobús system's substantial emissions benefits are expected to eliminate an average of 6100 work loss days, 660 restricted activity days, 12 new cases of chronic bronchitis and three deaths per year (*296*).

In 2010, the city also implemented the Ecobici public bike sharing programme, with 271 stations, 100 000 members and 10 million yearly trips. This system is conveniently located throughout the central business district mass transit stations thus helping to expand the service area of public transportation. The Mexico City government has integrated the payment systems for the metro rail network, BRT and the bike share system.

Public spaces have been improved, including revitalizing Chapultepec Park, the city's 680 hectare (1690 acre) urban oasis that now sees 18 million yearly users. On Sundays, the city hosts a Ciclovía, a time when roadways are shut down to cars for jogging, strolling and bicycling.

In addition, the city has pedestrianized key streets in its historic centre, added protected bicycle lanes, implemented traffic calming at high-traffic pedestrian areas and developed *parques de bolsillos*, or pocket parks, in underused street space. All of these actions have been important in helping residents choose to be more active.

Cities should also work towards making active mobility a desirable alternative for residents to choose over motorized transport. Enabling residents to walk or cycle for daily needs offers a substitute for motorized transport and facilitates physical activity. The choice may be easier for residents of more compact cities where more of their needs are already nearby. Walking and cycling in these environments may simply be the most efficient choice for residents. Even in relatively more compact cities, some destinations may lie sufficiently far away that making the choice is less clear for residents. Both convenience and safety are important considerations for the traveler and, for some, the benefits of physical activity and reducing air pollution may motivate them. Cities can make planning decisions that can make active transport a more persuasive choice for the traveler.

Cities can plan roadways and other corridors to assure safety for bicycle riders and pedestrians. Many street designs have favoured motorized commuters, granting them the greatest share of the road. Typically, projects to widen roads are intended to give a still greater share of the new road to motorized transport. Without adequate dedicated space for active commuters on transportation corridors, cyclists must share lanes with cars and trucks, and walkers and runners may not be able to share the road at all. Dedicated bicycle lanes and other bicycle and walking paths create safe spaces, segregated from motorized vehicles and at reduced risk of accident and injury. WHO developed HEAT to help city planners to make the case for the economic value of active transport investments and policies. HEAT helps cities to estimate the benefits of various numbers of people walking or cycling various distances per day by modelling for reductions in mortality. The tool is increasingly being used in Europe and recently piloted in the USA. The United Kingdom has used it to justify sustained investments in bicycle pathways. The subsequent assessment by the United Kingdom government was that bicycle pathways were "value for money". In Modena, Italy, HEAT was used to assess the value of

Europe 2008 511

Source: by Embarq Urban Mobility is licensed under CC BY 2.0, https://creativecommons.org/licenses/by/2.0/legalcode

existing walking and cycling infrastructure, and it has subsequently been used to model the value of investments in additional cycle paths (*297*).

Planning for walking and cycling infrastructure may not necessarily cause people to give up their cars for bicycles and walking shoes, but it can enable those who may already be motivated, and may motivate those who may not have previously considered it. Cities with connected networks of dedicated infrastructure for cyclists tend to be safer, especially for the cyclists themselves. These cycling networks are recommended to connect residential areas to business and retail, schools, parks and mass transport through infrastructure that physically protects bicyclists. For example, after the Bogotá added 300 kilometres of bicycle paths from 1998 to 2000, the share of bicycle trips increased from a baseline of 0.58% in 1996 to 2.2% in 2002 (*298*). The city added another 100 kilometres of bicycle paths from 2003 to 2013 and the share of bicycle trips increased to 6%. Bicycle deaths have decreased by 47% during the same period, even as the number of cyclists increased significantly. Data from cities such as Minneapolis, Minnesota, and Portland, Oregon, in the USA and Copenhagen in Europe show that injury rates go down and more people bike when there is a connected network of dedicated infrastructure such as off-street trails and dedicated bike lanes (*299*). Portland developed a city-wide plan to increase bicycle transport, resulting in considerable increases in the miles of bicycle and boulevards bicycle parking facilities. The accident rate has decreased and the number of bicycle commuters has increased by 90% in the 10 years since the plan was implemented. Studies have shown that active transport is associated with physical activity and weight reduction at the population level.

Box 14.	Bicycle sharing schemes

Many cities throughout the world have introduced bicycle sharing systems in an attempt to tackle the growing challenges of obesity, climate change and traffic congestion. These low-cost rental systems are designed to encourage cycling for short urban trips and multimodality – the combination of cycling with other modes of transport – for longer trips (*300*). Barcelona's Bicing scheme was introduced in 2007 to promote sustainable transport, create a new individual public transport system, promote the bicycle as a common means of transport, improve air quality and reduce noise pollution. By August 2009, 182 062 people had subscribed to Bicing (11% of the population in the Barcelona municipality), with 68% of trips being used for commuting to work or school and 37% combined with another mode of travel. A 2011 evaluation of the health co-benefits of these schemes revealed an annual reduction in mortality of the Barcelona residents using Bicing compared with motor vehicle users of 0.03 deaths from road traffic incidents and 0.13 deaths from air pollution. Due to physical activity, 12.46 deaths were avoided. In addition, annual carbon dioxide emissions were reduced by an estimated 9 062 344 kilograms. Since the first implementation of a bicycle sharing system in Lyon in 2005, many cities across the world have introduced them. The biggest schemes to date with over 60 000 bicycles each, have been implemented in Hang zhou and Wuhan, China (*229*).

SAFER URBAN MOBILITY

One of the most important factors when increasing bicycling and walking in a city is ensuring that city residents can do so safely. In many urban environments, walkers and cyclists are vulnerable to motor vehicle traffic. Currently, 26% of road traffic deaths occur among cyclists and pedestrians (274). In some cities, it is as high as 75%. There are only limited studies on road traffic injuries in LMICs, where 90% of road traffic fatalities occur worldwide, however, the studies that have been conducted are grim. In a study of road traffic accidents in Indian cities, the research found that pedestrians and bicyclists accounted for at least 44% of road traffic fatalities, but ranged as high as 60% in Mumbai (301).

Overall, reducing the number of motor vehicles and the distances they travel can lead to fewer road fatalities, with fewer vehicles exposing all road users to a risk of death or injury (299). Efforts to foster viable alternatives such as mass transport, walking and cycling can help achieve these results. As previously noted, this can include improving mass transport through BRT or other rapid transit as well as dedicated infrastructure for bicycling and walking, particularly by designing main roads to be safer places for all road users. Measures to improve and enforce behaviour such as curtailing drunk-driving are necessary and effective. However, reducing vehicle speeds on city roads is one of the most important measures that cities can take.

In urban areas, measures to reduce speed are critical to the safety of other road users. Vehicle speeds of 50 kilometres per hour are often considered to be best practice for urban speed limits. However, according to one conservative study, the fatality risk for pedestrians with vehicles travelling at 50 kilometres per hour is more than twice as high as the risk at 40 kilometres per hour and more than five times higher than the risk at 30 kilometres per hour (302). There is much corroborating evidence to support reducing speed limits to 30 kilometres per hour in order to calm traffic, especially in high density areas (274). In the United Kingdom, for example, 30 kilometres per hour zones in residential areas resulted in overall reductions of 15 kilometres per hour, and cut vehicle collisions with pedestrians and cyclists by 67%. Establishing and enforcing lower speed limits in urban areas can dramatically reduce road fatalities. Evidence indicates that a 1% reduction in average speeds can result in a 4% reduction in fatalities (303). Reducing speed limits to safer levels is imperative, but cities can also introduce additional measures to calm vehicle speeds and further ensure vehicle safety. The Safe

Transportation in Bangladesh

Transportation in Bangladesh

System Approach, endorsed by WHO in the Global Plan for the Decade of Action for Road Safety 2011–2020, assumes that road users are fallible, crashes do occur and that it is up to road designers and planners to reduce crashes and mitigate their impact. Street design can significantly influence the speed of cars and injury rates. Introducing traffic calming devices such as roundabouts, intersections, traffic lights, cross walks, protected bicycle lanes, pedestrianized retail areas and safe school zones are among the many ways that cities can suppress vehicle speeds and protect pedestrians and cyclists from being exposed to risk *(287)*. These measures are important to implement for all city dwellers. Even in high-income countries, people from lower socioeconomic backgrounds are more likely to be involved in road traffic crashes *(304)*. The large-scale Bridging the Gap study on income disparities in road safety and walkability in the USA showed that traffic calming devices are significantly more common in higher-income neighbourhoods in cities *(305)*. In higher-income communities, 8% of streets featured traffic calming devices, compared to 4% and 3% of streets in middle-income and lower-income neighbourhoods, respectively. Similarly, streets with marked crosswalks are significantly more common in high-income communities (13%) than middle-income (8%) or low-income ones (7%).

Efforts are under way in many cities around the world to develop comprehensive road safety plans. For example, Sao Paulo has recently begun making changes to its streets to help improve safety and improve walkability. The Calçadas Verdes e Acessiveis (Green and Accessible Sidewalks) project has helped improve the walkability of sidewalks by repairing hazards and repurposing spaces allocated to vehicles, including parking spaces. At a centrally located intersection with high pedestrian volume, the city installed an "all red" signal crossing that allows pedestrians to cross all ways and brings all vehicle traffic to a halt during this period. The city also has begun to reduce vehicle speed limits to safer levels for pedestrians. The city of Abu Dhabi, United Arab Emirates, has recently launched a plan to retrofit its streets to improve safety for all road users. The city is improving visibility on its streets and adding raised signalled crosswalks, wider

pedestrian crossings, accessible curbs and widened safe spaces for pedestrians at medians and turn lanes. Such efforts are in motion in many cities across the world, some with measurable results.

An exceptionally successful story of safe design is the Republic of Korea, where traffic fatalities among children fell nationally by 95% from 1766 deaths in 1988 to 83 deaths in 2012 as a direct result of a range of projects that targeted regulations, education and the built environment. Among these was the School Zone Improvement Project, implemented throughout several cities, which aimed to create safe routes from children's homes to schools and child-care facilities. Speed limits were reduced through street design measures such as speed bumps. Dedicated right-of-ways for pedestrians were established and clear distinctions between sidewalks and roads created. New fences further protected children from road hazards. City officials installed traffic signals and speed limit signs within 300 metres of a school's main gate and painted roads within school zones with messages such as "school zone" and "protect children" so that drivers would proceed with caution. Additionally, they banned street parking on roads leading to schools' main entrances, reducing the potential contact between vehicles and children. Such measures can be taken in all areas of cities to improve safety for all (*306*).

Box 15.	Envisioning a city with zero traffic fatalities

A movement is under way in cities across the world, not just to reduce road traffic fatalities, but also to eliminate them. In 1997, the Swedish Parliament passed legislation for the Vision Zero plan, which has a strategy for bringing road traffic fatalities and injuries to zero. In 2013, only three out of every 100 000 people died on the road of Sweden, an 80% reduction from 1970. The rate is just over half of that of the European Union, just over one fourth of that of the USA and one thirtieth of that of Nairobi. Cities in Sweden keep the speed limit to the lower safety limit of 30 kilometres per hour. Sweden has laid down more than

12 000 safe road crossings, including bridges and crosswalks, protected by speed bumps. Barriers separate bicycles from cars and from oncoming traffic. Many kilometres of roads have been converted to "2+1" roads, where a third lane, alternating for both directions of traffic, allows cars to pass one another. Strict enforcement of drunk-driving laws has decreased the number of drunk drivers to 0.25% of those tested. Cities across the USA and Europe have begun to emulate Vision Zero with similarly ambitious plans.

Source: The Economist 2015 (*307*).

SUMMARY

City leadership everywhere has the opportunity to improve urban mobility and health simultaneously. In 2014, in the USA alone, urban traffic congestion added up to 6.9 billion hours, 3.1 billion gallons of fuel wasted and a cost of US$ 160 billion (*232*). The most striking example of positive effects for health and for liveable cities is to reduce

ambient air pollution, that accounts for 3.3 million preventable deaths per year. The dynamics of urban mobility pose an economic challenge and a tremendous impact on human health through pollution, sedentary behaviour and road traffic crashes. Fortunately, city leadership can do a great deal. Cities around the world are demonstrating that it is indeed possible to make cities safer and healthier. Many cities have tried to reduce the hazards of personal motorized travel by increasing the cost to the user through congestion pricing, tolls or parking fees and reduced parking stock. Recently, a number of cities have taken steps to make districts of the city car-free, or to have car-free days. The capital cities of Helsinki, Finland, and Oslo, Norway, have declared their intention to be completely car-free in the near future. Even though not every city can be quite that ambitious, they can keep their residents conveniently mobile, while making them safer, healthier and more prosperous. It is essential that cities create desirable mobility alternatives. Convenient public transportation is a crucial piece of any city effort to reduce the health effects of motorized cities. It is imperative for growing cities, and can be deployed even in cities where long-term infrastructure is already in place. Cities can make active transport a more desirable alternative as well. Planning that brings people's needs closer to where they live, or close to accessible public transportation, is important. Equally important is ensuring that should people choose to walk or bicycle that they have safe means of doing so.

CHAPTER 9 — IMPROVE HEALTH IN THE HOME

KEY MESSAGE — Targeted housing interventions, greater use of clean energy and improved affordability can help tackle the global challenge of healthy and sustainable urban housing.

Access to adequate housing is so fundamental to the health and well-being of people and the smooth functioning of economies that it is embedded in the United Nations Universal Declaration of Human Rights and in the International Covenant on Economic, Social and Cultural Rights (308). Nonetheless, inadequate urban housing blights the health of billions of people worldwide. Security of tenure, availability of services and infrastructure, affordability, habitability, accessibility, location and cultural adequacy are all essential elements of adequate housing (309). The global challenge of adequate urban housing continues to grow, with a projected need of 1 billion new houses to be provided by 2025 to accommodate 50 million new urban residents per year (310).

Poor housing quality has been linked to the incidence of infectious diseases, chronic illnesses, injuries, poor nutrition and mental disorders (311). Poor housing is a particular problem in places where policies are lacking to ensure adequate housing, or where unplanned urban growth has led to the proliferation of unregulated, substandard housing. Even in cities in higher-income countries, many homes lack proper insulation, are poorly constructed or are made from hazardous materials. Furthermore, due to a lack of access to affordable and desirable energy for household needs, masses of people still

Apartment Building

use solid fuels at considerable risk to their health and of those around them. Fortunately, there are housing interventions that can yield both short-term and long-term health benefits, while improving overall quality of life.

Housing can be considered at four levels of scale within a local context: (i) the physical structure of the house (or dwelling); (ii) the home (psychosocial, economic and cultural construction created by the household); (iii) the neighbourhood infrastructure (physical conditions of the immediate housing environment); and (iv) the community (social environment and the population and services within the neighbourhood). At each of these levels, housing has the potential to have a direct or indirect impact on the physical, social and mental health of the residents, and two or more levels combined can have an even greater impact (*312*). While the preceding chapters address the broader aspects of the community, this chapter focuses primarily on the physical structure of the house and the home environment.

THE HEALTH TOLL OF POOR QUALITY URBAN HOUSING

Some of the most dire housing conditions are found in urban slums. In 2015, more than 880 million people live in housing conditions that can be classified as slums (*12*). Slum households are technically defined by the lack of any one of the following five elements: access to improved water; access to improved sanitation; durability of housing; sufficient living area; and security of tenure.

Sub-Saharan Africa has a slum population of 199.5 million, South Asia 190.7 million, East Asia 189.6 million, Latin America and the Caribbean 110.7 million, South-East Asia 88.9 million, West Asia 35 million and North Africa 11.8 million (*313*). In some cities, slum occupants represent up to 80% of the population. Slums are a clear manifestation of both poor urban planning and management as well as a malfunctioning housing sector. The pressure of housing demand does not stop, however. Estimates concerning total housing needs in Africa have been set at around 4 million units per year, with over 60% of the demand required to accommodate urban residents.

Many slum residents live in houses with dirt floors, poor-quality roofs and walls constructed out of waste materials such as cardboard, tin and plastic. These houses do not provide proper protection against inclement weather, parasitic infections or unwelcome human intruders. Many have insufficient access to services such as clean water, sanitation, electricity or security.

Inadequate housing conditions even in wealthier parts of the world carry a big health burden. WHO estimates show that in the WHO European Region inadequate housing accounts for over 100 000 deaths per year (*312*). These take into account 11 housing hazards such as those related to noise, dampness, indoor air quality, cold and home safety. The numbers include 38 200 excess winter deaths per year in 11 European countries due to inadequate protection from cold and 14 280 excess deaths per year due to indoor air pollution from solid fuel use. Even if the housing structure is durable, lack of adequate ventilation, air-conditioning, heating and use of hazardous building material can cause acute effects on health and comfort.

Such exposure to substandard housing is not evenly distributed across populations. Poor housing is associated with other determinants of health. Studies have shown that disadvantaged populations, such as racial ethnic minorities and people with

Democratic Republic of the Congo

98.5
1.2
14.0
77.2
98.7
99.7

Comoros

98.4
0.3
6.2
15.5
47.6
99.2

Sierra Leone

98.3
0.0
0.5
3.9
40.5
98.3

United Republic of Tanzania

98.2
0.0
0.3
8.9
53.2
98.2

Rwanda

97
0.1
1.5
22.5
75.8
97.1

Burundi

96.1
0.9
6.3
11.1
63.9
97.0

Somalia

95.1
0.8
1.1
9.1
63.1
95.9

Malawi

95.5
0.2
3.3
13.2
54.9
95.7

Ethiopia

93
0.3
8.6
29.6
62.8
93.3

Uganda

87.1
0.0
2.5
4.9
20.3
87.1

Niger

74.5
0.9
6.9
12.5
32.8
75.4

Sudan

81.4
17.6
84.4
97.8
98.8
99.0

Figure 32.
Proportion of urban households with dirt floors by wealth quintile for selected countries
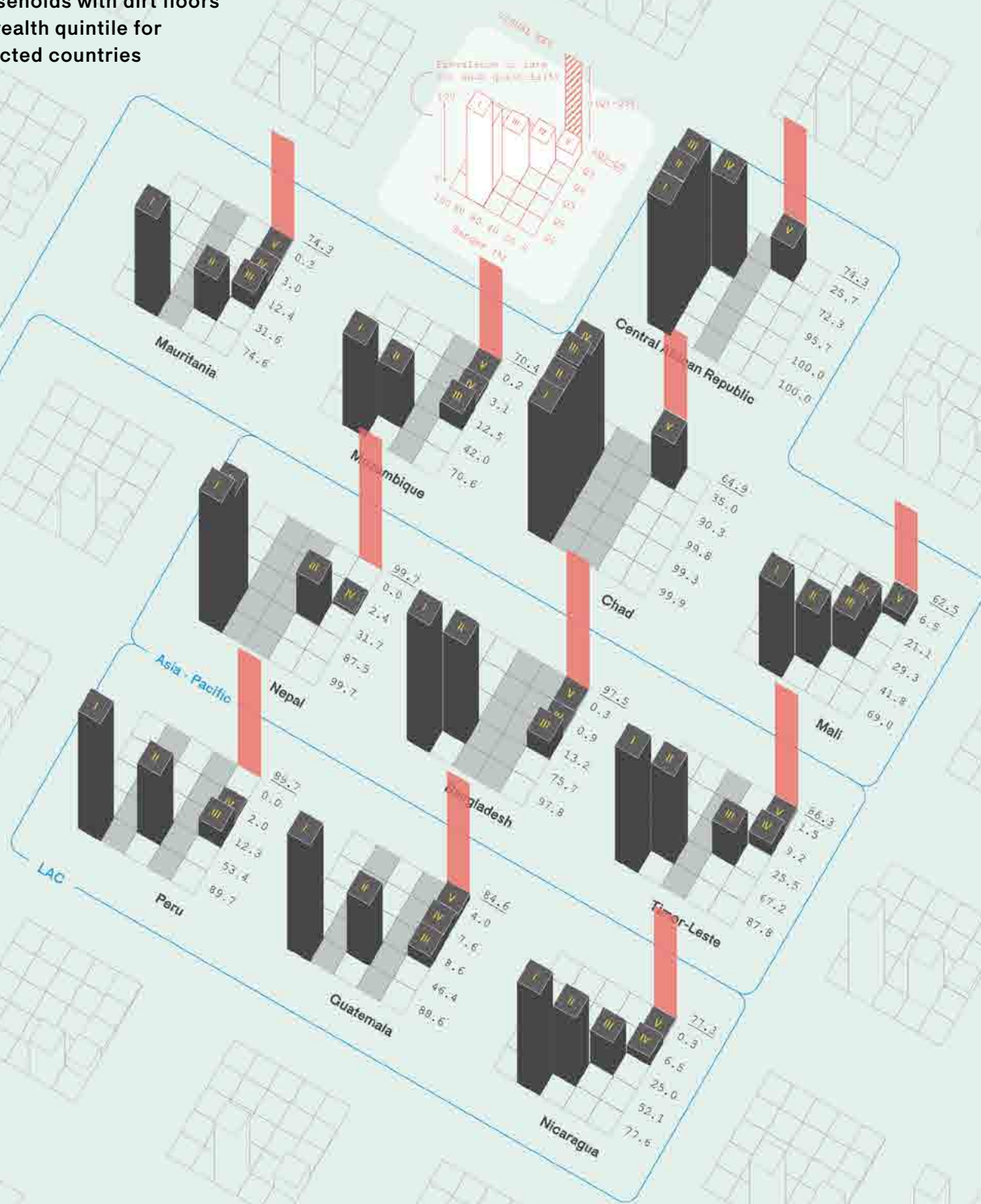
Note: For the full country names, see Annex 1, Table A1.2. Q2, 2nd quintile; Q4, 4th quintile
Source: Global Health Observatory 2015 (*21*).

low income are disproportionately affected *(311)*. They are more likely to occupy homes with severe physical problems, live in overcrowded homes, lack adequate insulation and air-conditioning, and have increased risk of respiratory problems, injuries and home fires due to poor housing quality. Figure 32 selectively shows data for countries where, on average, over one fourth of urban homes have dirt floors. For each country, the prevalence of dirt floors is shown by wealth quintile, revealing that most of the homes with dirt floors in those countries belong to poor households. In a few countries, virtually everyone in urban areas lives in dirt floor homes except those in the richest one fifth of urban households. Vulnerable groups such as people with poor health, older people and the unemployed are among those most likely to live in poor housing, and they also tend to spend long periods of time indoors exposed to potentially hazardous environments.

By contrast, good quality housing renders substantial benefits. Housing quality contributes to well-being, quality of life and mental health, especially as people spend a large amount of time in their houses to rest and relax. It can also induce a sense of dignity and pride. Adequate housing can promote physical health by providing protection against the ravages of the environment – roofs and walls provide shelter from rain and cold; water, sanitation and non-dirt floors protect against parasitic infestations and infections. In addition, housing may provide security and serve as a defence against crime. Increased home security can allow households to accumulate assets as well as free up time for use in more productive activities that would otherwise be devoted to protecting assets *(314)*.

TARGETED HOUSING IMPROVEMENTS

Health considerations should be a major objective in the construction and rehabilitation of housing and other built environments. Ideally, standards for "adequate housing" or "sustainable housing" should have a health rationale, and not just a technical rationale, such as strength and durability *(312)*. While many housing standards and codes may have originally been based on health principles, in most cases, there has been a lack of

continued input from the health community. The result is that, over the years, housing providers and other housing professionals have increasingly concentrated on the buildings and equipment, with limited ability to take into account health-based evidence. The health sector must become more involved in the development and implementation of policies and programmes directed at dealing with inadequate housing, which result in additional costs to society, including the health sector.

New dwellings make up only a very small proportion of the housing stock; the vast majority of the stock already exists and some of it is old and built to standards unacceptable today. It is the existing housing, therefore, where health-based policies and actions will have the biggest impact, and guidance should be developed for its improvement and rehabilitation. Housing refurbishments are typically more efficient, generate less carbon emissions and less disruptive to tenants than demolishment and reconstruction. Clearly, it will not be possible to improve all the housing stock at once. There should be national and local policies and programmes with defined, prioritized target areas where the most serious conditions are likely to exist.

Methods to improve housing are known, and there is evidence that housing upgrades and targeted housing interventions can significantly improve residents' health and quality of life, especially among those who are disadvantaged (*222,315*). A systematic review of studies from New Zealand and the United Kingdom examined the health impacts of housing improvements in heating and energy efficiency. After 5–12 months of the intervention, little indication of improved health was found in the United Kingdom studies, however, meaningful improvements were found across a range of respiratory and general health outcomes in the New Zealand studies (*316*). A key difference is that the studies in New Zealand targeted residents who lived in poor housing and residents with existing respiratory disease, and the results suggest that provision of improved warmth can lead to improved health, especially when targeted at those living under these conditions.

While housing improvements do not always lead to immediate improvements in health outcomes, there is evidence that improvements can have beneficial effects on broader socioeconomic determinants of health. The most common impacts reported shortly after housing improvements include: changes in domestic space and design; thermal comfort; housing costs (i.e. rent and fuel); and attitudes towards and control over

Source: WHO/Anna Kari

the living environment. Where these changes are positive, they point to the potential for subsequent health improvements in the longer term (316,317). When such co-benefits of housing improvement are taken into account across multiple sectors, the time required to recover the initial investment costs can be substantially reduced.

For example, a comprehensive home improvement programme in Liverpool, United Kingdom, honed in on the deprived areas of the city to improve housing conditions that cause or exacerbate preventable disease, injury and premature death (Box 16). It is difficult to isolate the contribution of the programme to observed declines in excess winter deaths and child accidents in the home, given the large number of other projects tackling poverty and health inequalities in the city. However, the intersectoral programme enabled residents to cope with their housing-related health and safety risks as well as fuel poverty. Cost savings to the National Health Service and wider benefits to the local economy were also achieved. These impacts on important determinants of health are expected to produce long-term health benefits.

Box 16.	Liverpool's Healthy Homes Programme

The city of Liverpool has one of the highest mortality rates and levels of health inequality in the United Kingdom. Over 44 000 households live in fuel poverty. Poor housing conditions are believed to be implicated in up to 500 deaths in Liverpool and around 5000 illnesses requiring medical attention each year. A significant proportion of properties within the private-rented sector is substandard, increasing the chance of occupants suffering preventable ill-health and contributing to health inequality.

The Healthy Homes Programme, started in 2009, improves housing conditions and engages residents into mainstream health-related and well-being-related services. Deprived areas of the city are proactively targeted, where advocates visit every property in the area to offer the services. The programmes' Environmental Health teams inspect homes, assess the risk to health of housing conditions and provide an outline of improvement works that the homeowner could take to make the property safer. Where the property is rented, they have enforcement powers to ensure that the property owner makes the necessary improvements. Referrals are made to a range of partners to address identified health needs.

The scheme has already led to over 3200 referrals to dentists and general practitioners. There have also been many referrals for fuel poverty, smoking cessation, food and nutrition, and home fire safety checks. As of March 2015, there have been more than 28 000 referrals to various partner organizations, over 5700 home risk assessments carried out and over 4100 serious housing hazards remedied. This has resulted in nearly £5.2 million of private sector investment by property owners to improving the condition and safety in properties. According to an independent evaluation, the total anticipated savings by the Healthy Homes Programme in the first year of its operation was £55 million, of which £42 million was attributed to excess cold.

Source: Watson and Hatcher 2013 (318).

There is comparatively less evidence of the health impacts of housing improvement in LMICs, but there are some particularly illustrative cases with robust evidence.

For example, a government programme in Mexico replaced dirt floors with cement floors in Mexico City slums, resulting in reductions in parasitic infestations, diarrhoea and anaemia among children (Box 17). Researchers who studied the effects of the programme importantly noted that access to safe water and child health interventions (e.g. nutrition, deworming) are key to achieve the desired effects of the dirt floor replacements.

Box 17.	Concrete action for children's health

Many parasites and pathogens live in faeces and soil, and are transmitted to humans when ingested or touched. Faecal matter and parasites can enter houses on shoes, on animals, in unclean water and from unclean babies. Faecal matter tends to remain on dirt floors: it is difficult to see and dirt floors are hard to clean. Consequently, young children living and playing on dirt floors are more likely to ingest faecal materials and come in contact with parasites than children playing on concrete floors.

State and federal governments of Mexico, under the Piso Firme programme (which originally started in 2000 in one state and later expanded to other states), had installed concrete floors in over 300 000 homes of disadvantaged families living in urban slums by 2009. The programme provides approximately 50 square metres of concrete to the home; the family provides the labour for levelling off the wet concrete. This is a one-time cost that provides a benefit indefinitely.

Two neighbouring cities across state borders that are socioeconomically similar except for the influence of state policies (i.e. one with the Piso Firme programme, the other without) were compared to evaluate the effects of the programme. In its first five years, the programme achieved remarkable results in improving young children's health and family welfare. It is estimated that a complete substitution of dirt floors by cement floors would lead to a 78% reduction in parasitic infestations, 49% reduction in diarrhoea, 81% reduction in anaemia and a 36–96% improvement in cognitive development in children. The programme also had a significant impact on mothers' happiness by increasing satisfaction with the quality of life, and reducing depression and perceived stress.

Source: Cattaneo et al. 2007 (315).

Another study provides valuable evidence regarding the causal effects of housing upgrades on the living conditions of extremely poor people in slums. It examines the impact of inexpensive, but sturdy houses constructed by TECHO, an NGO that provides basic pre-fabricated houses to extremely poor populations in Latin America. TECHO targets the poorest informal settlements, and within these settlements, the families who live in extremely substandard housing. TECHO houses are a significant improve-

ment over existing housing units in terms of their flooring, roofs and walls, though they do not have indoor sanitation facilities, running water or kitchens.

An assessment of the effects of this housing upgrade based on a randomized control trial in three Latin American countries – El Salvador, Mexico and Uruguay – found that the better structures had a positive effect on overall housing conditions and subjective well-being (319). Satisfaction with quality of life is a dimension of social policy that is often overlooked yet is crucial to the life experience of poor people. In El Salvador and Mexico, they also found improvements in children's health, while in El Salvador, slum occupants' perception of their safety and security also improved. There were, however, no noticeable effects on the possession of durable goods or in terms of employment outcomes. While the size of the effects was not as large as expected or desired, the study showed that the provision of this kind of in situ housing upgrade has some significant effects on the living conditions of slum residents. Upgrading homes in existing slums should, therefore, be considered as an alternative option to relocating residents to new houses further away from urban centres.

Providing better housing and housing facilities improves residents' well-being and satisfaction with life, but does not reduce the various ailments from which they suffer due to living in poor neighbourhoods. Housing upgrade programmes must be complemented with more comprehensive interventions combining infrastructure and social components that can address the other major problems affecting the lives of people living in deprived environments.

NEIGHBOURHOOD AND COMMUNITY UPGRADING

An important aspect of housing is the neighbourhood and community environment, which encompasses the physical and social conditions of the immediate housing environment. Urban renewal programmes have the potential to address these broader aspects. For example, neighbourhoods in Barcelona which were part of a region-wide urban renewal project in Catalonia showed improved health and health equity as a result of such interventions (Box 18).

Box 18.	Urban renewal projects in Barcelona improve health and health equity

The Neighbourhoods Law (Llei de Barris), implemented by the Government of Catalonia between 2004 and 2011, led to large-scale urban renewal interventions across the region. The government and municipalities co-funded interventions in neighbourhoods, mostly deprived, that focused on physical improvement, social integration, health and economic gains, in order to improve living conditions of residents.

In Barcelona, 15 out of 73 neighbourhoods benefited from the programme, resulting in about 10% of the 1.6 million residents being directly affected by the initiative. An evaluation study assessed the health of women and men of different social classes living in five renewed neighbourhoods in Barcelona and compared it to that of people living in non-

intervened neighbourhoods with similar socioeconomic conditions (*320*). It evaluated two indicators from the Barcelona Health Survey: self-rated general health and mental health status. A comparison of data from 2001, 2006 and 2011 allowed an evaluation of the intervention effects on health and health inequalities. The results showed that perceived health status of both women and men improved in the renewed neighbourhoods. A particularly strong effect was found among the manual social class, resulting in reduced social class inequalities. Similar effects were found for women's mental health. The intervention did not improve men's mental health, but it did protect it from worsening. The residents also perceived the intervention as positive and important for their well-being (*321*).

One of the concerns about urban renewal programme is the potential for population displacement and selective mobility between neighbourhoods. The study was able to show that the observed positive effects were not due to recent in-migration; the long-term residents actually benefited. However, it did not account for the health and ethical implications of out-migration, some of which were forced, due to the renewal programmes. These are important considerations to be taken into account before such interventions are undertaken, as once those people have left and are out of sight, it is often too late.

The extent to which structures and land use can be determined by authorities through such measures as building regulation and codes varies considerably from setting to setting. In high-income countries, building regulations are more often used to control indoor environmental quality. Policies have also been developed to target households in the lowest socioeconomic group, particularly those that may live in fuel poverty (those spending more than 10% of income on fuel). In informal settlements, there is almost no control over building construction, even though inhabitants in those areas are among those who stand to benefit the most from simple measures.

Evidence of short-term health impacts of neighbourhood renewal projects is less conclusive, however, than that of targeted housing improvements (e.g. replacing dirt floors; improving warmth). Neighbourhood interventions are typically administered over broad, diverse areas, which likely include many homes that did not need or benefit from renewal. In such cases, neighbourhood-wide impacts may mask significant gains for individual households. There are potentially higher returns in neighbourhoods with relatively high proportions of homes in need, such as in slum neighbourhoods and informal settlements.

Slum upgrading is a broad term and there have been many different approaches, ranging from single interventions, such as improving sanitation, to integrated programmes comprising many activities and targeting various problems at the same time. A comprehensive systematic review of slum upgrading involving both single and multiple interventions found limited, but consistent evidence to suggest that slum upgrading that includes water infrastructure may reduce the incidence of diarrhoea among the residents and their water-related expenses (*322*).

Of course, slum upgrading should not only be judged from a health perspective. It is a moral imperative to improve the living conditions of the poorest in a city. It also allows residents to stay in their homes and close to their jobs, rather than uprooting them. While there is sometimes the concern that upgrading slums will attract even

more people, often poor people, to the city and aggravate the problems of unplanned growth, there is no evidence that it actually causes increased rural–urban migration.

An important finding from the aforementioned systematic review is that slum residents' perspectives provide insight into barriers and facilitators for successful implementation and maintenance interventions. The value of community participation in such contexts is illustrated by the Participatory Slum Upgrading Programme (PSUP) to improve housing and the quality of living conditions in existing slums. Launched in 2008, PSUP is a joint effort of the African, Caribbean and Pacific (ACP) Group of States, the European Commission and UN-Habitat (*323*). To date, the programme has reached out to 38 ACP countries and 160 cities, and has provided the necessary enabling framework for improving the lives of at least 2 million slum dwellers.

In practical terms, PSUP puts slums on the urban map and encourages the necessary policy changes, budget allocations and multistakeholder partnerships for the sustainable improvement of slum dwellers' living conditions. PSUP thus institutionalizes partnerships and empowers key urban actors to contribute to the incremental eradication of urban poverty at community, city-wide and national levels.

While slum upgrading is viewed as a valuable approach to dealing with existing informal settlements, it should not divert attention from the fact that unplanned urban growth is inefficient and requires enormous amounts of resources to maintain. High costs of bad or no decisions with respect to urban expansion can be irreversible. Ideally, city leaders drive constructive change through anticipating a problem and then plan for urban growth in advance (*324*).

UNCLEAN FUEL: A MAJOR AIR POLLUTANT PRODUCED IN THE HOME

In addition to the physical characteristics of the home and neighbourhood environment, indoor air pollution due to solid fuel use is a major housing-related health risk factor. Urbanization has long been assumed to enable households to move away from using dirty fuels to cleaner energy, but a great number of households continues to use highly polluting fuels despite having access to cleaner alternatives. While an estimated 94% of the urban world's homes have electricity, millions of urban households in some of the most rapidly urbanizing countries in the world are still without it and cannot afford, or choose not to use, clean energy sources (*325*).

In 2014, the International Energy Agency estimated that around 1.3 billion people worldwide do not have access to electricity and around 2.7 billion people rely on solid fuels for cooking and heating (*325*). In sub-Saharan Africa's least-developed countries, an average of only 45% homes have electricity, and it can be as low as 4% in the Central African Republic, Liberia and South Sudan.

Solid fuel use in urban homes is still highly prevalent even in some European countries, where 14 280 deaths per year are related to exposure to indoor pollutants from solid fuel use (*312*). A major health impact of this is acute lower respiratory tract infections in children under 5 years, which are estimated to cause 16.7 deaths per 100 000 children per year.

Household solid fuel use is also an important contributor to outdoor air pollution. About 12% of fine particulate matter (PM2.5) is attributable to household use

of solid cooking fuels. Based on the 2010 Global Burden of Disease study, it was estimated that exposure to ambient PM2.5 from cooking with solid fuels caused the loss of 370 000 lives and 9.9 million disability-adjusted life years globally (326).

Household air pollution, including both indoor and ambient exposure to air pollution from household use of solid fuels, was responsible for an estimated 3.9 million premature deaths and about 4.8% of lost healthy life years in 2010. In just two years, by 2012, it was responsible for 4.3 million deaths, making it the largest environmental contributor to ill-health (327).

The importance of household air pollution as a public health threat varies quite drastically by context. In LMICs, household air pollution is responsible for almost 10% of the mortality, while the same risk factor is only responsible for 0.2% of deaths in high-income countries (328). Among countries where, on average, over one quarter of all urban households use solid fuel for cooking, there is generally a strong correlation between household wealth and solid fuel use (Figure 33). At the same time, there are several countries where nearly all urban households, or all except the richest ones, use solid fuels.

In addition, women typically have more severe exposure to pollutants in the home from unclean fuels in contexts where solid fuel use is common as they often spend a greater amount of time indoors than men do, cooking and caring for infants and young children. For example, of the deaths due to solid fuel use in Europe in 2002, 53% occurred in children, and another 36% in adult women (312).

CLEANER HOUSEHOLD ENERGY STRATEGIES

A recent systematic review of health risks from household air pollution exposure concluded that household air pollution is linked to multiple major disease outcomes for children and adults (329). Controlling this exposure could reduce the risk of these outcomes by 20–50%. A separate review of quantified multiple benefits showed that increased productivity through reductions in infectious disease incidence from indoor air pollution

Source: WHO/Anna Kari

Nigeria
86.0
10.8
24.8
58.8
88.4
98.8

Mauritania
81.2
4.5
14.6
35.2
51.1
95.8

Zambia
93.0
6.8
36.7
84.4
99.8

Sudan
92.6
4.2
20.0
43.0
72.5
96.8

Ghana
89.2
10.6
67.6
91.5
98.9
99.8

Cameroon
80.5
18.7
51.7
81.6
91.6
98.8

Senegal
76.7
19.5
49.7
80.8
97.7
96.2

Kenya
79.8
13.3
34.4
69.0
84.2
93.1

Comoros
79.7
15.4
33.3
50.5
69.4
95.1

Sao Tome and Principe
70.4
24.1
53.2
73.1
77.0
94.5

Côte d'Ivoire
64.7
33.2
58.8
60.5
88.6
97.7

Congo (Brazzaville)
78.2
17.2
56.7
59.6
84.2
95.4

Mozambique
43.2
56.8
85.8
97.4
99.8
100.0

Ethiopia
50.0
49.9
78.2
90.5
95.8
99.9

Burkina Faso
42.4
57.3
89.2
97.0
99.6
100.0

Malawi
44.4
55.6
94.0
99.7
100.0
100.0

Democratic Republic of the Congo
21.4
78.6
97.6
100.0
100.0
100.0

Benin
39.0
61.0
94.4
98.5
99.6
100.0

Niger
21.1
78.9
98.5
99.7
100.0
100.0

Togo
25.1
73.0
98.1
99.3
99.2
99.3

United Republic of Tanzania
20.7
77.1
87.3
90.7
94.3
97.8

Chad
25.3
74.7
97.9
99.8
100.0
100.0

Madagascar
12.4
87.6
99.2
100.0
100.0
100.0

Uganda
15.9
84.2
96.2
97.3
97.8
99.7

Central African Republic

1.6
98.1
100.0
100.0
100.0

Mali

5.5
94.5
98.6
99.4
100.0
100.0

Quinea-Bissau

9.3
90.7
99.5
100.0
100.0

Gambia

8.8
91.1
96.3
98.2
98.6
99.9

Liberia

1.2
98.1
100.0
100.0
100.0
100.0

Burundi

3.8
95.1
100.0
99.9
100.0

Quinea

2.3
97.6
99.8
100.0
100.0
99.9

Nepal

93.9
1.4
11.3
32.9
67.3
95.3

Bangladesh

92.8
5.9
36.6
53.4
83.7
98.7

Rwanda

1.0
99.0
99.2
99.7
100.0
100.0

Somalia

1.0
99.0
99.2
100.0
100.0

Sierra Leone

0.9
98.3
98.8
99.2
100.0
99.8

India

85.2
0.3
4.9
17.6
45.8
85.4

Philippines

92.3
1.8
13.2
35.3
70.4
94.1

Mongolia

90.8
0.0
33.9
75.1
96.4
90.8

Vanuatu

86.9
7.1
26.1
71.4
87.2
94.0

Cambodia

84.0
14.0
33.7
61.4
87.8
98.6

Timor-Leste

46.2
53.8
92.4
98.1
99.8
100.0

Afghanistan

85.1
2.2
11.3
22.8
45.7
87.4

Honduras

73.2
1.2
6.2
21.3
38.2
74.4

Haiti

26.1
73.2
97.2
98.9
99.4
99.8

Lao People's Democratic Republic

35.3
64.7
90.9
95.5
99.3
100.0

Bosnia & Herzegovina

72.0
4.0
20.7
51.5
63.3
81.0

Asia – Pacific

LAC

Eastern Europe

PG

185

Note: For the full country names, see Annex 1, Table A1.2. Q2, 2nd quintile; Q4, 4th quintile
Source: Global Health Observatory 2015 (21).

is particularly high *(330)*.

The best approach is to make cleaner fuels (i.e. electricity and gas) available, affordable, sustainable and desirable. Unlike typical biomass stoves, using gas and electricity does not pollute the household, even with suboptimal use. In addition to being a source of lighting, heating, cooking and air-conditioning, household electrification also allows families to store food safely.

Clean, efficient cooking stoves are actually relatively cheap and widely available in many parts of the world, but remain underutilized by the populations they are intended to reach. This may be due to relative pricing and affordability (and not simply availability), price volatility, intermittent availability and usability with existing embedded or cultural practices. Another important factor influencing the fuel choices that people make is how the built environment and housing designs facilitate the use of different fuels, and the extent to which local livelihoods depend on fuel trade. Other influences of the choice of fuels include available income, national and global trade, access to products and services, and infrastructure development aid *(331)*.

Overall, perhaps the most crucial factor is the behaviour of individual households. Even if many people do have access to cleaner fuels, they may not make use of it because of an array of factors. There are about the same number of people using solid fuels today as 25 years ago, in spite of considerable development and urbanization during this time *(332)*. A study among slum dwellers in Nairobi illustrates the kinds of misperceptions and related factors that can hamper widespread uptake of cleaner fuels (Box 19). Another study in Bangladesh, which looked at demand for clean cook stove technologies, found that users do not perceive indoor air pollution as a significant health hazard, they prioritize other basic needs and they prefer the free traditional cook stoves *(333)*.

Box 19.	Health-harming perceptions of air quality in Nairobi slums

A study by APHRC sought to establish the state of air quality in two slums in Nairobi, assessing the levels of fine particulate matter both in the ambient environment and indoors. Preliminary results indicated high levels of outdoor PM2.5 exceeding WHO guideline limits in both slums. Indoor air quality was equally poor in both slums with fine particulate matter exceeding WHO guidelines by a factor of about four in households using charcoal for cooking. High levels (in excess of WHO limits by a factor of three) were observed in the evenings when households reported poor ventilation practices.

When people's perceptions and attitudes towards air pollution and associated health risks were assessed, outdoor sources of air pollution were mostly mentioned, while indoor sources were rarely mentioned. Furthermore, while people perceived outdoor air quality to be very poor and causing more annoyance, indoor air quality was apparently of little concern.

These perceptions clearly depart from quantitative evidence of poor indoor air quality, often worsened by poor ventilation and the seepage of outdoor pollution into the indoor environment. In addition, the people in the study area believe they are unable to do anything about air pollution, citing lack of government support for inhabitants of informal neighbourhoods, and poverty. Residents

appeared resigned to the state of air in their communities, reporting that they were "used to this" because they had long been exposed to air pollution.

Even so, most residents easily identified respiratory conditions as some of the health effects. Fewer people mentioned cardiac illnesses and cancers. Yet, 45% said they had never received any information about air pollution, revealing an important knowledge gap in the two communities. The study organizers concluded that efforts to mitigate air pollution in these communities will need to include increasing awareness of the impact of commonly used cooking and lighting fuels as well as the use of ventilation.

Source: Egondi et al. 2013 *(334)*.

For households continuing to rely on solid fuels, the best possible low-emission solid fuel stoves should be promoted, backed up by testing and in-field evaluation. A randomized control trial of the impact of inexpensive, improved cooking stoves on household well-being in India showed that while smoke inhalation decreased in the first year of use, those gains were lost in subsequent years because the stoves were not used regularly and recipients did not invest in maintaining them properly *(335)*. Encouraging such households to choose healthier options requires new approaches by city leaders drawing on the advice of environmental health specialists, economists and social scientists. They should have features that are highly valued by users, such as reduction of operating or maintenance costs, including fuel savings, even when those features are not related to the cook stoves' health impacts.

Whatever the mix of fuels and technologies ultimately adopted by households over the next 20 years, improved solid fuel stoves will continue to play a very important part. Achieving adoption and sustained use of improved stoves on a large scale will require community coordination and policies to support them. Even if one or several households convert to clean fuels, if the others in the community do not follow suit, all households will continue to be affected. In a systematic review of the impacts of solid fuel and clean fuel interventions on exposure to PM2.5 and carbon monoxide, researchers found that improved solid fuel stoves led to large reductions in exposure. However, post-intervention kitchen levels of PM2.5 were still very high, likely due to contamination from other sources. The evidence implies that there needs to be a strategic shift towards more rapid and widespread promotion of clean fuels along with efforts to encourage more exclusive use and to control other sources in and around the home *(329)*.

Experts have often regarded energy access as a function of income. The assumption has been that increasing incomes would naturally lead to a transition from dirty fuels, such as crop residues, waste and dung, to cleaner sources of energy, such as electricity and gaseous fuels. Thus, it has been reasoned that households will move up the "energy ladder" and abandon "dirty" fuels, while increases in urban populations will lead both to increased incomes and access to urban infrastructure, thereby accelerating access to cleaner fuels *(336)*. This has been the case in urban areas in some countries, such as Cambodia, but in general, the evidence is mixed. Numerous studies have revealed an extra rung at the lower end of the energy ladder. Instead of moving up to "clean" fuels, many households in low-income countries move to intermediary fuels, such as wood, coal and kerosene, where these are available *(337–339)*. This half-step is mostly occurring in

cities, where infrastructure and fuel markets are available and accessible. In such settings, households can choose their type of fuel replacement, but not necessarily opt for one that does not have adverse health implications.

At the same time, however, a global energy revolution is taking place that is destined to change the way cities are shaped and the way people live in them. Although it may not yet seem so, cities are on the threshold of potentially astonishing progress. This is part of the energy transition. It means moving away from fuels that pose a risk to health to alternative energy sources that protect well-being and improve quality of life. In order for this transition to succeed, political leaders, planners and partners across many sectors – and people themselves – will need a better understanding of the energy landscape. The challenge for cities now is to plan to ensure that the energies consumed will be the cleanest, most efficient and equitably shared for the benefit of people at all levels of urban society. The key is to avoid getting locked into unhealthy and inefficient energy use for many decades to come.

HEALTHIER AND AFFORDABLE URBAN HOUSING

Housing affordability is in itself an element of adequate housing and a determinant of health. Yet, in developing and advanced economies alike, cities struggle with the dual challenges of housing their poorest citizens and providing housing at a reasonable cost for low- and middle-income populations (*310*).

"Affordable housing", which often refers to low-income housing or social housing, is different from "housing affordability", which is considered at the middle of the market. In order to improve equity, housing policy requires a strong focus on affordable housing, but it also requires a broader focus relating to the entire population (*236*).

In rapidly expanding cities, population growth puts constant pressure on housing; even in cities with ageing and shrinking populations, total housing demand could still grow, as a new generation of young adults and families enters into the housing market. Studies have shown that high education levels, good health and high income will increase a household's demand for housing. That is, housing demand is significantly determined
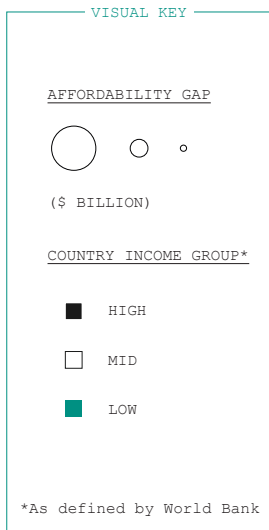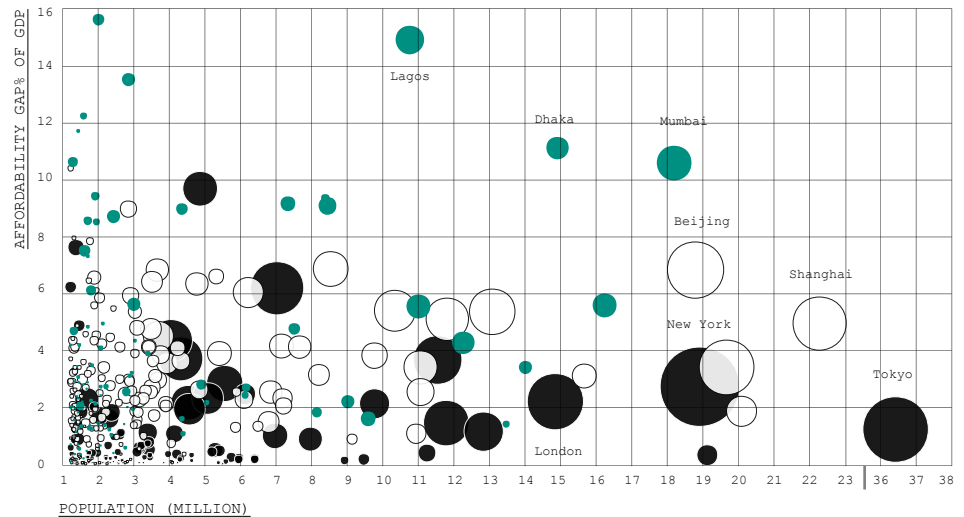
Figure 34.
Global housing affordability gap for 2400 world cities

Source: World Bank; UBS Prices and Earnings Report 2012; Numbeo; CEIC; Deposits.org; Global Banking Pool; Royal Bank of Scotland; Zillow; Metroscubicos; Exame; Notaires Paris Ile de France; Jones Lang LaSalle; McKinsey Global Institute Cityscope database; United States Census Bureau; national statistics offices; McKinsey Global Institute analysis, cited in Woetzel et al. 2014 (*310*).

by a household's human capital, and housing demand generally increases with age (*340*).

An estimated 330 million urban households around the world currently lack decent housing or are so financially stretched by housing costs that they forgo other basic needs, including food, health care and schooling for children. Based on current trends in urban migration and income growth, by 2025, about 440 million urban households around the world – at least 1.6 billion people, or one third of the urban population – will occupy crowded, inadequate and unsafe housing or will be financially stretched (*310*). Low- and moderate-income households are more likely to sacrifice having enough food, staying warm and living in adequate housing as housing and energy prices go up.

A study of 2400 cities worldwide revealed a substantial global housing affordability gap, defined as the difference between the cost of a city's acceptable standard housing and what households can afford to pay for it using no more than 30% of their income (*310*). The global gap is estimated to amount to US$ 650 billion per year, a full 1% of global GDP. More than two thirds of this gap is concentrated in the 100 largest cities in the world, while the largest gaps are found in low-income countries. In some of these cities, the gap is as large as 10% of GDP or more (Figure 34). In order to close the global housing affordability gap, an investment of as much as US$ 16 trillion will be needed by 2025.

VISUAL KEY

AFFORDABILITY GAP

($ BILLION)

COUNTRY INCOME GROUP*

■ HIGH
□ MID
■ LOW

*As defined by World Bank

The home is one of the largest expenditures that a family makes and it is a superior good, in as much as the share of income spent on housing typically increases disproportionately as income rises. Adequate, affordable housing provides a number of benefits. In the right locations, affordable housing boosts the city's productivity by integrating lower-income populations into the economy and reducing costs to provide shelter and services. It enables labour mobility, opening a path to rising incomes, giving households more to spend on goods and services in their neighbourhoods and, over time, enabling them to move up the income pyramid and help drive city GDP growth (*310*).

Achieving health equity depends substantially on changing the inequitable distribution of physical environments, with a focus on those with the highest health

needs. Designing low-income and affordable housing to make it healthier provides important opportunities to address health equity. Creation of amenities that support health within affordable housing developments and neighbourhoods can make it possible for children, adults, older people and those with special needs who live there to have healthier lives (127). These interventions can be low cost or cost neutral, in part due to technological developments that enable lower construction costs and building materials. For instance, the costs of integrating physical activity-promoting strategies into new affordable housing developments were examined in three cities in the USA – Atlanta, New York City and San Antonio. The findings ranged from increases of 0.01% to 1.6% of total development costs to a cost savings of 0.5% (341).

By providing affordable housing and other services, including health, education and transport to lower-income households, cities can play important roles in achieving health and social equity objectives, while simultaneously reaping economic benefits. This approach is likely to stimulate economic opportunities such as the ability of those residents to obtain jobs within convenient reach by public transport. In this way, the increased pool of workers who are available to businesses boosts urban economic development.

For city authorities, one of the biggest questions is where housing developments should be built. The current model of urban housing development often places housing at the very edge of the urban fringe, which leads to long commutes and even abandoned units. While living away from the city centre may save on housing costs, the increase in transport costs often balance out the difference. One new model of affordable housing development now used in many cities is to locate them in mixed-income and walkable neighbourhoods with access to shops, leisure amenities and rapid, convenient public transportation. In general, smart growth principles of locating residences close to services and jobs can have great benefits to occupants as well as the larger community. Thus, transport and housing policies, along with land use and other related policies, should be jointly considered when addressing housing affordability(342). This is particularly relevant for cities with sprawling urban forms.

The importance of coordinating different policies for housing also applies to informal settlements. Many people live in informal settlements not because of poverty or housing affordability, but because of the lack of suitable small plots of land in the formal market (343). While most of the residents have only part-time or informal sector employment, many have full-time jobs with sufficient resources to live in formal neighbourhoods. By providing small plots of serviced land and secure property rights, the government could leverage the existing resources of the poor and assist in the creation of assets that would improve welfare of the poor.

SUMMARY

Given the pressing need to provide adequate housing to all current and future urban residents, housing policy must be elevated on the urban agenda. Too often, housing is not appropriately integrated into urban policies despite the fact that residential land use occupies the majority of the surface area of many cities (309). This practice must change in order to ensure the right to adequate housing for urban populations, including for the ever-increasing number of migrants and internally displaced people due to natural hazards and forced evictions.

This chapter highlights the health risks of inadequate housing with a focus on the physical conditions of the home and neighbourhood environments, household energy use and affordability. It also demonstrates a number of interventions that cities can leverage to address these issues, from housing and neighbourhood upgrades to designing healthier affordable housing, and better urban planning to reduce transport expenditures associated with housing location. Greater policy coordination on housing will not only improve health outcomes, but also contribute towards the goals of other sectors. Such co-benefits could include increased participation in education and the work force, faster adoption and scale-up of clean energy, reduced air pollution and greenhouse gas emissions, lower levels of neighbourhood crime and poverty reduction. Reducing indoor air pollution alone will make significant contributions to reduced morbidity and mortality.

As the poor and vulnerable households are the most affected by lack of adequate housing, the focus on these groups must not be lost. At the same time, due attention should be paid to the broad spectrum of urban middle-income households, even in some of the wealthiest cities, for whom housing is unaffordable or of substandard quality.
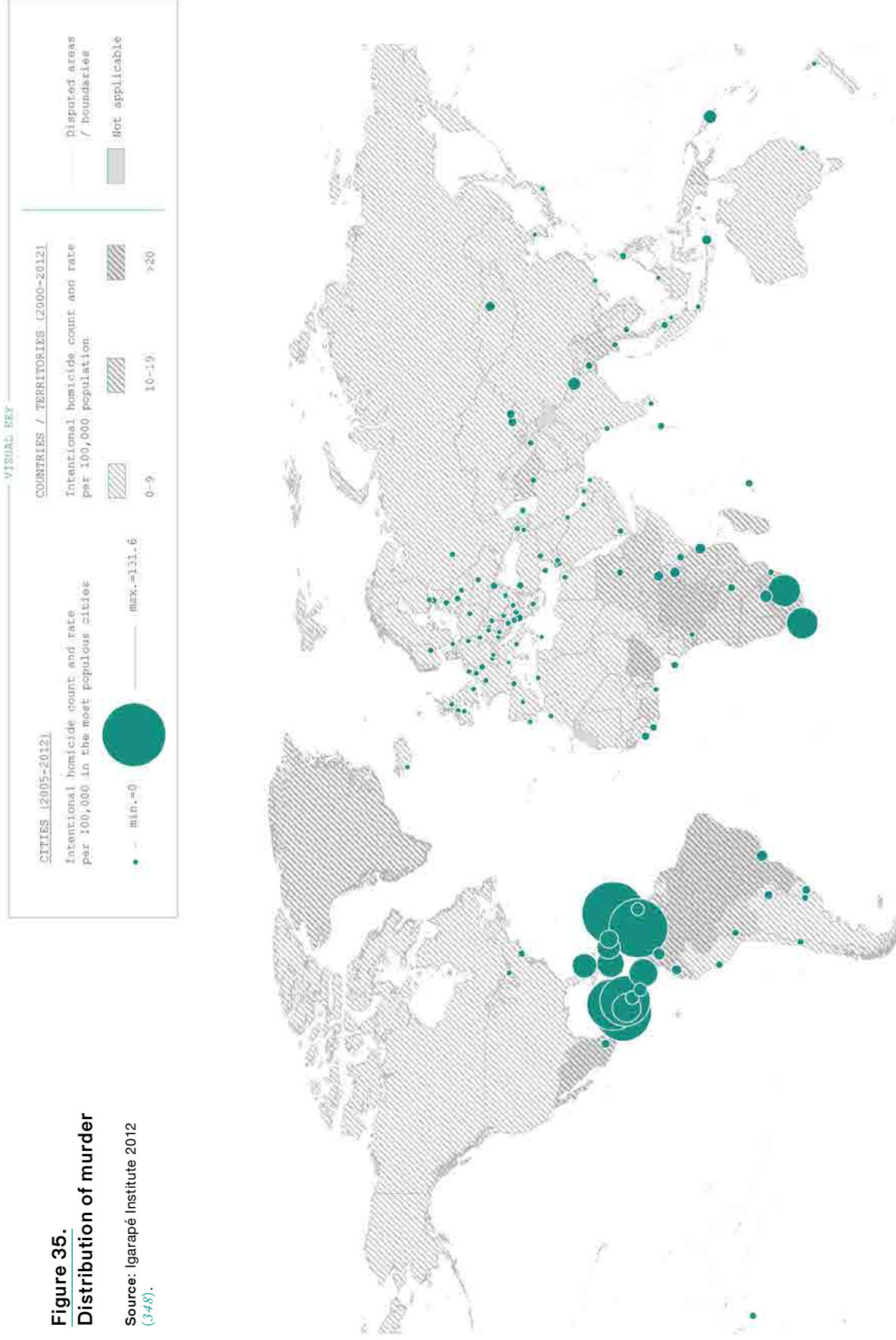
CHAPTER 10 — ENSURE SAFETY IN THE CITY

KEY MESSAGE — **Poor safety and urban violence come at a significant cost to the health of urban residents and the societies where they live.**

Safety has always been a top concern for city leaders. Not coincidentally, safety and security are among the chief concerns of their constituents. They have been found to be among the three most important factors that make a city an appealing place to live and work (*344*). The attractiveness of the city as a place to live, or visit, is just one of its many features influenced by the reality or the perception of safety of the city. Safety is intertwined with a city's economic vitality and social fabric. It underpins many of the basic functions of the city from transportation and infrastructure to the delivery of education. Safety in cities is also a health concern, as it is crucial to protect urban residents from physical and mental harm. As discussed above, the lack of safety of city roads is a significant source of injury and death in cities. In addition, safe drinking-water and safe passage to schools are important determinants of children's health and outcomes. Threats and hazards to our health abound and can take many forms in urban environments. Among these, one of the most significant sources of concern and disruption for urban societies is the threat of violence.

In many countries across the world, violence and crime remain chronic issues in cities. Across the developing world's cities, 60% of all urban residents are estimated to have been victims of crime (*345*). As much as 70% of these victims are residents of cities in the Latin American and African regions. These regions are also home to many of the most violent cities in the world, as depicted in Figure 35. However, cities plagued by violence are by no means restricted to developing countries. Three of the 50 most violent

Figure 35.

Distribution of murder

Source: Igarapé Institute 2012
(348).

VISUAL KEY

CITIES (2005-2012)

Intentional homicide count and rate
per 100,000 in the most populous cities

· — min.=0 ———— max.=131.6

COUNTRIES / TERRITORIES (2000-2012)

Intentional homicide count and rate
per 100,000 population

0-9   10-19   >20

————— Disputed areas
      / boundaries

Not applicable

cities in the world are in the USA (*346*). In some higher-income cities, overall rates of violence can mask intra-city rates that can be up to several multiples of the broader city, and more closely resemble rates seen in more fragile cities. For example, the intra-urban region of south-central Los Angeles has historically had murder rates that were many multiples of the city average. It has since improved its murder rate significantly, but it is still high (*347*).

Levels of urban violence vary widely between and within cities, with some of the world's largest cities also among its safest. Megacities such as Cairo, Egypt, and Jakarta, Indonesia, have remarkably low rates of fatal violence and, in Tokyo, fatal violence is nearly non-existent when juxtaposed against its size (*349*). Similarly, large cities such as Bogotá, New York City and Sao Paulo have all seen remarkable drops in violent crime despite dense and growing populations. Indeed, Sao Paulo has transformed itself from being one of the world's most dangerous cities to one that has reduced violence by 74% between 2001 and 2008 (*350*).

Why then do some cities, or parts of cities, experience more violence than others? Urbanization by itself cannot explain urban violence. As discussed previously, some of the largest cities in the world are also among its safest. Moreover, rapid urbanization is not necessarily predictive of violence either. China is among the most rapidly urbanizing countries in the world, and its violent crimes rates are relatively low. However, where cities experience violence, evidence implicates social exclusion, poverty, poor educational outcomes and inequality as key risk factors for violence in urban areas (*351*). Urban environments can be places of profound inequality, where these risk factors can aggregate (*352*) and cluster in space. Rapid urbanization can exacerbate inequalities by straining city governments' ability to deliver basic services that are protective against violence and crime.

There is clearly nothing inevitable about violence in the urban environment. However, in varying degrees, the threat of violence is a daily reality for cities everywhere. Whether it is a city concerned with chronic violence, or a city with very rare incidence, the impact of violence and fear of violence on society is a serious concern for city leaders. Fortunately, much can be done to prevent and reduce violence. This chapter concerns urban safety and health, of which there are many facets, but here focuses specifically on violence and violence reduction.

THE BURDEN OF VIOLENCE AND CRIMES IN CITIES

Approximately 526 000 people lose their lives to violence every year (*353*). The scale is roughly equivalent to the number of people losing their lives to malaria or influenza in a given year. Roughly 90% of these deaths happen in countries that are officially in a state of peace. In other words, the overwhelming majority of violence is perpetrated in places that are ostensibly not at war. In fact, there was more loss of life from 2000 to 2014 due to interpersonal homicide than in all of the wars during that period combined.

Much of this violence has become concentrated in urban areas, even in countries where the population is not substantially urban (*349*). There are, of course, notable exceptions. In fact, cities are also home to many factors that are protective against violence (*354*). There is also variation depending on the type of violence. A 10-country WHO study indicated that violence against women was more prevalent in rural areas than in urban areas (*355*). These figures also do not take into account the toll of nonfatal violence and its consequences for its victims, their families and their communities.

Certain communities in cities suffer from an aggregation of risk factors, including poverty and comparatively worse education, infrastructure and other crucial city services. In Rio de Janeiro, for example, low-income areas have been found to have more than twice the homicide rate of wealthier areas, and more than four times the rate of tourist areas (356).

This is particularly acute in informal settlements and slum areas, which often lay beyond the reach of formal city services. In the Philippines, compared to non-slum residents, slum dwellers experience higher levels of gender-based violence, wherein female slum dwellers have an elevated risk of being attacked by someone who is not their partner (357). Rates of physical and sexual violence against women in cities in India, both inside and outside their homes, are commonly twice as high in slums than in wealthier areas (358). In Cape Town, the violent crime rates have declined from their peak, but they continue to be concentrated in the poorest districts of the city. The slums in Khayelitsha and neighbouring Nyanga and Guguleta townships accounted for 44% of Cape Town's total homicides in 2009–2010 (359). According to census data, these districts also suffered from unemployment rates as much as 80% higher than the city average, comparatively lower incomes for those who had employment and up to 57% of households living in informal housing. Figure 36 shows that these settlements are spatially clustered towards the right side of the core of Cape Town.

MOUNTING A RESPONSE TO VIOLENCE IN CITIES

WHO estimates that homicide rates have declined 16% overall since 2000 (360). Consolidating these gains and continuing to reduce the impact of violence in cities requires that cities commit to understanding the root causes of violence in their communities. These can range from deep-seated factors, rooted in the deprivation of communities and resident's exposure to violence to more proximate triggers such as alcohol abuse or access to firearms. Understanding these root causes can then inform the city's response, ensuring that action is local relevant, timely and responds to the true nature of the issue.

Cities must first develop the capacity to collect and analyse data on violent events. Even at the country level, the data systems required to collect and analyse data on violence is lacking. An estimated 60% of all countries do not have usable data on homicide from civil and vital registration systems (360). For many of the countries where these data do exist, they are often not paired with much-needed complementary data that feed additional information about victims, perpetrators and other circumstantial data into the analysis. Furthermore, too many violent acts go unreported, particularly those perpetrated against women, children and older adults, making survey-based data critical to understanding the nature of violence.

These capacities are important at the national level, but crucial at the local level, where the impact is felt, where the root causes can be observed and where the response must be mounted. One approach to building this type of capacity was pioneered in Colombia when the country's first violence observatory was established to pull together and analyse data on violence in the city of Cali. The model has since been replicated in cities and states across Colombia (Box 20). Similar efforts are taking off across the region and spreading to other parts of the world.

Figure 36.
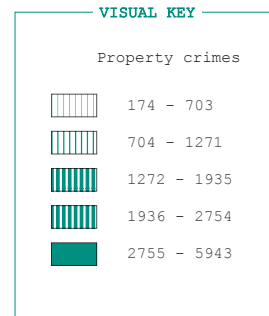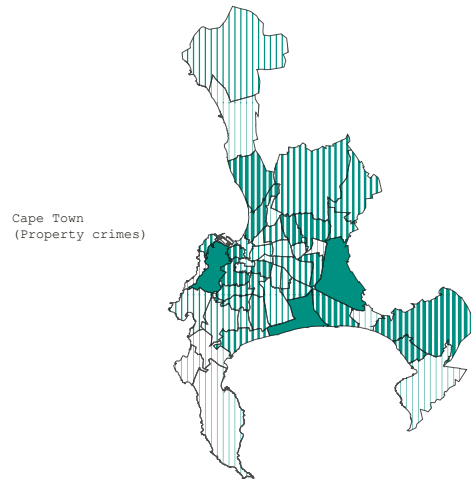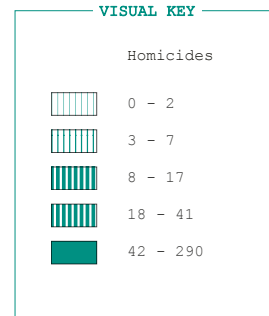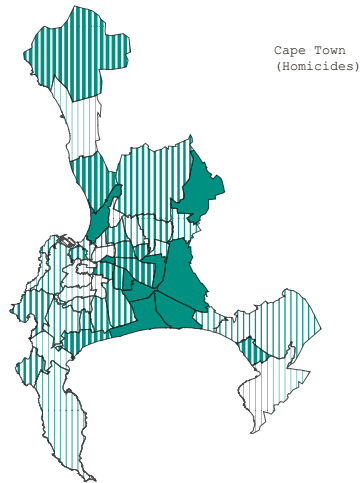**Map of Cape Town districts by crime level**

Source: South African Police Service, Crime Statistics 2003–2010, compiled by the Strategic Development Information and GIS Department, City of Cape Town, 2010, cited in United Nations Office on Drugs and Crime 2011 (359).

Cape Town
(Homicides)

VISUAL KEY

Homicides

0 - 2
3 - 7
8 - 17
18 - 41
42 - 290

Cape Town
(Property crimes)

VISUAL KEY

Property crimes

174 - 703
704 - 1271
1272 - 1935
1936 - 2754
2755 - 5943

Cape Town
(Sexual crimes)

VISUAL KEY

Sexual crimes

3 - 28
29 - 55
56 - 88
89 - 126
127 - 631

Between 1983 and 1994, during the height of an epidemic of violence in Cali, Colombia, the city's homicide rate ballooned from 23 to at least 120 per 100 000 inhabitants (*361*). At such a rate, Cali would place the near the very top of today's most violent cities (*346*), but at the time it was not even the most violent city in Colombia. The leading cause of death in Colombia at the time was homicide. Victims included people of all ages, but particularly young men, with suspects rarely identified. In response to the outbreak of violence, the mayor, an epidemiologist by training, set up a violence observatory – a health research think tank focused on understanding urban violence. The observatory reviewed and standardized the variables that different institutions gathered about the victims and their assailants and the facts surrounding each case, reporting weekly to the mayor and other local authorities. With enough relevant data, standardized and housed in one place, analysts could look at trends of when, how and by whom violence occurred in the city. They found that 80% of the homicides were committed using firearms. Homicides predominantly happened on weekends, late at night, often in the presence of alcohol. The observatory found that most of the perpetrators were younger, and mapping the crimes helped to identify higher-risk neighbourhoods. The mayor's administration put a curfew on alcohol sales on weekend evenings, and banned the possession of firearms during these periods. Younger adults were given an earlier curfew on weekends. The districts of the city where these policies were implemented were able to reduce homicide by 35%. The murder rate had dropped to 80 per 100 000 people by 1997. By 2014, the city had managed to reduce its murder rate further to 56 per 100 000.

Source: Toro 2014 (*362*).

When cities have developed the analytical capacity to understand violence in their environment, local evidence can then drive the design of interventions. Interventions must be proactive and address not just the proximate causes, but also the risks that often become entrenched in communities and cities, and can transcend generations. The roots of the different types of violence share many of the same underlying risk factors. Poor educational outcomes, economic inequality, unemployment and social and physical exclusion are among the many risk factors that can pool in communities and place people at risk. Nowhere is this more strongly felt than in the many informal settlements developing in the world's cities. Millions of people live in informal settlements, having moved there, or having been born there, looking for better prospects in the city for themselves and their families. However, as discussed previously, these can be places of profound exclusion. This is true in the physical sense, as these settlements are typically on the fringes of the city. It is most evident from a social perspective as these settlements are all too often deprived of the services of the city and the opportunities enjoyed by their peers living elsewhere in the city. These environments can aggregate risk factors for violence, and as the evidence presented earlier indicates, they can be associated with elevated levels of violence and victimization. As the determinants of violence are intersectoral in nature,

Metrocable - Línea J

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so must be the response to violence. Cape Town is piloting one such approach, which is a whole-of-government response to turn these vulnerable settlements into liveable communities in order to reduce violence and improve livelihoods (Box 21).

Box 21.	A comprehensive approach to violence prevention

In response to the unusually high incidence and health burden arising from interpersonal violence in South Africa's Western Cape Province, particularly in urban areas, the provincial government adopted an Integrated Provincial Violence Prevention Policy Framework in August 2013.

The policy framework outlines a comprehensive, intersectoral whole-of-government and whole-of-society response to violence, rather than focusing on the criminal justice approach that is more typical in South Africa. It includes a suite of short-term evidence-based interventions such as reducing the availability and harmful use of alcohol and guns. These are combined with longer-term interventions that aim to address structural factors to improve the quality of life and access to means for whole communities; and the engagement of all citizens to address complex social factors and norms that are associated with violence. Despite pressure from industry groups, stricter gun control legislation has led to a significant decline in homicide. This has also been the case with alcohol legislation, where conflicting intra-departmental priorities and competing policies and directives for more liberalized trade have thwarted attempts to apply public health-centred policies. Longer-term interventions include the Cape Town's flagship Violence Prevention through Urban Upgrading project that aims to reduce social exclusion.

The project's three core aspects are: (i) the restructuring of the built environment to form safe and integrated human settlements and

While slum settlements represent a more formal expression of exclusion in urban areas, many communities within the formal city share many similarities with the level of exclusion and depravity. Social inclusion refers to the capacity for individuals and groups to participate equally in society, and fostering the concept has been seen to prevent at least some forms of violence and victimization, which helps overall community cohesion *(352)*. This can be further strengthened when citizens are helped to overcome the inequality or disadvantage they were born into, and by promoting equality of opportunity in employment and education. Life skills programmes have successfully been used to target at-risk youth and provide them with the necessary skills to make the most of opportunities. For example, between 2003 and 2006, the Abrindo Espaços Open Schools Programme, involving 5306 schools in Sao Paolo resulted in criminal acts being reduced by 45.5% through a mixture of sports, cultural and leisure activities and work-focused training *(349)*. Creating access to better opportunity and designing communities to be more liveable can have profound effects on the incidence of violence. Broader approaches addressing both the physical and social environment in communities marred by exclusion is required to redress inequities and tackle the burden of violence and crime. The city of Medellin, Colombia, managed to reduce violence dramatically in one of its more marginalized communities by taking such an approach. Box 22 describes how a broader approach to community development, inclusiveness and safety can help to reduce violence.

Box 22.	Reducing violence by reducing exclusion

Medellin is Colombia's second largest city, and for two decades was one of the most violent cities in the world, with homicide the leading cause of death since 1986. In 2002, before intervention, Medellin's homicide rate was more than three times the highest homicide rate in the USA.

In 1999, the city government responded with a development programme designed to reduce physical and social exclusion of targeted communities. A new public transportation system known as the Metrocable was installed to connect impoverished neighbourhoods with the city centre. A parallel programme sought to improve the infrastructure of marginalized

communities with improved lighting, streets and walkways, schools, libraries, business development programmes and increased police patrols and presence.

The government's principal motivation for bringing effective public transportation to remote areas of Medellín was to improve residents' access to jobs and attract new businesses to impoverished neighbourhoods. Reducing levels of violence, generating collective efficacy and increasing community members' willingness to rely on police seem to have been subsequent benefits of the dynamics set in place by the investment in public works. There was indeed a life-saving bonus beyond their intended area of impact: homicide dropped 66% more in intervention neighbourhoods than in similar high-crime neighbourhoods, and reports of violent crimes declined 74% more in intervention neighbourhoods. This was one of the first natural experiments on neighbourhoods and violence, and the research findings have potential policy implications for cities elsewhere. They indicate that it is possible, even in LMICs, to harness municipal resources to implement structural interventions that will have an important impact on risk behaviours that place a significant burden on the health of populations.

Source: Cerdá et al. 2012 *(364)*.

Cities need to deploy strategies to intervene with vulnerable spaces and communities, however, they must also intervene with vulnerable people. Population-based strategies can intercede in "hot spots" and reduce overall levels of violence, but within these hot spots there are individuals for whom life experiences and environments may increase their vulnerability to commit or be the victim of violence. Evidence indicates that there are ways to intervene with vulnerable individuals and vulnerable situations to prevent violence, without incarceration. Dangerous situations can be defused. People can be trained to manage violent impulses. In addition to helping people to make better life choices by enabling them with better opportunities, it is also possible to help people to make better decisions when faced with a dangerous situation.

Recent experimental evidence suggests that cognitive behaviour therapy might provide one of the solutions. In Monrovia, Liberia, researchers recruited 999 of the highest risk men in the city – young men, engaged in criminal behaviours, with violent tendencies. Subjects were randomized into treatment groups and a control group, with treatment groups receiving cognitive behaviour therapy, approximately three months' wages in cash, or both. The rationale behind treating people with cognitive behavioural therapy was that managing beliefs and behaviours, emotions and impulsivity are fundamental life skills that can be developed. The programme taught participants to be aware of their patterns of thinking and behaviour. It worked on developing skills for self-control, including planning skills, as well the ability to conduct deliberate, unemotional decision-making. It tried to foster a positive, nonviolent, non-criminal self-image among participants. The results of the study were dramatic. Among men who received the treatment, drug dealing fell by one half and thefts fell by one third within a few weeks of completion. These effects began to diminish after one year, but among those who completed treatment and received cash, the effects were longer lasting. After one year, this treatment group was 44% less likely to carry a weapon, 43% less likely to sell drugs and reported lower aggression *(365)*. While it is not clear that this kind of intervention would work everywhere or for every individual at risk, the results are still highly

encouraging. First, the experiment raises the possibility that adults can be trained with life skills to control violent behaviour. Second, it indicates that when given the tools to avoid risky behaviours and the means to move in a more positive direction in life, people can make the right choices. The study found that most of the men who received therapy invested the money in a business or saved the money. For cities using job training as crime prevention, it is worth considering whether other life skills might be a worthwhile complement.

Similar therapy programmes carried out among youth in Chicago, for example, BAM (Becoming a Man), have experienced similar results. BAM found that its programmes reduced violent crimes among at-risk youth by 40% during the school year and may have improved graduation rates by up to 8% *(366)*. Similar to the Liberia approach, the Chicago programme gives at-risk individuals both life skills and the means to achieve better life outcomes (in Liberia, in cash; in Chicago, a high school diploma). More research is necessary to understand how to sustain the progress achieved in this programme, as the study indicates that impact faded with time.

Another successful programme originating out of Chicago suggests that violence can be prevented by identifying and diffusing situations before they become violent, and with treatment from trusted members of the community, for those at risk of committing violent acts. The programme is in part motivated by the premise that chronic violence is the result of the tendency for violence to beget more violence. Heightened tensions, motivations for revenge, the apparent or real absence of justice – these can all incite one violent act to provoke another, and so on. The premise of the programme is to interrupt the flow of violence within communities, and stop further continuation. As detailed in Box 23, the programme trains members of the community, who are trusted by at-risk individuals, with skills to seek out and diffuse potentially violent situations. Once these situations have been diffused, the programme operators can work with social workers to train individuals and their communities to be resilient against future violence.

Box 23.	Cure Violence

In 2012, there were 500 murders in Chicago – with more murders than any other city in the USA, its murder rate was four times the national average. In 2000, the NGO Cease Fire (now Cure Violence) developed a programme of "violence interrupters", community members who would intervene and stop the transmission of violence. Interrupters were hired from within violent communities, who would identify cases that could escalate to violence. They would also identify people close to the case, including those who might feel compelled to seek revenge, or otherwise provoke further violence. Trained in skills of persuasion, buying time, cooling people down and reframing, interrupters were trusted community members whose job was to diffuse potentially violent situations. Once the violence had been interrupted, patients worked with outreach and social workers for up to 24 months. Community projects worked in parallel to change norms and create community resilience to violence. In its first Chicago community, Cease Fire reduced homicides by 67%. The approach moved to other neighbourhoods in Chicago, where evaluations showed reductions in homicides by an average of 38% more than in untreated neighbourhoods. It has since moved on to 23 additional USA cities, and eight other countries.

Source: Cure Violence *(367)*.

SUMMARY

The effects of violence can be devastating, not only on the directly affected victims, but also as they ripple through families, communities and the city as a whole. Even nonfatal violence is known to cause lifelong ill-health, early death and social consequences for its victims and their families. In communities, violence can restrict mobility, deter investment, stigmatize neighbourhoods and constrain employment and educational opportunities

Violence comes at a significant economic cost to the city, the most obvious cost being the value of resources used to attempt to control it or treat its consequences in public and private expenditures. Violence and crime also have a high social cost. Being safe includes feeling safe – safe to simply take a walk in the park or neighbourhood and use public spaces, for example. A real or perceived lack of safety can isolate individuals and communities and change the way they interact with the urban environment. It affects their opportunities for work, education and recreation, and participation in political life. It also affects their health.

Reducing violence and improving safety in urban areas is a priority that cuts across issues and silos in cities. It is a challenge that affects the social fabric of the city, its economic vitality and the city's ability to function and deliver for its citizens. Violence and poor safety present a strikingly high burden of preventable ill-health and mortality for cities and the world, which, importantly, can be mitigated and prevented. City leaders can do much to intervene, but as with so many health issues in cities, the challenges and the solutions cut across sectors and silos and require coordination of a multisectoral response.

For decades, city leaders everywhere have faced the challenge of accommodating growing urban populations and building prosperous societies around them. This is no small feat. Cities are complex systems of infrastructure and services, requiring nimble management of many moving parts. Shifting demographics make an already complex environment difficult to plan with everyone in mind.

In the worst of cases, surging populations in underresourced cities have left millions in unacceptable living conditions, in slum or slum-like housing with access to little or no city services. As noted, the outcomes in these environments are frequently poor. This section shows how the provision of safe water and sanitation has too often lagged behind the needs of the population. Unsafe water and sanitation can have devastating effects for individuals who are exposed, and in these unsafe environments,

SECTION 2 — CONCLUSION

waterborne disease can spread quickly throughout communities. It also explores the relationship between housing and air pollution, including both indoor air pollution from the use of unclean energy sources and outdoor air pollution that affects residents in poor housing environments. Many homes, even in cities, continue to have dirt floors, placing residents at further risk of ill-health. Even in higher-income cities, poor home construction may expose residents to hazardous materials and can fail to protect them from extreme temperatures. It explores how exclusion and inequity in cities undermines safety. Few places suffer from more exclusion and inequity than informal settlements.

In much of the world, cities have managed population growth, but in ways that are increasingly locking urban infrastructure

into unhealthy forms for the long term. With the convenience of motor vehicle travel in mind, many neighbourhoods have fallen into mono- or limited-function environments, where the needs of everyday life and green spaces are difficult to access without personal motorized transport. Many growing cities have become sprawling expanses dotted with such neighbourhoods, where limited demand and supply of highly connected, accessible mass transportation has bolstered the need for personal motorized transport. With diminished physical activity and poor nutrition, these have fuelled the dramatic rise in NCDs and in obesity. This section covers how this phenomenon has contributed significantly to millions of annual deaths from ambient and indoor air pollution, road traffic fatalities, sedentary behaviour and poor nutrition.

These 21st century health challenges for cities can be avoided in growing cities and can be remedied in existing built environments. Cities can plan for natural growth and migration. Investing in services and infrastructure for growing populations can be expensive. However, the benefits of enabling new city residents to be healthy and productive are a significant counterweight, particularly when coupled with avoiding the cost of having to redesign poorly planned or unplanned urban development. Even within existing city infrastructure, important steps can be taken to make cities healthier and safer. Existing city streets can be rebalanced for mass transport, walking and cycling. Existing neighbourhoods can also be rebalanced to be multifunctional with green spaces to make the places where we live, work and play safely accessible. By enhancing their disaster health risk management systems, cities can mitigate the impact of unpredictable events.

There are solutions for every city. City leaders can choose to enable people to live healthier, more productive lives. They can prioritize people and vibrant economies at the same time, priorities that can be mutually reinforcing. It requires city leaders to think beyond the health sector when they prioritize the health of their people. It entails city departments co-owning these priorities and working together on coordinated strategies with communities.

SDGS:

PVRTY
1

HNGR
2

HLTH
3

EDUC
4

GNDR
5

WATR
6

ENRG
7

ECON
8

INFRA
9

INEQ
10

CITY
11

CNSUM
12

CLCHG
13

OCNS
14

BIODV
15

PEACE
16

PARTN
17

SECTION 3

A RENEWED FOCUS ON URBAN GOVERNANCE

KEY MESSAGES

Bringing it all together for health equity

•

Participation

•

Citizen empowerment through information sharing

•

Public–private partnerships

•

Intersectoral action

•

Equity as the core value

BRINGING IT ALL TOGETHER FOR HEALTH EQUITY

The primary purpose of this report is to elicit how health and health equity in cities is impacted by a multitude of factors and stakeholders, including social, political, and economic forces, urban planning, environment, safety, housing, pollution and access to health services, among others, and what can be done to remedy negative impacts and maximize positive health outcomes. Local governments are responsible for addressing many local needs. They typically have responsibility over a number of critical functions that determine liveability of cities such as land use, building standards, water and sanitation systems, roads and transportation, and environmental protection, among other issues. Their actions may exacerbate or diminish inequities in health, or in the distribution of determinants of health.

This concluding section of this report aims to bring together the various issues discussed in this report under the overarching issue of urban governance. It builds on the argument made earlier that the various topics covered in each chapter are actually closely interconnected and interdependent, and requires an integrated approach by different actors in order to maximize the desired effects and efficiency. Based on that premise, this chapter highlights some of the key features of urban governance that can help cities realize such an approach to becoming healthier and more sustainable places for all people.

WHO has previously identified four prerequisites for apt local action: political commitment; vision; institutional change; and networks (28). Political commitment to the values, principles and strategies of health for all urban residents is required at the highest level. A vision of the future with a strong health dimension provides a common basis for intersectoral action. Institutional structures, mechanisms and capacities must support both near-term change and enduring healthy public policy over the long term. Networks at local, national and international levels promote shared learning and innovation. These are all underpinned by strong leadership at the city or urban level.

Interest in urban governance and its impacts on city life is not new. The city council of Siena, Italy, commissioned a series of frescoes in 1338–1339 to illustrate the effects of good and bad government in the city (368). The artist Ambrogio Lorenzetti painted a series of six frescoes titled "Allegory of good and bad government", which are often referred to as representing good and bad governance, or the conduct of government. In one of the frescoes, the artist depicts virtues of good government by six crowned, stately female figures: peace; fortitude; prudence; magnanimity; temperance; and justice. Bad government, in a separate fresco, is represented by crime, disease and drought.

Acting on ill-health and poverty became an imperative in major cities of 19th century Europe. In Great Britain, for example, rapid urbanization and economic growth were associated with rising mortality rates for the country's groups, who were increasingly concentrated in urban slums. However, actions to reduce the burden of disease were not realized until political shifts supported progressive urban governance, including sanitary improvements. Important policy lessons from Great Britain emphasize information systems as well as civic and political institutions in influencing the health development process (369).

Nearly seven centuries since Lorenzetti's frescoes, the world has become an urban majority. Michael Bloomberg, former mayor of New York City, refers to this as the world's first "metropolitan generation". Bloomberg posits that the rise of this generation's values of "industriousness, creativity, entrepreneurialism and, most important, liber-

ty and diversity" will increasingly shape our world *(8)*. As demonstrated throughout this report, cities are poised to play a leading role in addressing major global challenges of the 21st century, especially with respect to the economy, climate change and public health.

The quality of governance in cities will be important not only for the local populations, but also for the achievement of ambitious international goals such as the SDGs. For this reason, the SDGs 16 and 17 specifically focus on the issues of governance and partnerships. So what should urban health governance look like in the 21st century given the experience and knowledge accumulated over the past few centuries, and more awareness of contemporary and future challenges? The discussion below outlines key elements of urban governance and the roles of members of civil society, the private sector and government to shape the future of public health in cities.

PARTICIPATION

The United Nations defines governance as "the process of decision-making and the process by which decisions are implemented (or not implemented)" *(370)*. The power of participatory decision-making is not just enshrined in theory. An important lesson from British cities of the 19th century is the role played by empowered and organized groups and citizens in creating healthy social change. The Health of Towns movement in the 1840s and the Sanitary Idea resulted in the first national Public Health Act in 1848. National legislation, though, was not nearly as important in the causal story of improved mortality rates in Britain as was the widening of the electorate in local government affairs in 1869 *(371)*.

Broad participation, although widely recognized as a desirable process for

governance, has often been difficult to achieve in practice. Compromised processes have cut off participation in the implementation phases of projects and eliminated the need for accountability of authorities to grassroots stakeholders. Non-binding processes, lack of diversity in representation of stakeholders and lack of timely information sharing are some of the key barriers to effective participation. Furthermore, grassroots stakeholders may not have sufficient independence or capacity to apply pressure to organize outside of process. Where participatory processes yield gains, these are often due to independent grassroots actions (372).

These practical shortcomings are likely to reduce the effectiveness of participatory processes. A United States Agency for International Development (US-AID)-sponsored study in the Plurinational State of Bolivia, Honduras, India, Mali, the Philippines and the Ukraine concluded that although democratic local governance has the potential to strengthen participation and accountability, "there seem to be important limitations on how much participation can actually deliver" (373). Even successful participatory budgetary programmes such as those in Belo Horizonte and Porto Alegre in Brazil did not reflect the priorities of the poorest populations in the cities. The majority of poor populations did not even participate in the deliberations. A survey in 150 municipalities across Brazil in 1991 showed that the poorest and less-educated voters mentioned economic survival concerns, including job opportunities, cost of living and low salaries, as their top priorities and not infrastructure, which was the main focus of the participatory budgetary investment (374).

Despite the difficulties associated with productive participatory processes, several examples of successful contemporary urban health initiatives are presented in this report in which community participation was also a key success factor. Building community ownership of processes and implementation is critical in ensuring sustainable action on health inequities. City authorities and local institutions can also play an important role in ensuring access. As Box 24 shows, city governments and city-based institutions such as universities can play an important facilitating role in participatory processes to improve health equity.

CITIZEN EMPOWERMENT THROUGH INFORMATION SHARING

Improving transparency and sharing quality information widely in cities will further empower people to participate productively in decision-making processes. Technology is likely to play an important role in this regard, but it is no longer the major barrier. It is often the government processes that can be slow, cumbersome and ultimately not that effective, despite laws that require them to provide data to citizens when asked (375).

Open data are powering a new civic movement that is changing the way citizens experience their cities. Originally driven by a commitment to transparency and accountability, citizens, public and private sectors can now work together to lay the groundwork for cities to be as efficient as possible. For instance, the United States federal government website (Data.gov) indicates that hundreds of software applications (apps) have been created by citizens using government data. Many of the apps focus on sharing knowledge and information on public health and its determinants. The app "AIRNow" uses United States Environmental Protection Agency data to provide location-specific

real-time air quality information and air quality forecasts for both ozone and fine particle pollution.

NGOs are also playing an important role in empowering citizens with information. Twaweza, an NGO working in Kenya, Uganda and the United Republic of Tanzania focus on enabling children to learn, citizens to exercise agency and governments to be more open and responsive. They have two main objectives. First, they seek to enhance citizen agency by enhancing the ability of people to get better information more quickly, cheaply and reliably, monitor and discuss what is going on, speak out and act to make a difference. Second, empowered with the information, citizens are then able to access quality basic education, health care and clean water (376).

If a city has appropriate data, then it is not very expensive to create platforms that are openly available. Not only can open data make it possible for citizens to do more with data, but it should also help governments get better at doing new things. Above all, a well-informed populace will be able to hold elected officials accountable to the data that are available in their communities.

While open data have the potential to further empower people, the use is currently limited to cities in high-income countries such as Amsterdam, Belo Horizonte, Melbourne, Paris, Nantes and Vienna, for example. By demonstrating the use of open data in enhancing citizen engagement to improve quality and reach of public services in the city, a precedent can be set for other cities around the world. Given the rapid spread of technology, such as smartphones, local governments in LMICs should soon have the capacity to generate and share city-level data openly; subject, of course, to their willingness to do so.

Community participation is a fundamental requirement for meaningful urban governance, from prioritizing issues to evaluating interventions and monitoring the outcomes. Participation of residents helps ensure that appropriate issues are being addressed, promotes local ownership and engenders the sustainability of interventions. It also supports the broader agenda of community development and empowerment.

PUBLIC–PRIVATE PARTNERSHIPS

Rapid urbanization is constraining city governments' ability to provide quality services to their increasing populations. Physical infrastructure and financial and human resources have to be continually upgraded to keep up with the demands of the population. In this scenario, the private sector plays a critical role in supporting the provision of services that people need. The United Nations Global Compact lists 10 principles that can help private businesses establish a culture of integrity, and support them in upholding their basic responsibilities to people and to the planet, while also setting the stage for long-term success (377). These principles are focused on issues related to human rights, labour, environment and anticorruption issues.

Business leaders are also encouraging private companies to take the lead in bringing business and society back together. This can be done, for example, by redefining their business models based on the principle of shared value, which involves creating economic value in a way that also creates value for society by addressing its needs and challenges. Shared value is not the same as social responsibility, philanthropy or even

sustainability, but a new way to achieve economic success. Social success is not intended to be on the margin of what companies do, but instead at the centre.

Demand for products and services that meet societal needs are rapidly growing. For instance, food companies that traditionally concentrated on taste and quantity to drive greater consumption are refocusing on the fundamental need for better nutrition. Given the comparative advantage of businesses in marketing to motivate customers to embrace products and services, governments and NGOs could partner with them to focus on products that create societal benefits, such as healthier food or environmentally friendly products, in line with international normative standards.

While public–private partnerships are not the focus of this report, they are an important aspect of urban governance. The private business sector can provide its financing capacity and business expertise to cities by working independently or in partnership with the public sector. Three main ways in which the private sector can engage in urban health governance are: (i) in a partnership with the public sector on building infrastructure and providing health-related services; (ii) by investing their comparative advantages in specific areas such as marketing to support the adoption of health-promoting behaviours and products; and (iii) as a donor or philanthropist supporting initiatives relevant to public health.

For instance, there is an increase in corporate philanthropic activity in Latin America (378). Health is one of the three priorities together with education and social assistance. Some companies are investing resources in local development programmes in municipalities or neighbouring communities. These programmes usually include participatory diagnostic processes and the establishment of partnerships with civil society organizations and local government authorities. Others aim to modernize public administration, offering financial resources and expertise to build the capacity of managers and policy-makers in the implementation of public programmes, often in health services.

Even so, there is a need for caution while considering public–private partnerships, especially with respect to promoting equity. With the rise of neoliberalism in the late 20th century, more private sector participation was widely promoted including by international development agencies. However, the resulting public–private partnerships proved no better at reaching deprived urban neighbourhoods.

In some countries such as India, it is not out of choice but out of necessity that much of the middle class in cities benefits from privately provided services for health and education (379). Public service provision is inadequate to meet the demands of its populations. For example, the key barrier in upgrading and maintaining cities in India is political. At one end, there is political resistance at the state government level to empowering towns and cities with a statutory urban local government that could articulate and deliver their demand for infrastructure and services. At the other end, rural local governments are reluctant to "go urban" because local politicians see more funds coming their way through rural development schemes. India's urban population is projected to increase from 380 million (33%) in 2014 to 600 million (about 40%) by 2031. Inadequate planning for the inevitable increase in urbanization in India is creating a socially and environmentally unsustainable situation.

There are constraints in bringing public and private sectors together effectively. Getting the financial and institutional aspects right requires constructive and efficient negotiations between the two sectors. A study in Accra, Ghana, was conducted on waste collection performance from 1985 to 2000 under two different institutional

regimes *(380)*. The study compared the situation of entire public sector dependence to increased private sector involvement. It found that the public–private mix was more effective for the solid waste collection rate, and disposal improved from 51% in 1998 to 91% in 2000. However, the results could not be sustained in the long term, in this case beyond 10 years of public–private partnership.

According to a United Nations report *(5)*, private sector contributions through both good governance in business practices and investment in sustainable development will be critical to the fulfilment of the SDGs. Public sector contributions will remain indispensable, but may be insufficient to meet demands across all SDG-related sectors. While recognizing the challenges in sustaining public–private partnerships in relation to productivity and equity in outcomes, it is time to enhance this relationship. With the wide and ambitious ambit of the SDGs there appears to be little choice but to do so.

INTERSECTORAL ACTION

Intersectoral action for urban health equity can refer to: (i) working across departments within city government (e.g. health; transport; environment); (ii) working across different actors (e.g. government, private sector; civil society); and (iii) action across the different levels of policy and action concerned with urban health (e.g. neighbourhood, city, provincial, national and international levels).

This report shows the impact of the health sector along with other sectors, such as housing, transport, urban planning and the environment on public health in cities. While each of the factors and their impacts are considered separately, this division is largely for convenient illustration. In reality, these factors are inextricable. For instance, increasing traffic density in poorly planned cities of LMICs with weak enforcement of seatbelt legislation and speed limits is not only a risk for road traffic crashes, but the pollution from motor vehicles contributes to ambient air pollution, which is strongly linked to cardiovascular and respiratory health.

Reducing the health impacts of increasing traffic density in such cities will involve improving legislation (e.g. on seatbelts), law enforcement and making roads and motor vehicles safer. To control the magnitude of ambient air pollution, exhaust and non-exhaust emissions standards for motor vehicles would have to be created and enforced. The health system would need to enhance its capacity to prevent, treat and manage health problems linked to air pollution. To develop positive impacts for health, additional options for low-emissions public transport or active transport will need to be formulated. Infrastructure development for new transport options will also necessitate appropriate urban planning, which can redefine urban form in cities. To add to the complexity, pedestrians, cyclists and motorcyclists account for 49% of all deaths *(274)*. Therefore, any action would need to consider its differential impact on road users as well. Cities do not always have the mandate to develop legislation for all the issues discussed, such as for seatbelt use or exhaust emissions levels. This means that coordination with the national government will also be essential to mitigate the negative impacts of increased motor vehicle traffic on health.

While the analysis above may not be exhaustive, it illustrates the point that mitigating adverse health impacts cannot only be handled by the health system, it also

requires a system-wide approach, working across sectors in the city government as well as engaging with different levels of government.

Health in All Policies (HiAP), a specific application of intersectoral action, is an approach to decision-making that recognizes that most public policies have the potential to influence health and health equity, either positively or negatively (381). In the process of HiAP, decision-makers in other sectors routinely consider health outcomes, including benefits, harms and health-related costs.

HiAP has been most successfully applied at the regional level in Australia, Canada and Finland. The North Karelia Project, launched in 1972, aimed to reduce the impact of coronary heart disease in the Finnish region of North Karelia through engaging other sectors such as community organizations, dairy and meat producers, and schools to improve community health (382). The project resulted in significant reductions in CVD mortality and has been noted as a successful model for cross-sector collaboration. At the city level, Richmond in the San Francisco Bay Area has been pursuing and has successfully implemented an HiAP strategy that views its municipal employees as "community clinicians" (Box 24) (383).

Box 24.	Health equity in all urban policies

In the San Francisco Bay Area of California, local governments and university partners are collaborating to address chronic, socially produced urban health inequities. An African-American child born in West Oakland in this area will die, on average, 15 years earlier than a Caucasian child living just a few kilometres away. In this same geographic region, life expectancy for everyone increased between 1960 and 2006, yet the difference in life expectancy between these racial groups has persisted and is increasing.

As part of a response to this longstanding problem, local governments and civil society groups began developing new strategies to alter policy and urban planning practice. The Richmond Health Equity Partnership (RHEP) strategy was crafted with the help of the University of California, Berkeley. As part of RHEP, the city/county health department, the school district and community-based organizations were brought together to work on health equity for the first time.

Three new initiatives emerged: (i) a full service community schools project, where public schools act as resources for children and adults in the community to deliver health services, employment and ongoing education; (ii) a health equity indicator effort, where residents and health officials gather data to define and track progress towards health equity; and (iii) a Health in All Policies strategy and ordinance. The result of 18 months of collaborative work was an HiAP law, enacted in April 2014, and accompanying implementation guidance that was the first for a city in the USA.

The impacts of HiAP have been significant and gained national attention. Richmond is using HiAP to retrain municipal employees and create a culture of health, where all city staff are viewed as "community clinicians". The city has also used it to: address housing foreclosure and gentrification issues; invest in violence reduction, not prisons; advocate industrial air pollution control; attract new

economic development; revitalize parks and greenspaces; hire local youth for municipal improvement projects; and build a care centre for victims of domestic violence and human trafficking.

While population health outcomes may not change in only a few years, gun-related homicides were at their lowest number in 30 years by 2014, and city survey results indicated that self-rated "good" health and positive perceptions of community and the role of local government were all at their highest level in seven years. As the work to implement HiAP in Richmond continues, it offers a democratic model for addressing health equity through an integrated urban governance strategy.

Source: HiAP 2014 *(383)*.

Despite a long history of recognizing the need for intersectoral action in addressing public health and implementing specific strategies such as HiAP, there are limited examples of the process being effectively applied. A number of reasons for this have been put forward, but a critical one has been the lack of replicable models of successful intersectoral action. Specific challenges, for example, were identified in a city-based effort on intersectoral action for health in Varde, Denmark *(384)*. First, employees outside the health sector perceived the initiative as an additional task. Second, there was a lack of direct funding for the initiative. Third, there was a lack of ownership of the policy and the level of ambition in pursuing success varied widely between sectors. Fourth, baseline measures were lacking and the objectives of the initiative were not clear to all participants.

Place-based intersectoral action for health offers an opportunity to overcome many of these barriers by focusing on improvements in neighbourhood resources and conditions. New York City's Take Care New York (TCNY) 2020 initiative, for example, calls for working with communities to make neighbourhoods healthier *(385)*. To determine neighbourhood health, the plan considers both health and social factors such as how many people in a community graduate from high school or go to jail. Including these social factors has highlighted the need for partnerships and collaborations to improve health. Financially backed by the city government and supported by evidence of community health profiles, community consultations are organized by TCNY with open invitations to the public. While this is still an ongoing process, such initiatives can potentially set an example of how to address health equity by including health considerations in all neighbourhood issues.

Given the complex interconnectivity of issues related to health in cities, HiAP is very much an essential approach to adopt. Truly embedding health equity into policy and decision-making processes across all city government departments will require that HiAP be institutionalized *(386)*. This needs formal and sustainable structures, processes and resources that enable timely analysis of the health consequences of decisions. Translation of this understanding into action necessitates an active engagement of a wide range of relevant stakeholders.

There are a number of key considerations in order for HiAP to be successful. First, the most effective placement for HiAP will be within the executive office of government to help ensure that this becomes a priority across all agencies. Health experts or a health department would need to play an important leadership and technical assistance role. Second, funding allocation to a single agency or team can create

unfair burdens for other participating agencies, or unrealistic expectations for the funded agency. On the other hand, distributed funding requires interagency agreements that can be complicated or require contractual obligations that limit flexibility. A contextual approach, or even a place-based approach, for the funding strategy will need to be determined. Third, not every policy decision will impact health, and applying a health lens often requires resources. It is important to determine when a health lens analysis is appropriate, who will conduct that screening and how it will be done. Fourth, HiAP requires new skills for workers in public health and partner agencies including technical skills such as how to conduct a health lens analysis or policy analysis, collaboration skills and political skills. An active partnership with academia can support local authorities with the necessary evidence and expand the availability of skills for HiAP.

EQUITY AS THE CORE VALUE

At the heart of the matter is the urgency for cities to improve equity in health and development, which is being challenged by a multitude of forces such as rapid unplanned urbanization, climate change and unequal economic growth and prosperity. Increasing meaningful participation from citizens, especially those who are most affected by adverse events and conditions, will increase the effectiveness of programmes and initiatives to improve equity. Reaching an understanding with the private sector on the harmony between social and economic goals in the city will vastly expand opportunities and access to services for citizens. And all of this will be more efficiently achieved if health of the people is not viewed solely as a responsibility of the health system. All sectors in cities benefit from a healthy population. There should be no reason for not developing a shared responsibility for health in city departments.

This report presents evidence that health is not only "manufactured" by the health sector. People's health in cities is strongly dependent on their living and working conditions, and accessibility to a wide range of services as well as physical and social environments. Urban living is mostly beneficial with respect to increased prosperity and better access to health and social services. However, new threats to human health have emerged. While some health threats are due to limited resources in cities that are experiencing a rapid rise in population, other challenges are arising from how available resources are used, including how cities and their services are planned and managed. Of greatest concern are the implications for people who are socially and economically excluded from the benefits of living in a city.

Effective urban governance is not the sole domain of government, but the combined effort of a multitude of actors, including different levels of government, NGOs, the private sector and the community. We all have a role to play in improving the situation either as a part of the community in which we live, or in our professional capacities. Our actions in making the city a better place to live and work in for all will result in important health improvements for current and future generations. Demand for transparency in generating and sharing evidence and in decision-making will increase accountability and efficiency. As citizens, we need to constructively engage in understanding the implications of policies and decisions taken on our behalf, and develop an informed response to situations that may not be in the best interests of people's health.

The global political commitment to the SDGs provides us all a platform to

contribute to improving health and quality of life in cities. While each of the 17 SDGs address critical areas for development, it is important to capture the links between the different goals and address them holistically. For example, nearly half the goals are related directly to environmental and social sustainability. The World Economic Forum has linked five goals, including health, to the Global Competitiveness Index, which measures competitiveness of national policy environments *(387)*. The United Nations has estimated a US$ 2.5 trillion annual investment gap for achieving the SDGs in developing countries alone *(5)*. If we are to address health of populations in cities, a holistic approach needs to be applied in achieving the SDGs for health, cities, education, nutrition, gender equality, poverty eradication, climate action, and clean water and sanitation.

One of Lorenzetti's six frescoes titled "Peaceful city" illustrates that if government is virtuous and rules justly, then the city thrives and prospers. The artist, in particular, emphasizes the role of "justice". At the lower end of the wall, words inscribed by the artist translate into "…how sweet and peaceful is that life of the city where is preserved this virtue [Justice] who outshines any other" *(388)*. Health equity is social justice in health *(389)*. As cities grapple with 21st century challenges and pledge to improve the health of their populations, it is critical that the core value of their strategy is equity.

ANNEX 1 — Methodological notes for the urban-level analysis using the Demographic and Health Surveys (DHS) and the Multiple Indicator Cluster Surveys (MICS)

Reliable and comparable data for 102 countries, mostly low- and middle-income (LMICs), were analysed for determining health and health inequities in urban areas. Data presented in this report are only from countries for which at least one dataset beyond 2005 for urban areas was publicly available at the time of analysis in 2014–2015. In order to assess how urban areas perform in comparison to the national and rural levels, national, urban and rural averages were calculated for all indicators of interest. To further investigate inequalities *within* urban settings, the indicators were also disaggregated using different socioeconomic stratifiers, including wealth and education.

The purpose of the comprehensive descriptive and trend analysis of these data was to identify countries that have been more effective at reaching the urban poor over the past two decades. The main objectives were to:

— identify patterns, magnitudes and trends of health inequalities in urban settings at the national level on key health and social determinants of health indicators;
— analyse whether the urban poor are being left behind by development initiatives and overall improvement of health indicators at the national level;
— identify health inequities in selected cities where sample sizes were sufficiently large and data were reliable.

While this report focuses on highlighting the most relevant evidence to support its key messages, the full datasets on 102 countries can be found on the WHO Global Health Observatory, urban health theme page: www.who.int/gho/urban_health.

DATA SOURCES

The descriptive analysis used two sources of data, namely the Demographic and Health Surveys (DHS) and the Multiple Indicator Cluster Surveys (MICS). The DHS and MICS have been conducted in several developing countries across the world since the late 1980s. Both provide information, mostly comparable between countries and over time, about health issues and their social and economic context. They include a variable that allows the extraction of data from urban areas. Therefore, they provide an opportunity to develop a reliable and comparable evidence base that will enable better understanding of relevant urban health issues. Both the DHS and MICS have been a major source of data for the Millennium Development Goals (MDG) indicators and will continue to be a major data source for the Sustainable Development Goals (SDG) indicators as part of the post-2015 agenda.

DATASETS AND INDICATORS

Data were used from 196 DHS surveys in 68 countries and 85 MICS surveys in 60 countries. Also used were all standard and interim DHS surveys, from Phase II to Phase VI, that were publicly available as of May 2015, covering the period from 1990 to 2013. Data from Phase I of the DHS (1984–1989) were not used, mainly because questionnaires have changed significantly, making data less comparable over time, and because key household wealth information was missing in many surveys in this initial phase. Also excluded were surveys with only raw data available and those that were not representative of the whole country. In addition, surveys were excluded that did not have wealth information and, therefore, were not suited for inequality analysis.

Data were used from all MICS surveys from Round III and Round IV that were publicly available as of May 2015, covering the period from 2005 to 2012. All nationally representative surveys were considered as well as specific regional/state surveys such as those from Macedonia, Pakistan and Serbia. To improve comparability across the MICS surveys and with the DHS surveys, surveys corresponding to the first rounds of implementation in the 1990s and early 2000s were excluded.

The list of indicators and their respective definitions for which data were available from the WHO Global Health Observatory urban health theme page is shown in Table A1.1. While only selected analyses are highlighted in this report based on relevance to the particular issue being discussed, data on all indicators can be downloaded from the WHO Global Health Observatory.

Table A1.1.
List of indicators and definitions

Indicator		Definition
HEALTH OUTCOMES		
1.	Under-5 mortality rate	Probability of dying before fifth birthday (5q0) expressed as number of deaths per 1000 live births
2.	Infant mortality rate	Probability of dying before first birthday (1q0) expressed as number of deaths per 1000 live births
3.	Adolescent birth rate	Number of births among women ages 15–19 per 1000 women ages 15–19
HEALTH SYSTEM COVERAGE		
4.	Coverage of skilled birth attendance	Percentage of births attended by a health-care professional
5.	Coverage of antenatal care (at least four visits)	Percentage of women who had at least four antenatal care visits to a health-care professional for their last birth
6.	Coverage of DPT3 vaccination in children	Percentage of children under 5 years immunized with the third dose of the DPT vaccine
7.	Coverage of measles vaccination in children	Percentage of children under 5 years immunized against measles

Indicator		Definition
8.	Coverage of bednet ownership in household	Percentage of households that have a bednet for sleeping
9.	Coverage of ITN ownership in household	Percentage of households with at least one ITN for sleeping (an ITN is a factory-treated net that does not require any treatment or a net that has been soaked with insecticide within the past 12 months)
10.	Coverage of bednet use among children	Percentage of children under 5 years who slept under a bednet the previous night
11.	Coverage of ITN use among children	Percentage of children under 5 years who slept under an ITN the previous night
PHYSIOLOGICAL RISK FACTORS		
12.	Prevalence of (moderate or severe) chronic malnutrition in children (stunting)	Percentage of children under 5 years whose height for age is less than minus 2 standard deviations from the median for the standard reference population
13.	Prevalence of (moderate or severe) underweight in children	Percentage of children under 5 years whose weight for age is less than minus 2 standard deviations from the median for the standard reference population
14.	Prevalence of overweight and obesity in children	Percentage of children under 5 years of age whose weight for height is more than 2 standard deviations from the median for the standard reference population
15.	Prevalence of overweight and obesity in women	Percentage of women ages 15–49 years with a BMI greater than 25
16.	Prevalence of obesity in women	Percentage of women ages 15–49 years with a BMI greater than 30
BEHAVIOURAL RISK FACTORS		
17.	Prevalence of current cigarette smoking among women	Percentage of women ages 15–49 years that currently smoke cigarettes
18.	Prevalence of current cigarette smoking among men	Percentage of men ages 15–54/64 years that currently smoke cigarettes
19.	Comprehensive correct knowledge about sexual transmission of HIV/AIDS among women	Percentage of women ages 15–49 who know that using condoms AND having just one sexual partner can reduce the risk of getting HIV/AIDS
20.	Comprehensive correct knowledge about sexual transmission of HIV/AIDS among men	Percentage of men ages 15–54/64 who know that using condoms AND having just one sexual partner can reduce the risk of getting HIV/AIDS
21.	Knowledge about the use of condoms as a way to avoid HIV/AIDS among young women	Percentage of women ages 15–24 that identify the use of condoms as a way to avoid HIV/AIDS
22.	Knowledge about the use of condoms as a way to avoid HIV/AIDS among young men	Percentage of men ages 15–24 that identify the use of condoms as a way to avoid HIV/AIDS
ENVIRONMENTAL RISK FACTORS		

	Indicator	Definition
23.	Exposure to indoor air pollution	Percentage of the population using solid fuels as the main energy for cooking
24.	Access to piped water onto premises	Percentage of the population using a piped water connection located inside the dwelling, plot or yard
25.	Access to improved drinking-water	Percentage of the population using an improved drinking-water source
26.	Open defecation	Percentage of the population not using any sanitation facility (human faeces are disposed of in fields, forests, bushes, open bodies of water, beaches or with solid waste)
27.	Access to adequate handwashing facilities	Percentage of households with soap and water at a handwashing facility in the dwelling, yard or plot
28.	Poor housing quality (durable structures)	Percentage of households living in dwellings that have dirt (earth), sand, mud or dung floor

BMI, body mass index; DPT, diptheria, pertussis and tetanus; ITN, insecticide treated net

Table A1.2 shows the list of countries for which data were analysed and disaggregated at the urban level for this report. It includes the United Nations 3-letter code for the country, the region to which the country belongs using the United Nations classification, income category using the World Bank classification, number of surveys available for the country during the study period and the latest year for which data were used in this report.

Table A1.2.
List of countries with DHS or MICS data available for urban analysis

	Country	3-letter United Nations code	World Bank income category	Total number of surveys (DHS or MICS) available, 1990–2013	Latest year of data available
AFRICA					
1	Benin	BEN	Low-income	4	2011
2	Burkina Faso	BFA	Low-income	5	2010
3	Burundi	BDI	Low-income	2	2010
4	Cameroon	CMR	Lower-middle-income	5	2011
5	Central African Republic	CAF	Low-income	3	2010

	Country	3-letter United Nations code	World Bank income category	Total number of surveys (DHS or MICS) available, 1990–2013	Latest year of data available
6	Chad	TCD	Low-income	3	2010
7	Comoros	COM	Low-income	2	2012
8	Congo (Brazzaville)	COG	Lower-middle-income	2	2011
9	Democratic Republic of the Congo	COD	Low-income	3	2013
10	Côte d'Ivoire	CIV	Lower-middle-income	4	2011
11	Djibouti	DJI	Lower-middle-income	1	2006
12	Egypt	EGY	Lower-middle-income	5	2008
13	Ethiopia	ETH	Low-income	3	2011
14	Gabon	GAB	Upper-middle-income	2	2012
15	Gambia	GMB	Low-income	1	2005
16	Ghana	GHA	Lower-middle-income	6	2011
17	Guinea	GIN	Low-income	3	2012
18	Guinea-Bissau	GNB	Low-income	1	2006
19	Kenya	KEN	Lower-middle-income	4	2008
20	Lesotho	LSO	Lower-middle-income	2	2009
21	Liberia	LBR	Low-income	2	2013
22	Madagascar	MDG	Low-income	3	2008
23	Malawi	MWI	Low-income	5	2010
24	Mali	MLI	Low-income	4	2012
25	Mauritania	MRT	Lower-middle-income	1	2007
26	Mozambique	MOZ	Low-income	4	2011
27	Namibia	NAM	Upper-middle-income	4	2013
28	Niger	NER	Low-income	3	2012
29	Nigeria	NGA	Lower-middle-income	6	2013
30	Rwanda	RWA	Low-income	5	2010
31	Sao Tome and Principe	STP	Lower-middle-income	1	2008
32	Senegal	SEN	Lower-middle-income	4	2012

	Country	3-letter United Nations code	World Bank income category	Total number of surveys (DHS or MICS) available, 1990–2013	Latest year of data available
33	Sierra Leone	SLE	Low-income	4	2013
34	Somalia	SOM	Low-income	1	2006
35	Sudan	SDN	Lower-middle-income	1	2010
36	Swaziland	SWZ	Lower-middle-income	2	2010
37	United Republic of Tanzania	TZA	Low-income	4	2010
38	Togo	TGO	Low-income	3	2010
39	Tunisia	TUN	Upper-middle-income	1	2010
40	Uganda	UGA	Low-income	4	2011
41	Zambia	ZMB	Lower-middle-income	3	2007
42	Zimbabwe	ZWE	Low-income	5	2010
			ASIA-PACIFIC		
43	Afghanistan	AFG	Low-income	1	2010
44	Bangladesh	BGN	Lower-middle-income	7	2011
45	Bhutan	BTN	Lower-middle-income	1	2010
46	Cambodia	KHM	Low-income	3	2010
47	India	IND	Lower-middle-income	3	2005
48	Indonesia	IDN	Lower-middle-income	4	2012
49	Iraq	IRQ	Upper-middle-income	2	2011
50	Jordan	JOR	Upper-middle-income	6	2012
51	Kazakhstan	KAZ	Upper-middle-income	4	2010
52	Kyrgyz Republic	KGZ	Lower-middle-income	3	2012
53	Lao People's Democratic Republic	LAO	Lower-middle-income	2	2011
54	Maldives	MDV	Upper-middle-income	1	2009
55	Mongolia	MNG	Upper-middle-income	2	2010
56	Nepal	NPL	Low-income	4	2011
57	Pakistan	PAK	Lower-middle-income	3	2012
58	Philippines	PHL	Lower-middle-income	5	2013

	Country	3-letter United Nations code	World Bank income category	Total number of surveys (DHS or MICS) available, 1990–2013	Latest year of data available
59	Palestine	PSE	Lower-middle-income	1	2010
60	Syrian Arab Republic	SYR	Lower-middle-income	1	2006
61	Tajikistan	TJK	Lower-middle-income	1	2006
62	Thailand	THA	Upper-middle-income	1	2005
63	Timor-Leste	TLS	Lower-middle-income	1	2009
64	Uzbekistan	UZB	Lower-middle-income	2	2006
65	Vanuatu	VUT	Lower-middle-income	1	2007
66	Viet Nam	VNM	Lower-middle-income	4	2010
67	Yemen	YEM	Lower-middle-income	1	2006
	EASTERN EUROPE				
68	Albania	ALB	Upper-middle-income	2	2008
69	Armenia	ARM	Lower-middle-income	3	2010
70	Azerbaijan	AZE	Upper-middle-income	1	2006
71	Belarus	BLR	Upper-middle-income	2	2012
72	Bosnia and Herzegovina	BIH	Upper-middle-income	2	2011
73	Georgia	GEO	Lower-middle-income	1	2005
74	Macedonia	MKD	Upper-middle-income	2	2011
75	Moldova	MDA	Lower-middle-income	2	2012
76	Montenegro	MNE	Upper-middle-income	1	2005
77	Serbia	SRB	Upper-middle-income	2	2010
78	Ukraine	UKR	Lower-middle-income	3	2012
	LATIN AMERICA AND THE CARIBBEAN (LAC)				
79	Argentina	ARG	Upper income	1	2011
80	Barbados	BRB	Upper income	1	2012
81	Belize	BLZ	Upper-middle-income	2	2011
82	Bolivia (Plurinational State of)	BOL	Lower-middle-income	4	2008

	Country	3-letter United Nations code	World Bank income category	Total number of surveys (DHS or MICS) available, 1990–2013	Latest year of data available
83	Colombia	COL	Upper-middle-income	5	2010
84	Costa Rica	CRI	Upper-middle-income	1	2011
85	Cuba	CUB	Upper-middle-income	2	2010
86	Dominican Republic	DOM	Upper-middle-income	5	2013
87	Guyana	GUY	Lower-middle-income	2	2009
88	Haiti	HTI	Low-income	4	2012
89	Honduras	HND	Lower-middle-income	2	2011
90	Jamaica	JAM	Upper-middle-income	2	2011
91	Peru	PER	Upper-middle-income	9	2012
92	Saint Lucia	LCA	Upper-middle-income	1	2012
93	Suriname	SUR	Upper-middle-income	2	2011
94	Trinidad and Tobago	TTO	Upper income	1	2006

DHS, Demographic and Household Surveys; MICS, Multiple Indicator Cluster Survey

ANNEX 2 — Methodological notes on the calculation of the Urban Health Index (UHI)

ABOUT THE UHI

The UHI is a single, composite metric that can be used to measure and map the inequalities in health determinants and outcomes in urban areas. The UHI provides a flexible approach to selection, amalgamation and presentation of health data. Its purpose is to furnish visual, graphical and statistical insight into various health indicators and health determinants within particular geographic boundaries, with a focus on capturing intra-urban health inequalities.

The UHI was commissioned by the World Health Organization Centre for Health Development (WHO Kobe Centre) and developed by researchers at Georgia State University in Atlanta, USA, with funding and technical guidance from the WHO Kobe Centre. The tool that emerged through expert consultations and commissioned papers was not predicated on new methods, but rather built on a methodology that has

been under development for many years. A review of existent indicator databases and current approaches to the formation of indices revealed diversity in terminology, but considerable concordance in the types of indicators used (*390*) they provide a common language of appraisal and furnish clear evidence of disparities and inequalities. Over the past 30 years, facilitated by high speed computing and electronics, considerable investment has been made in the collection and analysis of urban health indicators, environmental indicators, and methods for their amalgamation. Much of this work has been characterized by a perceived need for a standard set of indicators. We used publication databases (e.g. Medline. Numerous indices have been proposed, most predicated on the inclusion of specific indicators, and many employing arbitrary weighting schemes. The UHI builds on the considerable correlation among indicators of the same type (for example, total mortality and its subsets) and eschews weighting in favour of different indicator combinations.

The method for the UHI construction has drawn on the approach used by the Human Development Index (HDI) that standardizes indicators by converting them to a proportion of their range so that they are directly comparable, and then combines them using the geometric mean. The resulting UHI value has a range from 0 to 1. The UHIs for contiguous areas are rank ordered. A disparity ratio is calculated from the extremes of the distribution and a disparity slope is calculated by the angle of increase. UHIs for contiguous areas are mapped to provide an immediate visual grasp of the extent and distribution of disparities. This approach permits freedom to choose the scale (from small area estimates to national comparisons), the indicators (largely dependent on data availability) and the mode of presentation.

The detailed methodology for the UHI has been published elsewhere (*32*) we standardized indicators for small area units on a (0, 1. A handbook for the calculation and use of the UHI is available from the WHO Kobe Centre, along with an Excel-based calculation tool and sample data (*391*).

ABOUT THE UHI RESULTS IN THIS REPORT

While the main focus of the UHI is on examining intra-urban inequalities, for the purpose of this global report, the UHI was applied to city data extracted from the Demographic and Health Surveys (DHS) to conduct an inter-city comparison across as many cities as possible. The dataset selected was all data made available and collected or released through the DHS from 2003 to 2013. For each country, a capital city was identified. Then, variables related to the residential location of the interviewee – mainly v024, v025, v026 – were used to identify and extract urban observations from the capital city (or capital region) of that country. In some cases where additional major cities were identifiable, urban observations from those cities were included in the analysis as well (e.g. Kolkata, Mumbai and New Delhi in India). Subsequently, 60 cities in 56 countries were identified.

Various combinations of indicators were considered for the construction of the UHI for this particular analysis. The main objective was to select a set of key urban health determinants and tracer indicators of UHC. Indicator selection also took into consideration the number of missing observations and effective sample sizes per variable in order to maximize the number of city samples that could be included in the analysis.

Thus, the final construction of the UHI reflects the optimal balance between relevance of the indicators and number of city samples available for analysis.

The final version of the UHI presented in Figure 2 in the Introduction of this report is based on a UHI comprised of nine indicators calculated at the city level for the urban samples of households, women and children, as applicable: (i) percentage of households with water piped onto premises; (ii) percentage of households with improved sanitation; (iii) percentage of households that *do not* use solid fuel for cooking in the home; (iv) percentage of women who completed secondary education or higher; (v) percentage of women who believe that having only one partner can decrease HIV risk; (vi) percentage of women who believe that condom use can decrease HIV risk; (vii) percentage of children 1–4 years of age who received three doses of the DPT vaccine; (viii) percentage of children 1–4 years of age who received three doses of the polio vaccine; and (ix) percentage of children 1–4 years of age who received the measles vaccine. The two indicators on HIV/AIDS were assigned a weight of ½ each, while the three indicators on immunization were assigned weights of 1/3 each.

This UHI could be calculated for 57 (mostly capital) cities in 54 countries. The results are visualized in the map presented in Figure 2 in the Introduction of this report. The city-level UHI has been divided into quintiles and colour-coded with the darker colour shades indicating worse UHI scores. The size of the bubble for each city represents population size. Specific findings are highlighted in the accompanying text.

A detailed technical report (*27*) describing the sample selection method, the rationale for the indicator selection and additional analyses is available from the WHO Kobe Centre. The indicator values and the resulting UHI values for each of the 57 cities can be found in the appendix of the technical report.

Another example of an analysis that used the UHI method is presented in the chapter on health equity in this report. It was applied to visualize the variance in health outcomes at the ward and municipal subdivision levels of the Greater Tokyo Area of Japan using a UHI based on age-adjusted, cause-specific mortality rates (*32*) we standardized indicators for small area units on a (0, 1. In this case, a higher UHI value represented worse outcomes (higher mortality).

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GLOBAL REPORT
on

URBAN

equitable, healthier cities for sustainable development

HEALTH

The Sustainable Development Goals, 2016-2030 (SDGs), inclusive of its goals and targets for health and for urban settings, provides an unprecedented opportunity to improve the lives, health, productivity, and wellbeing of all people living in an increasingly urbanized world.

The WHO-UN Habitat Global Report on Urban Health: equitable, healthier cities for sustainable development presents new information and evidence-based multi-sectoral practical solutions to enable cities, countries, and the global health community reduce health inequities, achieve the Sustainable Development Goals (SDGs), and realize universal health coverage (UHC) and the New Urban Agenda. The report reveals the impact of health inequities on achieving health outcomes and outlines options for strengthening health systems and reshaping urban environments, capitalizing on synergy of actions across sectors and co-benefits.

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