ECONOMIST IMPACT

City Heartbeat Index 2024

Findings report

Commissioned by NOVARTIS

Contents

About this report

This report, written by Economist Impact and commissioned by Novartis, presents the findings of the City Heartbeat Index, a new benchmarking tool measuring efforts at the city level to influence cardiovascular health. Based on an analytical framework composed of quantitative and qualitative indicators, the City Heartbeat Index examines local capacity to support the prevention and management of cardiovascular disease (CVD) across five domains: Social Determinants, Physical Environment, Health Risks, Health Services and Governance. Economist Impact evaluated 50 large cities around the world, representing diverse geographical locations and economies, with a regional weight proportional to current global CVD burden. The development of the methodology was informed by a literature review and an expert panel, and data collection relied on international datasets and city and country research across official documents, policies and strategies.

The first chapter of this report discusses the linkage between urbanisation and CVD and the rationale, objectives and high-level findings of the City Heartbeat Index. The subsequent chapters examine detailed findings across each of the five domains of the Index, introducing key concepts and highlighting case studies from the city sample.

The research was commissioned by Novartis but independently conducted by Economist Impact. We would particularly like to thank the following experts (listed alphabetically) who contributed to this report through expert panel discussion:

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Economist Impact bears sole responsibility for the content of this report. The findings and views expressed in the report do not necessarily reflect the expert panel's or sponsor's views. Framework development and data collection was led by **Anelia Boshnakova** with oversight by **Amanda Stucke**. The research team included **Aanisah Khanzada**, **Giulia Cappellazzo**, **Giulia Garcia**, and **Julia Maciel de Rodrigues** plus additional contributors. Data finalisation and Index compilation was led by **Miranda Baxa** with oversight by **Alicia White**. **Barinder Chauhan** managed the project. The report was written by **Adam Green** and copyedited by **Paul Tucker**, with additional editing by the research team. Appreciation is given also to **Katherine Stewart** and **William Shallcross** who contributed to the development of the Index.

Executive summary

Cardiovascular disease (CVD) is the leading global cause of mortality, causing 17.9m deaths in 2019 and 38% of premature deaths from noncommunicable diseases.[1] Urbanisation is known to be associated with an increase in risk factors for CVD, including unhealthy diet, inactivity, smoking and alcohol use.[2] With over 55% of people living in cities as of 2022, global CVD prevention will require strategies tailored for urban settings, involving the promotion of healthy behaviours and tackling social determinants of health, such as poverty and level of education.[3] One example, the Health in All Policies (HiAP) approach championed by the World Health Organisation (WHO), encourages integrating health considerations into all policy sectors, such as transport, housing and urban planning.

The City Heartbeat Index evaluates 50 cities across five domains with 44 indicators and sub-indicators, primarily serving as a benchmarking tool for assessing the drivers and barriers to cardiovascular health at the city level. In addition, it aims to raise awareness of the importance of a city-level focus on cardiovascular health, facilitate policy development, spark stakeholder discussions, promote collaboration across sectors, and spur consideration of greater investment in health initiatives.

The key findings of this Index are as follows:

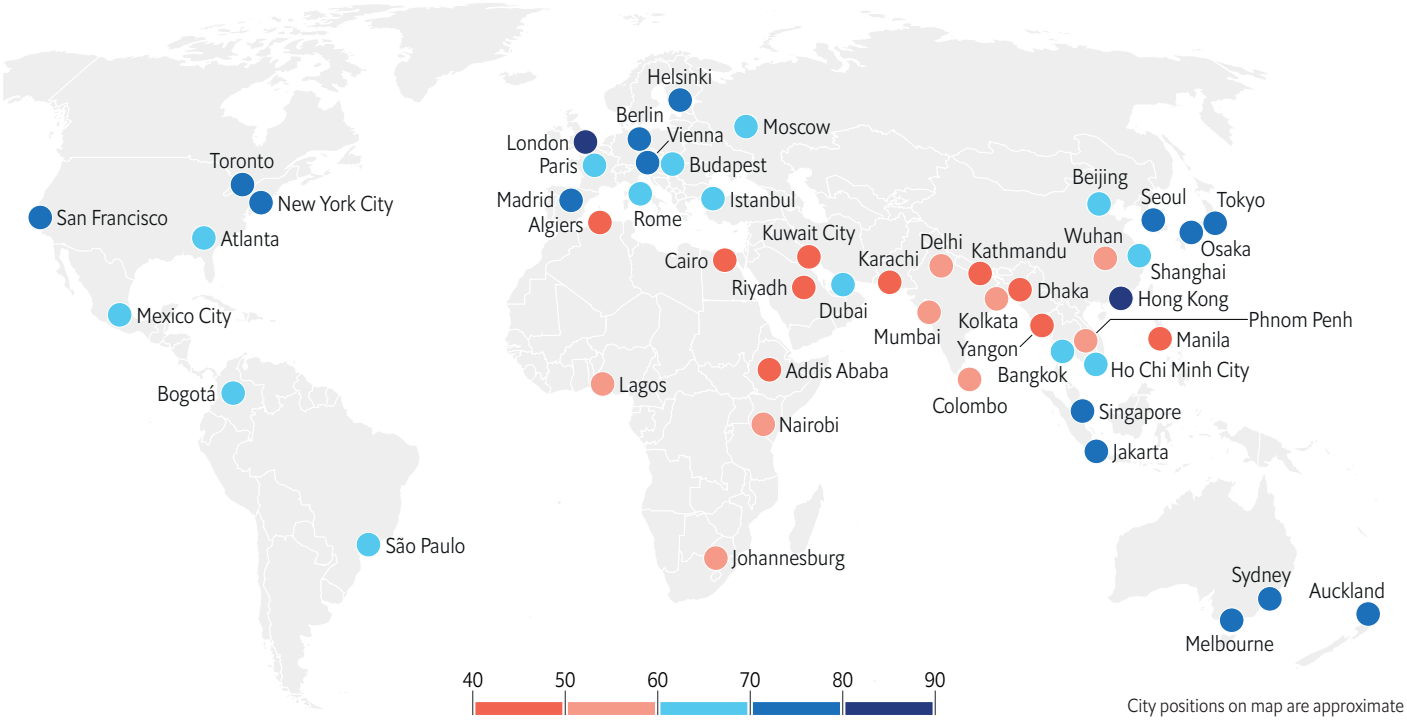
High-income cities demonstrate superior performance in social determinants, and action is needed in cities in low- and lower-middle-income countries. The Index's Social Determinants domain highlights factors such as income, level of education, and access to healthcare as key contributors to CVD risk. High-income cities generally perform better in these areas, with Toronto (Canada) and Berlin (Germany) leaders in this domain. However, there are some success stories among middle-income cities, with São Paulo in Brazil and Bogotá in Colombia performing well in access to healthcare and Yangon (Myanmar) having relatively low inequality.

Nevertheless, the findings underscore the urgent need for action in low- and lower-middle-income cities to address infrastructure gaps and implement policies for improved cardiovascular health.

Physical Environment is the weakest performing of all Index domains, with wealthy cities showing advantages in areas such as open and green spaces and active transport. Emerging economies face challenges related to air pollution, with particulate matter being a major contributor to cardiovascular health risks. However, innovative solutions are emerging, such as smog vacuum cleaners in Beijing (China) and pollution-absorbing substances used on the exterior of buildings in Mexico City (Mexico). Open and green spaces, vital for cardiovascular health, are abundant in high-income cities like Hong Kong and Auckland (New Zealand). Cities in emerging economies face complex food security challenges—a result of issues with governance, infrastructure and climate change—that impact access to healthy diets.

Figure 1: City Heartbeat Index: overall scores

Overall scores for the 50 cities included in the City Heartbeat Index (out of 100, higher score is better)



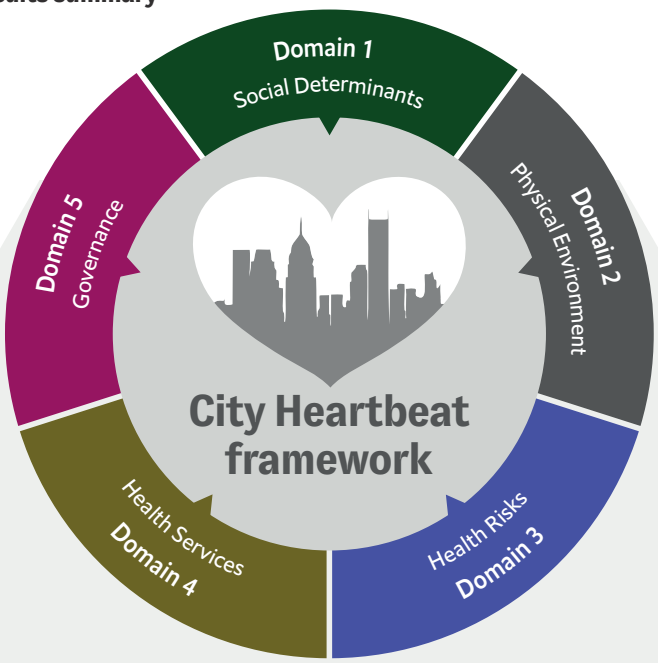
Source: Economist Impact
Graphic insight: Economist Impact

City-level data availability highlights prioritisation of certain health risks including obesity, diabetes and hypertension over others. The Health Risks domain of the City Heartbeat Index evaluates critical factors such as tobacco use, poor diet, physical inactivity, hypertension, diabetes, obesity, and high cholesterol levels, all of which significantly impact cardiovascular health in urban settings. Greater availability of city-level data on some health risks including obesity, diabetes, and hypertension suggests that these areas are being prioritised, while other risk factors such as low vegetable consumption, high cholesterol, and trans fat intake are receiving less attention. Although cities with higher data availability and lower national prevalence of key health risks are predominantly in high-income countries, middle-income Jakarta (Indonesia) stands out with comprehensive city-level data across these measures. Prioritising data collection at the city level is essential as it serves as the foundational step in informing the development of tailored urban health policies.

Low- and lower-middle-income cities have the poorest health services, pointing to limited funding, infrastructure, workforce and education. The Health Services domain evaluates metrics such as access to essential CVD medications, hypertension diagnosis coverage, undiagnosed diabetes rates, and patient-centred care. Although high-income cities typically perform better, São Paulo stands out as a middle-income city with strong health service accessibility, while Colombo (Sri Lanka) demonstrates efforts to enhance access to essential medicines and provide patient-centred care. Even high-income cities such as Dubai (United Arab Emirates) face hypertension diagnosis challenges, prompting national plans for improvement.

Effective governance is vital for urban cardiovascular health, requiring city autonomy, rigorous planning and consistent political support. While London (United Kingdom) and Hong Kong excel in developing autonomy in health matters, providing political support and careful planning of health strategies, Jakarta, Ho Chi Minh City (Vietnam), Mumbai (India) and Nairobi (Kenya) offer valuable insights for middle-income settings. The Index further evaluates city-level policies addressing health promotion, and specific health risks such as unhealthy diets, tobacco and air pollution, with London emerging as the most active city in this regard, implementing policies in areas such as healthy diets and air pollution, notably expanding its Ultra Low Emission Zone (ULEZ) in 2023 to cover the entire urban area, making it reportedly the largest clean air zone in the world.[4]

Figure 2: Index results summary
City and rank



Overall	Domain 1 Social Determinants	Domain 2 Physical Environment	Domain 3 Health Risks	Domain 4 Health Services	Domain 5 Governance
Hong Kong 1	Toronto 1	Toronto 1	Hong Kong 1	New York City =1	London 1
London 2	Berlin 2	London 2	Jakarta 2	San Francisco =1	Hong Kong 2
Madrid 3	Melbourne =3	Melbourne 3	Singapore 3	Berlin 3	New York City 3
New York City 4	Sydney =3	Singapore 4	Osaka =4	Helsinki 4	Toronto 4
Berlin 5	Vienna 5	Bogotá 5	Tokyo =4	Vienna 5	Jakarta 5
Toronto 6	London 6	Madrid 6	Beijing 6	Paris 6	Dubai =6
Singapore =7	Atlanta =7	Rome 7	Seoul 7	London 7	Madrid =6
Tokyo =7	New York City =7	Paris 8	Madrid 8	São Paulo =8	Berlin =8
Melbourne 9	San Francisco =7	Hong Kong 9	Shanghai 9	Seoul =8	Ho Chi Minh City =8
Seoul 10	Helsinki 10	New York City 10	Helsinki 10	Madrid 10	Mumbai =10
					Nairobi =10
					San Francisco =10

Note: "=" denotes a tie in rank

Source: Economist Impact
Graphic insight: Economist Impact

Introduction

Cardiovascular diseases and urbanisation

Cardiovascular disease (CVD) is the leading cause of mortality globally, accounting for 17.9m deaths, or 32% of all global deaths, in 2019. CVD also represented 38% of premature deaths (under the age of 70) due to noncommunicable diseases (NCDs).[2] Evidence suggests that the rising incidence of CVD is influenced by global demographic shifts towards urbanisation.[5] According to a 2022 report by the World Health Organisation (WHO) , over 55% of the world's population currently lives in urban areas, a proportion expected to increase to 68% by 2050.[3]

Urbanisation offers improved opportunities for employment, education, social connections, and better access to healthcare and other essential services.[2] However, it also coincides with lifestyle changes that increase the risk of cardiovascular diseases, such as tobacco use, unhealthy diets, physical inactivity, and harmful alcohol consumption.[2] In cities, unhealthy foods high in salt, sugar, and fats are more readily available and cheaper than fresh fruits and vegetables, promoting unhealthy dietary habits.[2] Evidence shows that rural-to-urban migration contributes to more sedentary lifestyles, poorer blood lipid profiles, and increased obesity.[6]

Risk factors for CVD are typically split into two groups: individual behaviours or lifestyle choices and social determinants of health. The key behavioural risk factors include unhealthy diet, physical inactivity, tobacco use, and harmful alcohol consumption. These behaviours can lead to raised blood pressure, blood glucose and blood lipids, and overweight/obesity, all of which increase the risk of heart attack, stroke, and other complications.[1] Social determinants of health are non-medical factors that shape health outcomes such as income, level of education and social inclusion.[7] A comprehensive approach to preventing CVD must address both individual behaviours and social factors.

Encouragingly, most CVD is preventable by tackling behavioural risk factors.[1] Cities, through strategic policy measures, can play a significant role in supporting public health. Health behaviours and outcomes are influenced not only by healthcare programmes but also by policies across other sectors. The WHO, for example, proposes the Health in All Policies (HiAP) approach which aims to address policies in sectors including transportation, housing, education, and economic development to promote overall health and equity.[8]

Introducing the City Heartbeat Index

This project seeks to uncover the essential factors influencing cardiovascular health in cities and address barriers to its improvement. It aims to identify policy strategies conducive to heart health at the city level. To achieve these goals, Economist Impact developed a comprehensive framework, covering social, institutional, community, and policy factors impacting the cardiovascular health of urban populations, following an HiAP approach. We assessed these key capacities across five domains: Social Determinants, Physical Environment, Health Risks, Health Services and Governance.

The City Heartbeat Index assesses city-level efforts to understand, prevent and address CVD in 50 cities worldwide. We selected cities based on the regional proportionality of CVD burden (by WHO region) and city population size (minimum population of 500,000 or more). To contribute to the diversity of the index, we ensured that the selected cities represented diverse geographical locations and economies.

We developed the Index framework through a rigorous process of examining the evidence on factors influencing CVD risk and outcomes, and validated the framework with a panel of experts. The Index includes 44 indicators and sub-indicators across five domains that measure the policies, processes and risk-factor-mitigation efforts that are key to reducing the burden of CVD.

The Index serves as a benchmark for cities to evaluate their performance and identify areas for improvement in their cardiovascular health strategies, and also seeks to inform wider policy discussions on the current status and future directions for preventing CVD at the urban level. In addition, it aims to enhance awareness of the multifaceted factors contributing to CVD risk within urban environments. It seeks to foster collaboration among diverse stakeholders to develop and implement evidence-based approaches, encourage improved public health infrastructure, and promote equity in access to healthcare services and prevention programmes.

The methodology for the Index and the full ranking of all 50 cities are provided in the Appendices. In the following chapters we first summarise high-level and aggregated findings arising from the Index, before exploring each of the five domains in greater detail in the subsequent chapters, highlighting best practices and areas for improvement.

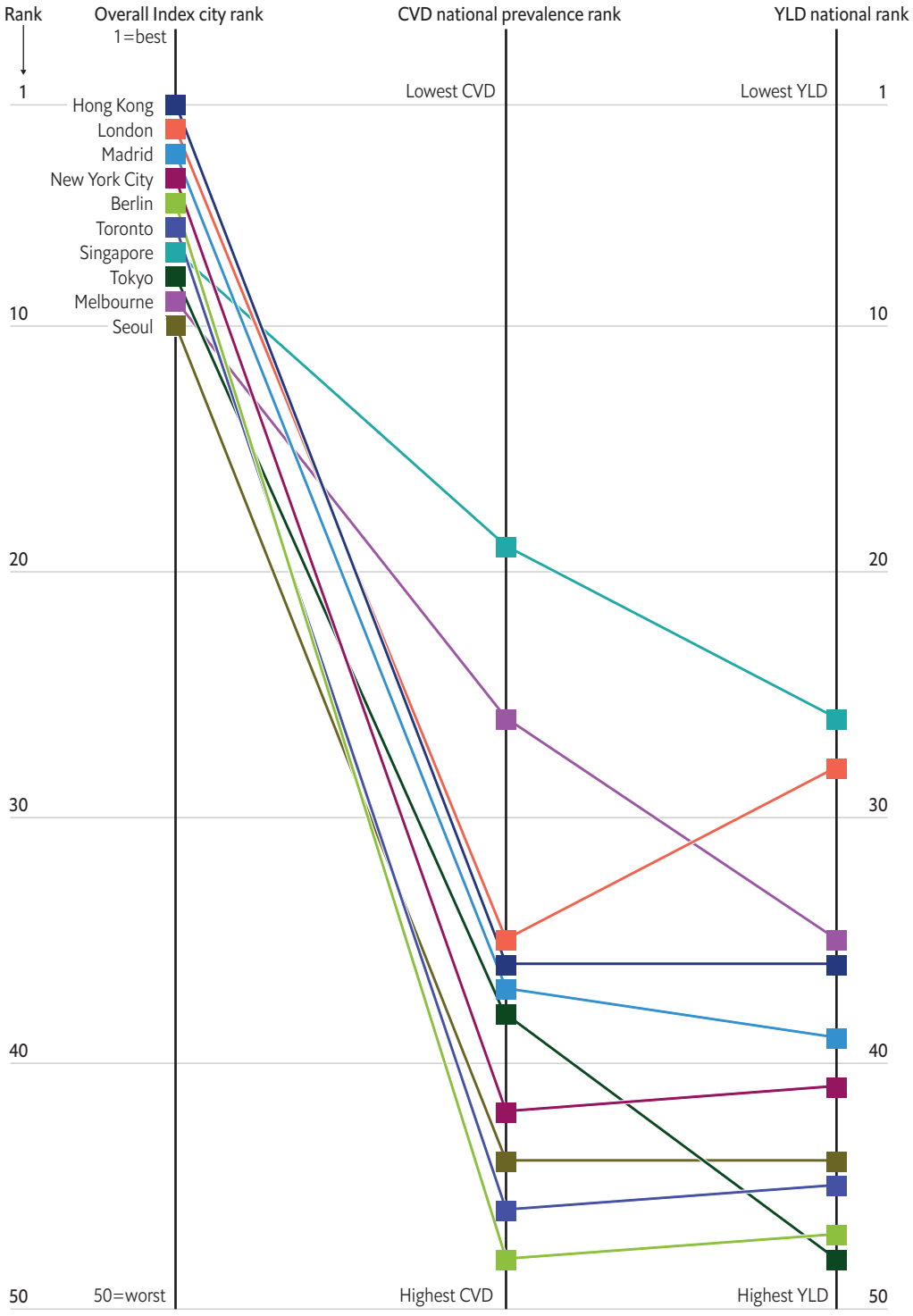
High-level findings

Many cities are making efforts to improve cardiovascular health, but all cities still show room for improvement, particularly those in low and lower- middle-income countries. Hong Kong and London scored the highest out of all cities, and were the only cities to score above 80 out of the maximum possible score of 100 (see Figure 1). The majority of cities scored between 70 and 80 points (15 cities) or 60 and 70 points (14 cities), with 19 cities scoring below 60 points. The concentration of low and lower-middle-income cities in the bottom 20 positions highlights the significant challenges faced by urban centres in rapidly urbanising regions, such as Asia and Africa.[9]

The burden of CVD is driving action: cities situated in countries with the highest burden are more focused on understanding, preventing and addressing CVD. A higher number of years lived with disability (YLD) due to CVD in a country is associated with better performance on the City Heartbeat Index ($r = 0.73$). Of the ten highest-scoring cities on the Index, four—New York City (United States), Toronto, Berlin and Tokyo (Japan)—are in countries with among the greatest number of years in poor health due to CVD and some of the highest prevalence rates (see Figure 3). This means that cities with the highest burden of disease (based on national data) are more focused on understanding, preventing and addressing CVD.

Figure 3: Top ten cities and national CVD burden

The top scoring cities, national CVD prevalence and years lived with disability (YLD) due to CVD



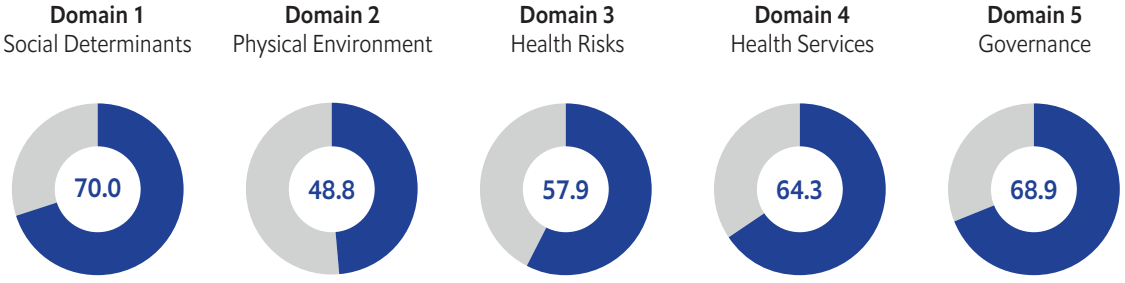
Source: Economist Impact; Institute for Health Metrics and Evaluation (used with permission, all rights reserved)
Graphic insight: Economist Impact

Despite most cities having policies to prevent and reduce CVD, efforts to measure and address key risk factors are lagging. Most action is evidenced in the Social Determinants, Governance and Health Services domains (based on average global scores). A weaker performance across the board (averaging 57.9 out of 100) is evidenced for domain 3, Health Risks, which addresses availability of city-level data and levels of each health risk factor nationally. With an average score of 48.8 (out of 100), cities show the weakest performance on domain 2: Physical Environment.

Improvements to city-level data collection are needed, as this serves as the initial step in developing tailored actions. While cities commonly had data available on factors impacting CVD risk such as employment (76%), poverty (70%) and obesity (74%), several key risk factors for CVD areas are less well understood at city level, such as food security (42%), cholesterol level (22%) or trans fats consumption (14%; see Figure 5). In those areas, the Index captures this lack of data and uses national-level data as a proxy for likely current status. Going forward, collecting this data will be critical for cities to be able to monitor their population's cardiovascular health, drive their public health strategy and monitor the impact of policy changes.

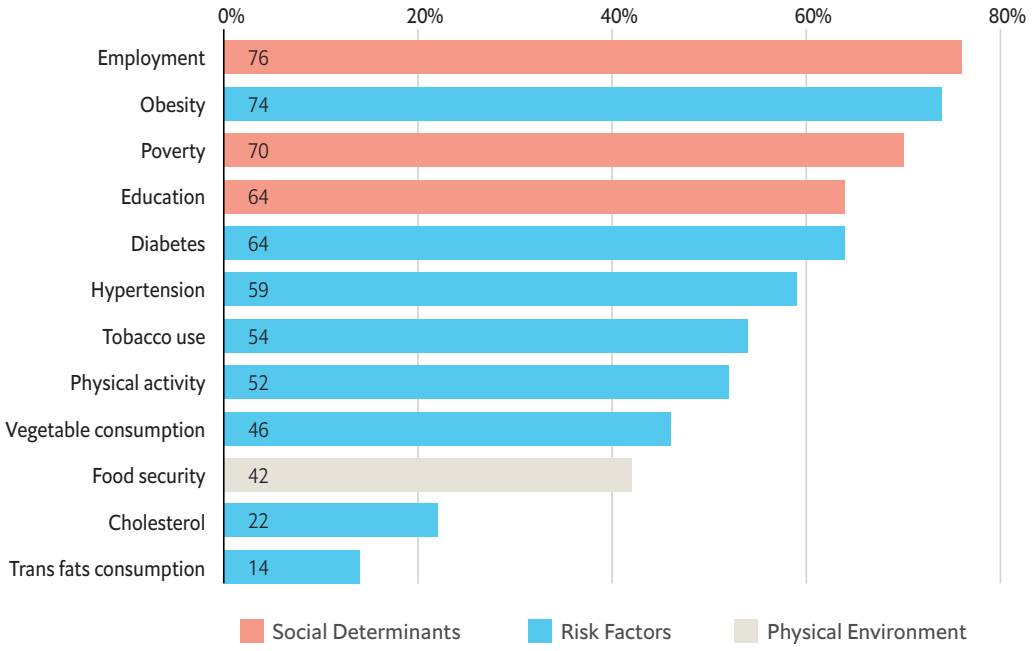
Figure 4: Domain performance

Average scores (out of 100, higher score is better) for the five domains in the City Heartbeat Index



Source: Economist Impact
Graphic insight: Economist Impact

Figure 5: City-level data availability
Percentage of cities for which data are available on key factors impacting CVD risk

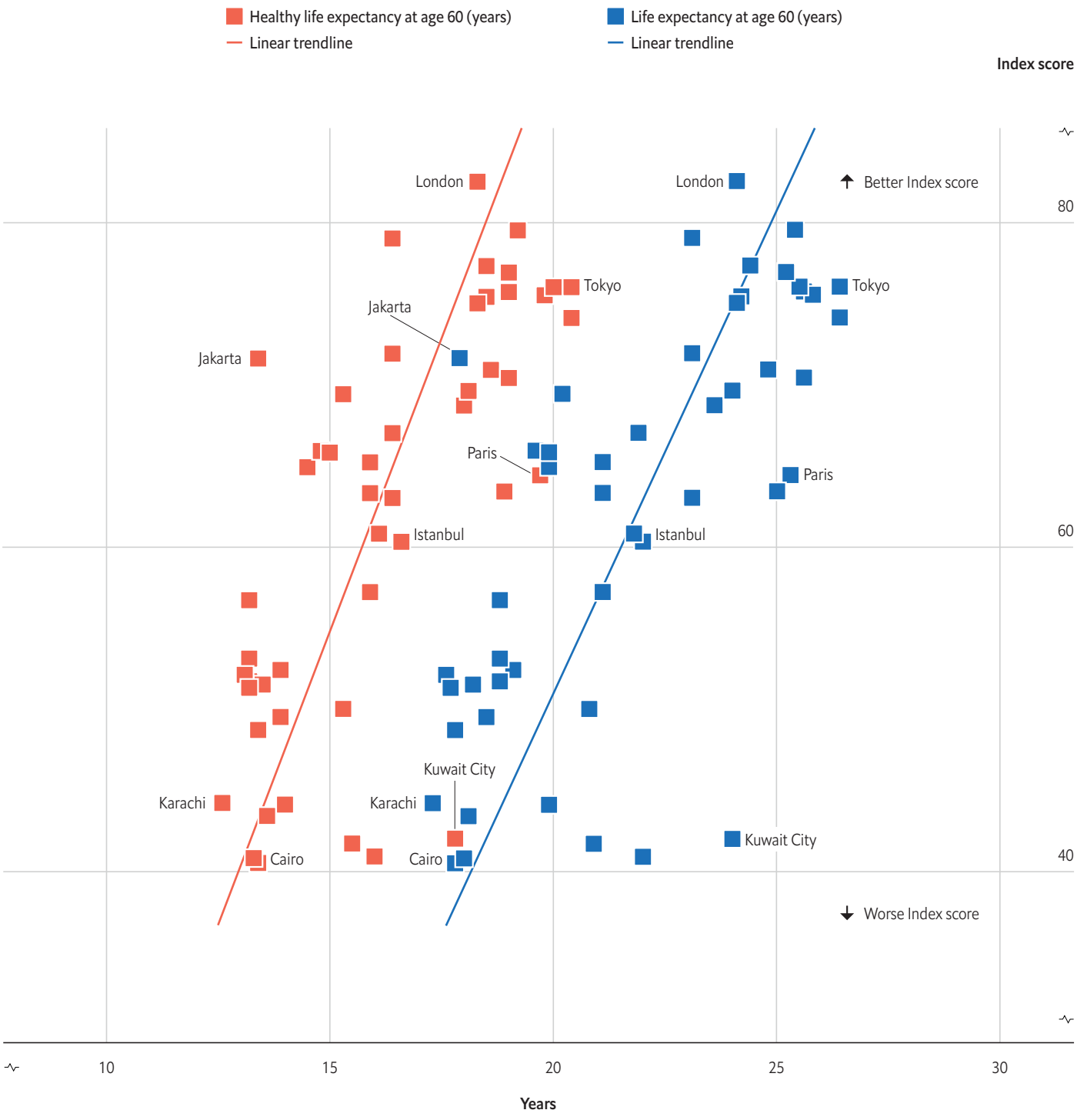


Source: Economist Impact
Graphic insight: Economist Impact

Greater efforts to understand, prevent and address CVD are associated with greater life expectancy. Cities scoring higher on the City Heartbeat Index tend to have populations who can expect to live longer (r=0.71) and in better health once they reach the age of 60 (r=0.72; see Figure 6). There is also a strong association between scores for domain 2, Physical Environment, and healthy life expectancy at age 60 (r = 0.71), which is consistent with evidence of the importance of environmental factors (such as air pollution) in reducing CVD risk and promoting overall health.[10,11] Although causality cannot be inferred, these findings do support that the Index is capturing factors that are important in the health and longevity of the population.

Figure 6: Association between City Heartbeat Index scores, life expectancy and healthy life expectancy

Index scores are out of 100, higher score is better



Source: Economist Impact
Graphic insight: Economist Impact

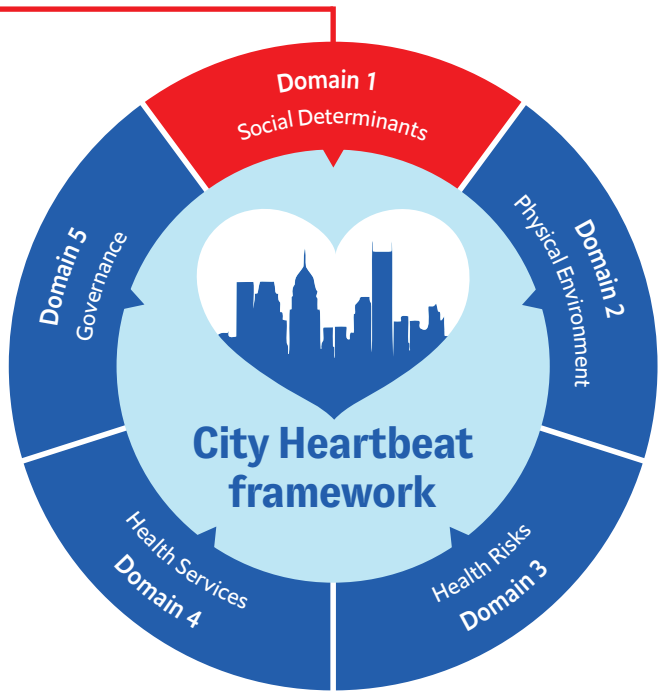
Hong Kong not included as data not published by WHO

Domain-level findings

1. Social Determinants

Table 1: Top 10 cities in the Social Determinants domain

Domain 1 Social Determinants		
Rank	**City**	**Score**
1	Toronto	89.9
2	Berlin	89.6
=3	Melbourne	87.9
=3	Sydney	87.9
5	Vienna	87.3
6	London	86.9
=7	Atlanta	86.8
=7	New York City	86.8
=7	San Francisco	86.8
10	Helsinki	86.4



Source: Economist Impact
Graphic insight: Economist Impact

Measuring social determinants for urban cardiovascular health

Social determinants of health encompass the environmental and social conditions that affect health outcomes, including chronic diseases like CVD. Factors like lower income and education levels, along with issues including food and housing insecurity, contribute to higher CVD risk.[12]

Studies have found higher rates of unhealthy behaviours and modifiable risk factors, poorer uptake of certain types of care for CVD, and poorer health outcomes among economically disadvantaged populations.[13] Lower education levels correlate with increased lifetime CVD risk throughout adulthood.[14] Employment conditions also impact cardiovascular health with evidence pointing to a harmful association between job strain, shift work and CVD.[15] Access to quality healthcare, including preventive care and treatment, can reduce population-level CVD risk.[16]

Monitoring of social determinants plays a pivotal role in cities planning for good cardiovascular health in their population. Addressing them is essential for improving cardiovascular health outcomes and reducing health disparities.

The City Heartbeat Index measures social determinants of health by analysing a combination of city- and national-level indicators on poverty, education, unemployment, access to healthcare, and household health expenditure.[a]

This first domain of the Index is largely dominated by high-income cities (accounting for the top 19 positions), with Toronto and Berlin attaining the highest scores. These cities offer the most favourable conditions overall in terms of poverty and inequality, education, employment, access to healthcare and household health expenditure (based on national data), but have also made the most progress in measuring these dimensions at the city level.

Achieving more with limited resources

Although social determinants are more likely to be favourable in wealthy countries, some middle-income cities stand out in specific areas. Such is the case of Yangon (Myanmar), which has relatively low inequality, and Phnom Penh (Cambodia) and Ho Chi Minh City where unemployment is low (based on national-level data). Two Latin American cities, São Paulo and Bogotá, stand out for ranking in the top ten cities for the healthcare accessibility indicator, owing to the strong legal protection conferred to universal healthcare in Brazil and Colombia.[17,18] A key takeaway from the performance of these cities, surpassing even some wealthier counterparts, is that improvements in social determinants may result not only from vast expenditure, but also from establishing principles of equality and universal healthcare.

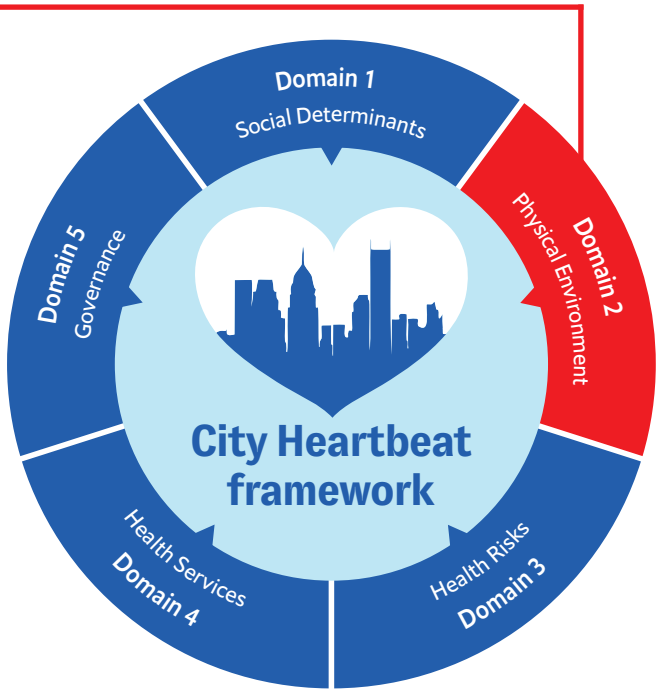
However, it is concerning that eight of the cities in the bottom ten positions in this domain are in low- or lower-middle-income countries. This underscores the critical need for urgent action in poorer nations to develop infrastructure and implement policies to optimise scarce resources.

[a] National data is used as a proxy to assess various quantitative indicators, while city-level metrics focus on the qualitative assessment of data availability at the local level in specific dimensions.

2. Physical Environment

Table 2: Top 10 cities in the Physical Environment domain

Domain 2 Physical Environment		
Rank	**City**	**Score**
1	Toronto	77.5
2	London	76.7
3	Melbourne	75.5
4	Singapore	74.6
5	Bogotá	74.3
6	Madrid	72.6
7	Rome	71.4
8	Paris	69.8
9	Hong Kong	69.2
10	New York City	68.8



Source: Economist Impact
Graphic insight: Economist Impact

Assessing physical environment and urban cardiovascular health

The physical environment, crucial for assessing cardiovascular health promotion, comprises factors such as air quality, green spaces, and active transport infrastructure. This domain evaluates various metrics, including mean particulates with an aerodynamic diameter of ≤ 2.5 μm (PM2.5) in urban areas, average share of the built-up area designated for public use (a measure of open spaces and green areas), and active transport infrastructure such as cycle lanes and pedestrian pathways. It also considers the availability of city-level data on food insecurity and the prevalence of food insecurity using national data. Access to public transport is evaluated based on the share of the urban population with convenient transportation options.

Again, high-income cities lead in this domain, with Toronto and London securing the first and second positions, respectively. Noteworthy performance by middle-income cities includes Bogotá in 5th place, São Paulo ranking 12th, and Moscow (Russia) in 13th place. With an average overall score of 48.8 (out of 100), this domain has the weakest performance in the Index across cities. This suggests that this is an area where cities could focus attention, particularly given the strength of the association between the Physical Environment domain scores and healthy life expectancy at age 60 ($r = 0.71$).

The growing threat of air pollution in developing cities

Urbanisation has brought about various sources of harmful air pollution, impacting cardiovascular health.[19] Research suggests that city air pollution, akin to prolonged smoking,[20] provokes lung inflammation, triggering a stress response that has been implicated in the development of chronic respiratory diseases, including lung cancer.[21] This stress response disrupts sugar metabolism, potentially contributing to diabetes.[22] In addition, long-term exposure to air pollutants is associated

with significantly higher prevalence of CVD risk factors such as high blood pressure and high LDL cholesterol, as well as increased CVD mortality rates.[23]

In scenarios of both short-and-long-term exposure, particulate matter stands out as the primary detrimental factor of air pollution on cardiovascular health. A 10 µg/m3 increase in exposure to fine particulate matter (PM2.5) has been linked to an 11% increase in cardiovascular mortality rates.[24] Even at low concentrations, short-term exposure to PM2.5 has been linked to an increased risk of out-of-hospital cardiac arrest.[25] Major sources of air pollutants include traffic, heating systems, power plants, and maritime operations, with urban centres bearing the greatest responsibility for emissions.[26]

Current WHO air quality guidelines recommend that mean annual PM2.5 levels in urban areas should be less than 5 µg/m3—a level that has not yet been reached in the countries where the cities included in our index are located, based on the latest available WHO data.[27,28] The highest concentration of PM2.5 particulates is evidenced in the urban areas of Kuwait, Egypt and Saudi Arabia, followed by Nigeria and India, thus impacting Kuwait City (Kuwait), Cairo (Egypt), Riyadh (Saudi Arabia), Lagos (Nigeria), Delhi (India), Kolkata (India) and Mumbai (India). Notably, the majority of the 20 cities with the worst air pollution are in middle-income countries, highlighting a significant challenge faced by emerging urban centres. China, experiencing remarkable economic growth and urbanisation, also faces challenges in air quality based on PM2.5 levels.

There are a range of actions that city authorities can implement to combat air pollution. C40 Cities, a global network of cities focused on climate change, proposes a six-step approach.[29] The first step involves adopting WHO air quality standards as targets and actively monitoring pollution levels to identify key priorities. Enforcing clean air zones, particularly targeting diesel and petrol

vehicle emissions, is vital, through measures like vehicle emission standards and charging or banning polluting vehicles. Promoting a shift away from personal vehicles towards public transport, walking, and cycling is another essential initiative requiring investments in infrastructure and urban planning reforms. In addition, transitioning to zero-emission vehicles and decarbonising the electricity grid are crucial steps, alongside minimising the burning of solid fuels and waste through improved waste management and alternative fuel schemes.[29]

Recent examples of measures in such directions include Madrid (Spain), Milan (Italy), and Seoul (South Korea), which are expanding low-emission zones and enforcing stricter limits on polluting vehicles. Warsaw (Poland) is planning to introduce restrictions on high-polluting vehicles in 7% of the city with its Strefy Czystego Transportu initiative starting July 2024. Bogotá's Urban Zones for Better Air initiative, developed in partnership with local communities, targets transportation and industrial pollution to improve air quality and public health while enhancing public spaces.[30]

Some cities are using innovation to expand the range of solutions available to tackle this complex problem. For example, Beijing and Mexico City, two huge cities with a long track record of environmental challenges, are experimenting with new tools. In Beijing, a "smog-free tower" has been erected for the purpose of cleaning the air. Described as the world's first smog vacuum cleaner, it captures smog particles on a negatively charged dust-removal plate.[31] The smog particles are then turned into diamond-like jewellery which helps fund the expansion of more such towers.[32] Another innovation is found in Mexico City, where some buildings have been clad with a substance that can turn the nitrogen dioxide from vehicle exhausts into nitric acid, which is then converted into a salt that is washed away with rain. The biggest building involved in the project, a hospital, aims to remove 1,000 cars worth of pollution daily.[33]

Open spaces and green areas and their impact on well-being

Access to green spaces is associated with lower risk of cardiovascular disease.[34] These areas promote physical activity, benefiting cardiovascular health, while also mitigating air pollution, thereby lowering CVD mortality rates.[35] In addition, studies suggest that proximity to green spaces correlates with improved pregnancy outcomes, better childhood academic performance,[36] and resilience against heat-related deaths during heatwaves.[37]

Hong Kong and Auckland, respectively, hold first and second place in the rankings for this indicator. The 15 top positions are dominated by high-income cities, although Bogotá, Moscow and Istanbul (Turkey), ranked 4th, 6th and 15th, registered a strong performance.

The creation of green and open spaces may carry costs, including opportunity costs, which may deter some countries. Additional barriers may arise from limited land availability, conflicts with other land uses, and the technical challenges associated with redeveloping existing spaces and infrastructure. But steps to create open and green space can also be considered investments to yield important collective impacts that justify public expenditures. In high-ranking Toronto (ranked 3rd), higher tree density in urban areas has been linked to lower rates of CVD and related risk factors. One study found that an increase of 11 trees per city block was associated with health benefits comparable to those associated with a $20,000 (USD $14,500) rise in personal income, moving to an area with a $20,000 higher median income, or being 1.4 years younger.[38]

The impact of green space has also been measured in emerging countries. A study focused on Wuhan (China) found that the presence of greenery in residential areas was associated with a notable reduction in CVD admission risks caused by air pollution, regardless of long-term exposure levels.[39]

Innovative funding options can be explored. For example, Birmingham in the UK has explored the option of reallocating funds from the National Health Service (NHS) towards investing in green spaces to support physical activity and health more broadly, including among patients prescribed exercise.[40]

Urban mobility and active transport for cardiovascular health

The WHO identifies low levels of physical activity as the fourth leading risk factor for global mortality, responsible for about 3.2m deaths annually.[41,42] This burden could be reduced through promoting active transportation to stimulate greater physical activity across all socioeconomic segments. Public transportation systems also promote physical activity, as users often walk or cycle to stops and interchanges, and this has been shown to reduce adiposity (body fat).[43] In addition, use of active transport and public transportation systems could help to reduce urban air pollution and traffic injuries, which together cause 2.6m deaths annually.[44]

The City Heartbeat Index shows that 33 of the 50 cities, in a mix of high-income and middle-income countries, have availability of active transport infrastructure (walking and cycling), such as cycle lanes, walking space, safe crossing points and audible signals.

Cycling and walking can make cities less polluted, healthier and more inclusive by cutting emissions and improving public health. A joint report by the Institute for Transport and Development Policy and the World Bank underscores the economic and environmental benefits of active mobility, stressing the need for better planning, funding and national strategies.[45] The report stresses the role of city governments in developing clear active mobility network plans that align with urban development goals and seeking funding for them from various sources. Local authorities should also communicate the benefits of active mobility to the public while designing and funding programs supporting cycling infrastructure.[46]

The City Heartbeat Index shows that 33 of the 50 cities, in a mix of high-income and middle-income countries, have availability of active transport infrastructure (walking and cycling), such as cycle lanes, walking space, safe crossing points and audible signals. There are cities from all regions within this group, but some regions are underrepresented. Among African cities, only Nairobi was identified as having active transport infrastructure for both walking and cycling, and in the Eastern Mediterranean, only Dubai does. There is a strong representation of European cities in this group (10 of the 33).

Indeed, many European cities boast a strong culture and tradition of rethinking urban space to encourage sustainable and active transportation. Helsinki (Finland), a strong performer in the Index, is prioritising active transport by developing a network of walkable and interconnected neighbourhoods. The goal is to make work, home, leisure, school, and businesses close enough to each other that travel can be done by bicycle or on foot, making cars unnecessary.[47] The Netherlands is renowned as a world leader in active transport with 16% of their road network dedicated to cycle paths, and about a third of all trips under 7.5 kilometres cycled.[48] Since the 1970s, cycling has been integral to Dutch culture,[49] with research in the country establishing an inverse relationship between cycling and CVD incidence.[50]

Other European cities also have highly ambitious plans to support active transport. There is a 15-year plan to extend cycle lanes in Milan (Italy); Berlin aims to establish a car-free area larger than Manhattan; and Paris (France) aims to be 100% cyclable by 2026.[51] The Smart City

strategy adopted by Vienna (Austria) proposes the installation of long-distance cycle lanes from the city outskirts into the centre.[52]

Cities with less of an active transport tradition may find it hard to encourage user uptake, especially when experiencing extreme heat or cold. Singapore has implemented various projects to enhance walking safety, comfort and convenience despite its challenging weather. The Walk2Ride programme has created 200 km of sheltered walkways, ensuring sheltered walking within 400 metres of major transport stations.[53] The Silver Zones project enhances safety for the elderly in selected residential areas by using raised pedestrian crossings which slow down motorists, and pedestrian crossings with extra time for the elderly and those with disabilities.[53]

In Jakarta, government agencies, public institutions, and local residents joined forces for the 'Safe Routes' project, painting pedestrian paths on streets shared between vehicles and pedestrians to enhance safety and accessibility. The initiative saw a remarkable outcome, with 98% of students choosing to walk on the painted path.[54] Similarly, in Manila (Philippines), significant funds have been allocated for the development of protected bicycle lanes and other cyclist-friendly infrastructure.[55]

A 2020 study in the US revealed that counties experiencing increased food insecurity between 2011 and 2017 also saw significant rises in cardiovascular mortality rates.[56] Food insecurity is linked to long-term cardiovascular conditions like diabetes and high blood pressure.

Impact of food security on cardiovascular health

Food security is a critical dimension to consider when assessing factors affecting cardiovascular health in cities. A 2020 study in the US revealed that counties experiencing increased food insecurity between 2011 and 2017 also saw significant rises in cardiovascular mortality rates.[56] Food insecurity is linked to long-term cardiovascular conditions like diabetes and high blood pressure. Furthermore, people facing food insecurity often prioritise food over medication, worsening health issues.[56]

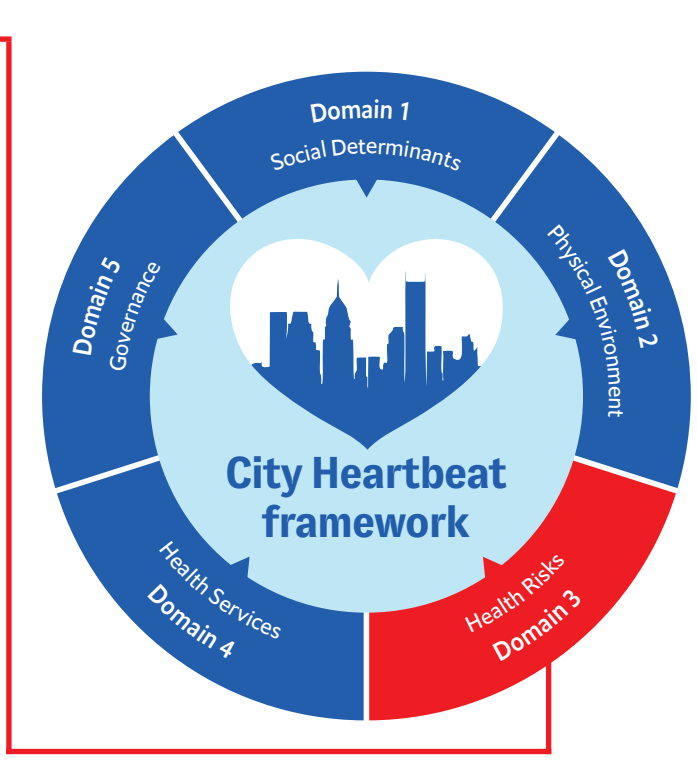
This dimension is assessed in the Index through indicators on availability of data on food security at the city level, as well as the prevalence of food insecurity at the national level. The results highlight challenges in urban centres of emerging economies such as Delhi, Cairo, Kathmandu (Nepal) and Nairobi. Nairobi, for example, does not have city-level data on food security and national figures indicate that Kenya has the highest proportion of people facing food insecurity in our sample (72.3%).

Food security is a challenge even in wealthy countries, but is a greater issue in poorer settings lacking reliable infrastructure and social safety nets. In fact, global food insecurity has surged recently, with the number of people facing acute food shortages rising from 135m in 2019 to 345m by mid-2022, driven by the war in Ukraine, supply-chain disruptions, and the economic impact of covid-19.[57] Climate change further complicates food security by affecting the reliability of crops and supply chains, suggesting that the issue is not likely to go away in the future.

3. Health Risks

Table 3: Top 10 cities in the Health Risks domain

Domain 3 Health Risks		
Rank	**City**	**Score**
1	Hong Kong	86.0
2	Jakarta	83.3
3	Singapore	82.1
=4	Osaka	80.7
=4	Tokyo	80.7
6	Beijing	80.6
7	Seoul	80.5
8	Madrid	78.6
9	Shanghai	77.5
10	Helsinki	77.4



Source: Economist Impact
Graphic insight: Economist Impact

Measuring health risks for urban cardiovascular health

Prevalence of health risks such as tobacco use, poor nutrition, lack of physical activity, hypertension, diabetes, obesity and high LDL cholesterol levels is a critical metric in assessing cardiovascular health in cities. With more than 10% of cardiovascular deaths attributable to smoking, tobacco use is a major preventable risk factor for CVD.[58] Diet quality, dietary habits, and nutrient intake play a role in cardiovascular health inequalities, via risk factors such as hypertension, LDL cholesterol, and glucose levels, along with oxidative stress, pro-inflammatory cytokines, and endothelial dysfunction.[59]

On the other hand, regular physical activity strengthens the heart, improves lung function, and reduces the risk of coronary heart disease by managing blood pressure, cholesterol levels, blood sugar, and inflammation. It also helps individuals to maintain a healthy weight and lowers the risk of heart attacks, especially for those with coronary heart disease.[60] If untreated, high blood pressure, or hypertension, escalates the risk of heart attack, stroke, and other health complications.[61]

Diabetes, especially Type 2 diabetes, is a major controllable risk factor for CVD. Individuals with diabetes face increased risk of CVD, particularly if they have poorly controlled blood sugar. They also often display other risk factors including high blood pressure, high cholesterol levels, obesity, lack of physical activity, and smoking.[62] Lastly, obesity significantly raises the risk of heart disease and mortality, promoting conditions like atherosclerosis and high blood pressure, taxing the heart and increasing the likelihood of diabetes-related heart complications and sleep apnoea.[63]

Health risks in cities and local data availability

The City Heartbeat Index measures the impact of health risks by looking at two main aspects: prevalence and exposure. Prevalence indicates the proportion of a population affected by a risk factor, offering a snapshot of the burden. Exposure refers to the average level of a risk factor that a population experiences, whether inherent or environmental. For example, we measured tobacco use according to the percentage of individuals aged 15 and older who smoke (that is, the prevalence), whereas low vegetable consumption was quantified using daily vegetable intake in grams (ie, exposure). Owning to the lack of availability of comparable city-level data, the study uses national data for quantitative factors and qualitatively assesses cities' efforts to monitor these aspects, as an indicator of city-level action.

Seven of the 10 top-scoring cities in this domain are in high-income countries; these are the cities with a combination of lowest risk-factor prevalence or exposure and more data availability at the city level. Upper-middle-income Jakarta, Beijing and Shanghai (China) also perform strongly (2nd, 6th and 9th respectively).

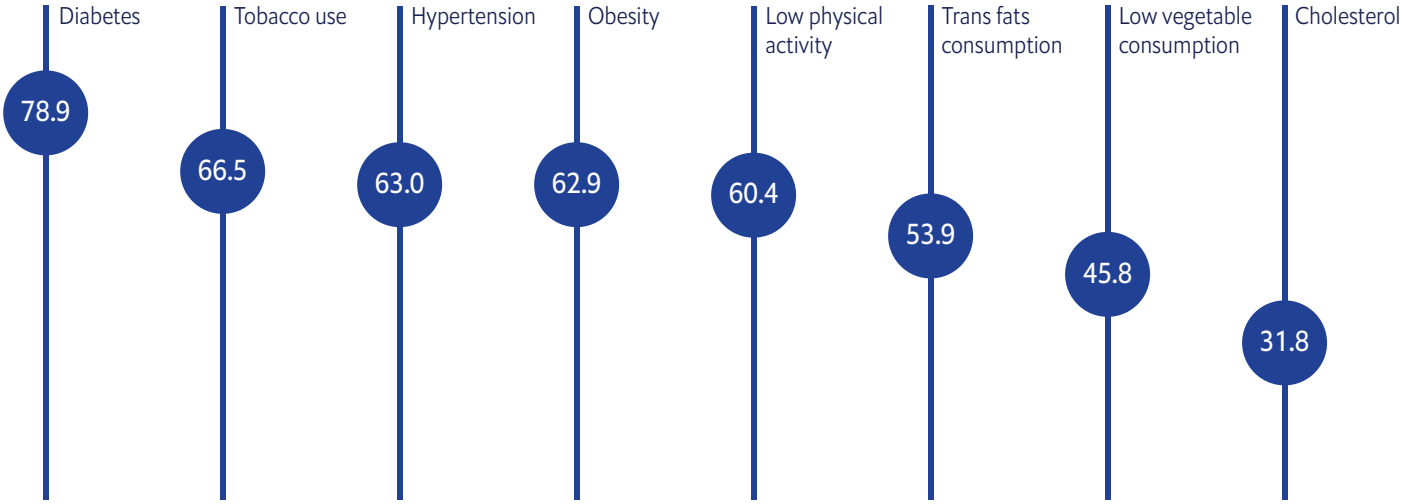
Jakarta's ranking is supported by comprehensive availability of city-level data on health risks. In fact, out of all cities only Jakarta and Singapore have data available for all city-level data-availability indicators included in the study, demonstrating their intent to understand the factors affecting cardiovascular health in their local population, enabling them to better plan for addressing them.

The risk factors for which cities were most prepared on average were diabetes (with an average score of 78.9), tobacco use (66.5), hypertension (63.0) and obesity (62.9); see Figure 7. Higher scores on these indicators reflect greater availability of city-level data to understand the scale and scope of risk factors, as well as lower levels of these health risks nationally. Cities performed less well on average for other risk factors, including level of consumption of vegetables (average score 45.8) and trans fats (53.9), and levels of physical activity (60.4) and LDL cholesterol (31.8), which indicates fewer city-level efforts to monitor these health concerns, and higher levels of these risk factors nationally.

Figure 7: Addressing key risk factors

Average scores (out of 100, higher score is better) for indicators on key CVD risk factors

Higher scores indicate better performance: availability of city-level data on risk factor exposure and lower levels of the risk factor nationally

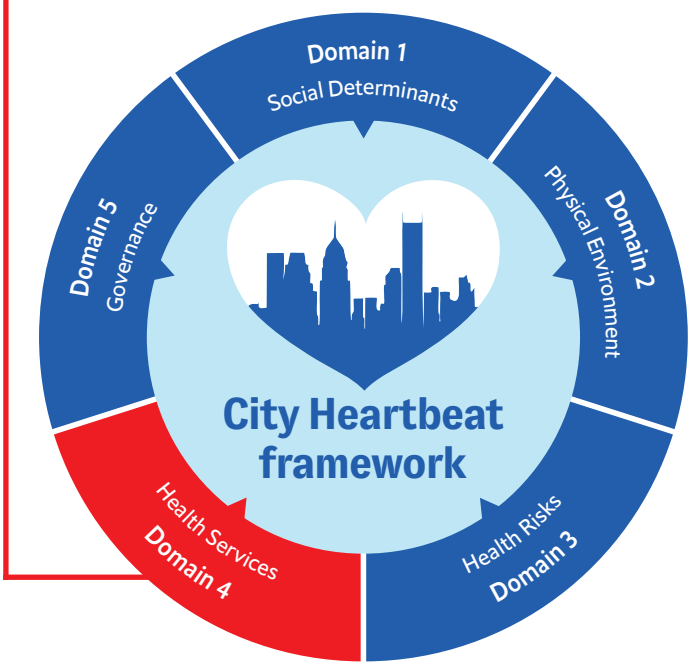


Source: Economist Impact
Graphic insight: Economist Impact

4. Health Services

Table 4: Top 10 cities in the Health Services domain

Domain 4 Health Services		
Rank	City	Score
=1	New York City	91.9
=1	San Francisco	91.9
3	Berlin	87.6
4	Helsinki	87.3
5	Vienna	84.5
6	Paris	84.3
7	London	84.0
=8	São Paulo	83.8
=8	Seoul	83.8
10	Madrid	83.7



Source: Economist Impact
Graphic insight: Economist Impact

Measuring health services and urban cardiovascular health

High quality health services are vital for preventing and treating CVD. The Index thus explores access to critical diagnosis and management services, as well as models of engagement with patients that support better care.

The Index first considers access to essential CVD medicines as listed by the WHO. For example, control of blood pressure and lipid levels through pharmacotherapy is vital for preventing CVD. However, the utilisation of certain of these medicines remains suboptimal, particularly in low- and middle-income countries.[64]

Coverage of hypertension diagnosis is also measured. Detecting and managing hypertension is crucial for reducing the likelihood of CVD and stroke. Early diagnosis, alongside consistent monitoring, is vital for achieving treatment objectives.[65]

The proportion of adults with diabetes who remain undiagnosed is another indicator. People with diabetes, especially Type 2 diabetes, are at greater risk of CVD and often have other risk factors such as high blood pressure, abnormal cholesterol levels, and obesity, all of which contribute to their heightened risk for CVD.[62]

Lastly, the Index examines the presence of patient-centred care models. Patient-centred care prioritises patients' needs and preferences, fostering collaboration between patients, families, and healthcare providers. By tailoring treatment to individual beliefs and values, it enhances engagement and decision-making, potentially improving cardiovascular outcomes.[66]

Disparities in health service accessibility across income levels

The higher rankings in the Health Services domain are again largely dominated by high-income cities. São Paulo is the only middle-income city in the top 15. With ten cities from low- and middle-income countries (LMICs) in the bottom 15 positions, these results highlight challenges in health service accessibility in developing countries. This could be due to a combination of factors such as limited funding, infrastructure gaps, workforce shortages and limited education.[67] However, the Index uncovers some interesting efforts to improve this situation.

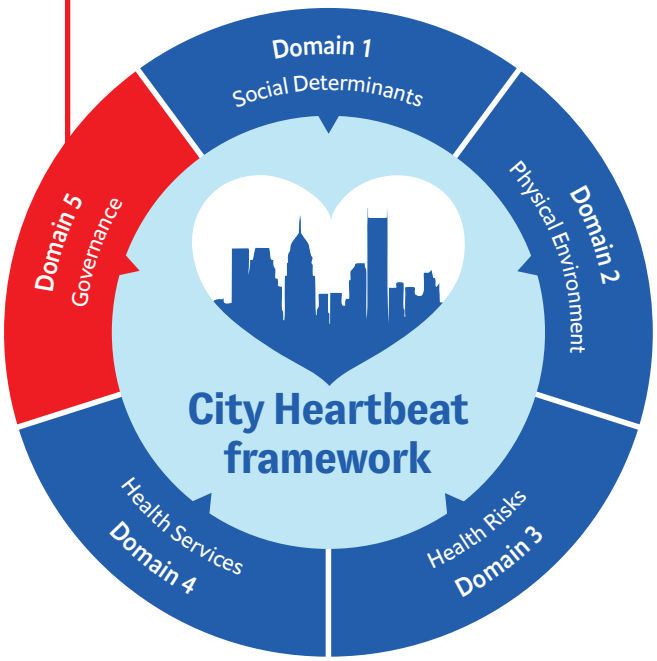
Colombo, the highest-ranked city in the low and lower-middle income group (19th in this domain), displays efforts to ensure access to essential CVD medications. The city's Primary Medical Care Institutions align with the WHO's Essential Medicine List by adopting a National List of Essential Medicines, allowing them to dispense monthly blister packs of 18 essential drugs, ordered via an online system based on Ministry of Health guidelines.[68,69] Despite excluding some combined formulations of CVD medications, the medications are affordable and accessible.[68,69] The city's residents can expect a patient-centred care model, supported by multidisciplinary teams, focused on self-management of risk factors and cardiovascular conditions, emphasising screening, personalised treatment, lifestyle changes, and follow-up care.[69]

Despite having access to more funding and resources, high-income cities should remain vigilant. Dubai has the second-weakest performance among high-income cities in this domain, it is ranked 43rd owing to lower levels of diagnosis of hypertension and diabetes, and lack of evidence of patient-centred care. A recent adult risk-factor survey revealed that 32.5% of adults had hypertension, and 29.8% were pre-hypertensive.[70] In response, the UAE Ministry of Health and Prevention developed a national plan with key partners to reduce hypertension prevalence to 21.8% by 2025, focusing on awareness campaigns and promoting early detection through periodic examinations.[71]

5. Governance

Table 5: Top 10 cities in the Governance domain

Domain 5 Governance		
Rank	**City**	**Score**
1	London	96.3
2	Hong Kong	90.7
3	New York City	87.0
4	Toronto	85.2
5	Jakarta	83.3
=6	Dubai	81.5
=6	Madrid	81.5
=8	Berlin	80.6
=8	Ho Chi Minh City	80.6
=10	Mumbai	79.6
=10	Nairobi	79.6
=10	San Francisco	79.6



Source: Economist Impact
Graphic insight: Economist Impact

Measuring governance of urban cardiovascular health

Effective governance is vital for advancing cardiovascular health in urban areas. First, a degree of autonomy in health matters is crucial for city authorities to address the unique needs of urban centres. Second, ensuring a holistic approach in health and other policies is important owing to the long-term nature of cardiovascular challenges, starting with prevention and spanning various life stages, as well as the cross-sectoral span of CVD risk factors. Finally, precise and rigorous implementation plans are fundamental, as is coordinating resources, engaging stakeholders, and prioritising measurable results.

The Index evaluates regulatory power, measuring cities' authority in health-related matters, and political will, gauging leadership commitment to urban heart health improvement. It assesses the availability of urban health plans and their comprehensiveness in addressing NCDs like CVD, including budget allocations for health services and programmes. It also considers stakeholder engagement across sectors during urban health plan development and policy formulation.

The Index also assesses city-level cardiovascular health risk policies, including measures targeting unhealthy diets and food marketing to children, recent dietary surveys among adults, evidence-based national guidelines for managing major NCDs, treatment protocols for hypertension and diabetes, progress in tobacco control policies, urban initiatives for air pollution reduction, and multisectoral health education policies aimed at improving the public's health behaviour and knowledge.

The strongest cities in this domain are London and Hong Kong, with high-income cities in most of the top ten positions. However, Jakarta, Ho Chi Minh City, Mumbai and Nairobi, also in the top ten, may offer valuable lessons for other cities in upper-middle-income countries.

City autonomy in health policy

The City Heartbeat Index measures this dimension through a qualitative assessment of a city's autonomy to introduce health policies addressing the major CVD risk factors that may not have been introduced at national level (taxation policies such as sugar taxes for example). Out of the 50 cities examined, 26 demonstrate such regulatory powers.

In London, the Greater London Authority has the power to create policies to improve city health. For example, it introduced advertising restrictions on transport services in 2019 to combat childhood obesity.[72] Research suggests these bans on junk food ads have prevented nearly 100,000 cases of obesity and saved the NHS an estimated £200m (US$253.6m).[73]

Paris and its surrounding regions wield considerable autonomy in enacting health policies, with Regional Health Agencies (ARS) executing France's national health strategy locally. Plans from the ARS for Paris include a focus on managing, anticipating, and preventing health risks through data mobilisation in projects spanning 2023 to 2028.[74] Poor nutrition, a primary risk factor for CVD, is targeted through health promotion and information campaigns in health and social care facilities.[75]

In Manila, the city's health officer enforces laws, ordinances, and regulations related to public health.[76] One significant policy is the prohibition of smoking in public places, with penalties for violators aiming to reduce health risks associated with smoking.[77]

Although health taxes can reduce consumption of unhealthy products and cut deaths due to non-communicable disease, the WHO reports that such taxes remain underused.[78] In Tokyo, the local government has the authority to establish additional taxes beyond statutory ones. Current taxes include a highway toll for large diesel

vehicles and taxes on industrial waste emitters, aimed at improving public health by reducing pollution.[79]

Cities lacking such regulatory powers often exist within centralised government systems, such is the case of Istanbul. In Turkey, health system governance is highly centralised, with the national Ministry of Health executing policies determined by the Health and Food Policies Council under the President. The health ministry and its provincial directorates oversee various health policy aspects including workforce planning and regulation of medicines, vaccines, and medical devices, as well as health research and development.[80] In Istanbul, health policy is administered by the Istanbul Provincial Health Directorate, which operates under the health ministry rather than the municipal government.[81] The city government's discretion in health matters is limited to confirming or reinforcing mandates decided at the national level.[82]

Political will to drive cardiovascular health policies

To measure political will around cardiovascular health policy, the Index examined whether the city government possesses a health department, if it delineates clear responsibilities and monitoring procedures, and if it participates in any global, regional, or national urban health networks or initiatives. Successful initiatives aimed at enhancing urban health have been spearheaded in many countries by government agencies, non-profit organisations, and the private sector. Notable programmes include the Partnership for Healthy Cities, the International Society for Urban Health, and Fast-Track Cities.[83] In fact, most cities (35 out of 50) feature all of these attributes, while 13 feature two attributes and only two feature one attribute.

Bangkok (Thailand) is a strong performer. The Medical Services Department of the Bangkok Metropolitan Administration oversees a wide range of health initiatives, including education programmes and new healthcare implementations.[84] Bangkok is actively engaged in international urban health networks like the Rockefeller Foundation-funded Resilient Cities Network. As part of this collaboration, an initiative targeting CVD risk factors began in 2017 and focuses on screening adults over the age of 21 for diabetes and hypertension.[85]

In Seoul, the Ordinance for Supporting Chronic Disease Patient Health Management, enacted in 2022, focuses on patients with hypertension and cardio-cerebrovascular diseases.[86] It allows the mayor of the city to offer subsidies and financial incentives to healthcare providers and pharmacies for activities relating to chronic disease management, alongside funding for health screenings. The city's urban health plan emphasises community-based integrated CVD prevention and management through collaboration between primary care providers and community health centres, leveraging digital healthcare technology for enhanced

access to screenings and healthcare.[87] Stakeholder participation is integral, involving a committee and subcommittees to ensure broad representation. In addition, the city has a Comprehensive Plan for Children's Dietary Life Safety Management, enforcing restrictions on marketing unhealthy foods to children and encouraging voluntary agreements to reduce exposure to such marketing tactics.[88]

New York City showcases notable achievements in urban health. The Health Department spearheaded impactful anti-tobacco campaigns in 2006, employing graphic depictions of smoking-related health issues and testimonials to drive a substantial drop in smoking rates from 22% to 14%.[79] Furthermore, New York City took the lead in the US by requiring restaurant chains to display calorie information on menus and menu boards since 2008, alongside enacting restrictions on trans-fat content in food service establishments. Additional measures were introduced to reduce salt intake, improve fresh produce accessibility, and curb consumption of sugar-sweetened beverages. Simultaneously, the city has made efforts to promote physical activity and implemented regulations aimed at mitigating air pollution.[79]

Ensuring coordination of efforts through urban health plans

This indicator examines the presence and details of urban public health plans, including budget allocations for health services and programmes, and the presence of specific plans targeting NCDs or CVD. It also assesses multisectoral stakeholder involvement in plan development or policy formulation, with contributions from sectors including transport, education, retail, industry, healthcare providers, and community representatives. Nine of the 50 cities examined display all attributes. Interestingly, most of these cities are in Asia (Ho Chi Minh City, Hong Kong, Jakarta, Mumbai, Osaka (Japan), Tokyo and Wuhan).

Mumbai's health plan relies on India's National Urban Health Mission (NUHM), which focuses on urban populations, especially those in slums and vulnerable groups. NUHM collaborates with various sectors, receives budget allocations from both central and state governments, and engages international collaborators like the US Agency for International Development (USAID) and the WHO. The Central Ministry of Health and Family Welfare provides policy guidelines and funding for NUHM. State governments and local health departments deliver services aided by community health workers.[89]

Nairobi is the only African city displaying all of the attributes required in this indicator. It has developed a Community Health Services Implementation Plan for 2023-2027 with a dedicated budget. The development of the plan involved engagement with various stakeholders, validated through workshops and consultations.[90] The Nairobi City County Development Plan for the same period also includes a Sector Programme under Wellness targeting the reduction of modifiable risk factors for NCDs, with potential funding from the Partnership for Healthy Cities to support NCD reduction policies.[91]

Policies for health risks and health factors

The Index assesses city-level policies addressing specific CVD risks, covering diverse metrics. It examines initiatives targeting the reduction of unhealthy food marketing to children and recent diet surveys among adults. Furthermore, it evaluates the existence of government-endorsed guidelines for major NCDs including CVD, as well as protocols for the detection and treatment of hypertension and diabetes (treatment guidelines). In addition, it analyses the implementation and effectiveness of tobacco control measures, city air quality policies and programmes (air pollution control), and multisectoral policies and programmes promoting adoption of healthier behaviours.

Cities showed their best performance for the existence of treatment guidelines for hypertension and diabetes, scoring an average of 95.0 for this indicator, followed by air pollution control at 82.7 (see Table 6). Healthy diet policies and health promotion fall behind with scores of 55.0 and 41.0 respectively. Treatment guidelines for both hypertension and diabetes are present in 47 cities, whereas healthy diet policies, tobacco control, and health promotion initiatives show low numbers of best practice compliance.

Analysing the correlation between policy implementation and income levels reveals further insights. Although there is a weak correlation between income level and most policy areas, a moderate correlation exists with health promotion efforts. Higher-income cities may prioritise health promotion owing to the availability of more resources and better awareness of its importance.

Table 6: Average score for Governance indicators relating to policies for health risks and health factors and correlation with national income level

	Healthy diet policies	CVD management guidelines	Treatment guidelines (hypertension and diabetes)	Tobacco control	Air pollution control	Health promotion
Average score (where 100 is best)	55.0	78.0	95.0	67.0	82.7	41.0
Cities with full attributes (out of 50)	13	39	47	12	27	6
Correlation with income level (GDP per capita in USD)	Very weak (+0.03)	Very weak (+0.16)	Very weak (+0.08)	Very weak (-0.11)	Weak (+0.38)	Moderate (+0.49)

Source: Economist Impact

London, the most active city in policies for health risks

London stands out as the sole city in the study with policies covering all areas relating to health risks measured in this domain. In the realm of healthy diets, London's mayor implemented advertising restrictions across the entire Transport for London network in 2019, targeting childhood obesity by limiting promotions of unhealthy products.[72] This measure led to lower-than-expected sales of unhealthy foods and drinks.[92] London has also pioneered initiatives like healthier zones and School Superzones across 13 boroughs, aiming to combat childhood obesity by restricting advertising of unhealthy foods and controlling the number of fast food outlets.[93]

London is also considered a pioneer in air pollution control. Low emission zones, urban areas where restrictions are placed on more polluting vehicles, have consistently improved air pollution-related health outcomes, with the most notable effects seen in reducing CVD.[94] In August 2023, London expanded its Ultra Low Emission Zone (ULEZ) to cover the city's entire urban area. A report on the first month of implementation of this measure revealed rapid success in reducing the number of older, more polluting vehicles on the streets, with vehicles meeting ULEZ emission standards reaching 95% (up from 39% in 2017).[4]

Following this success, the mayor of London, along with counterparts from Paris, Los Angeles (United States), Delhi, Mexico City, Jakarta, and other global cities, pledged to deliver clean air to over 140m people. This commitment includes ambitious pollution reduction targets and substantive clean air policies by 2025.[95]

Conclusion

The leading cause of mortality around the world,[1] CVD is influenced by urbanisation, which amplifies risk factors including unhealthy eating habits, physical inactivity, tobacco use, and alcohol consumption.[2] Given that over half of the world's population reside in cities,[2] effective prevention and management strategies for CVD need tailored approaches for urban settings that encourage healthy behaviours and tackle underlying social determinants. Inspired by the WHO's Health in All Policies[3] approach, the City Heartbeat Index evaluates 50 cities on their efforts to understand their populations' CVD health and needs, and develop prevention and management actions. This benchmarking tool aims to facilitate the identification of best practices, to inform debate and to raise awareness on the need for increased city-level action.

Efforts to enhance cardiovascular health globally are visible, with notable successes in cities like Hong Kong and London, which score highest on the City Heartbeat Index. However, the strong performance of several middle-income cities demonstrates that success is not solely dependent on financial resources; effective policies and strategic actions are also crucial factors. São Paulo and Bogotá benefit from universal healthcare systems at the country level; Jakarta stands out owing to its efforts to produce city-level data on health risks, and Bangkok shows strong political support for urban health. Yet significant room for improvement remains, particularly in low and lower middle-income countries. These settings are more likely to face limitations in funding, infrastructure (including green spaces and public transport), and social determinants such as employment and education.

Prioritising data collection at the city level is essential as it serves as the foundational step in developing tailored urban health policies. The City Heartbeat Index reveals that city-level data availability is better for health risks such as diabetes, tobacco use, hypertension and obesity, than for other

risk factors including levels of vegetable consumption, trans-fat intake, physical activity and cholesterol. Effective governance is also vital for urban cardiovascular health and can help to optimise outcomes in the face of limited resources. London is a global leader in governance, but middle-income Jakarta also displays attributes such as city autonomy, political will, a robust urban health plan and availability of specific policies for health risks and health factors.

Supporting cardiovascular health requires targeted interventions and a holistic health approach across policy sectors, as well as addressing social determinants such as inequality, poverty and education, and environmental factors such as air quality, green spaces and active transport. Collecting data on health risks and other risk factors is essential for informed policy development, with strong governance needed to effectively implement these policies and therefore optimise cities' CVD prevention and management efforts.

Appendices

Appendix A: Methodology

Introduction

The following details the methods used to develop and construct the composite scores of the City Heartbeat Index. The specific stages of the Index research programme were as follows:

- **Literature review:** a pragmatic review to identify conceptual indicators with a sound intellectual basis for assessing a city's capacity to support the prevention and management of CVD
- **Expert engagement:** the selection of appropriate experts for a roundtable discussion on project scope, methods and preliminary findings from the literature
- **Framework creation:** the creation of an initial framework for the Index, involving the definition of specific indicators and the selection of cities
- **Data collection:** the identification of key sources of information, generating and reviewing justifications for qualitative measures, and gathering relevant data to develop the Index and support the analysis
- **Index creation:** building the Index, conducting further analysis and presenting the findings via an interactive data dashboard and a white paper

The specific objectives of this research were to:

1. Deliver a meaningful contribution to the policy debate around progress in primary, secondary and tertiary prevention of CVD at the city level.
2. Review policies, practices and strategies across the aforementioned cities.
3. Develop a nuanced benchmark of indicators across 50 cities that identifies the drivers of the growing burden of CVD, highlights variability in burden and practice, and provides recommended strategies through the identification of best practices and improvements to be made for cross-geography learning.

Literature review

Economist Impact began with a targeted literature review, following a pragmatic and iterative methodology, to assess available data and sources, and evaluate existing frameworks for healthy cities for the prevention and control of heart diseases.

We identified key and measurable factors for improving heart health through evidence-based programmes and initiatives using the Health in All Policies (HiAP) approach. This approach recognises that population health is not just a product of health sector programming but is largely determined by policies that guide actions beyond the health sector. Different local and national government policies that influence areas such as transport, housing and urban planning, the environment, education, agriculture, finance, taxation and economic development can be used to promote population health and health equity.

The targeted evidence review informed the development of a framework of 44 indicators and sub-indicators covering social, physical environment, health, service provision, and policy factors impacting the cardiovascular health of urban populations.

To gather the evidence, we searched published and grey literature to identify relevant cross-country studies, assessment tools, frameworks, and benchmarks. The search was targeted in scope, though it followed structured methods and was carried out by a health information specialist. While it was not a comprehensive search, it was designed to provide a selection of publications that could contribute to the development of a framework for a benchmark assessing city-level policy towards heart health.

Expert engagement

Following the targeting literature review, the research team brought together leading experts in the field to support and inform the research programme. Economist Impact aimed to ensure that the Index framework incorporated the expertise of those working in the field of CVD and city-level efforts to improve health more broadly. The objectives of the expert panel were as follows:

- Help to understand the factors contributing to the global burden of CVD, including key best practices and programmes to address them.
- Support defining recommendations for the design and implementation of this.

Framework creation

The development of the Index was driven by the creation of a theoretical framework, as informed by the literature review and discussions with the expert panel. The framework was intended to be a first-of-its-kind, holistic benchmark of city-level approaches to heart health.

The top level framework includes five core domains: (1) Social Determinants, (2) Physical Environment, (3) Health Risks, (4) Health Services and (5) Governance.

Through consultation with experts and internal audits, we also explored potential indicators on the basis of their relevance, data availability and comparability. The resulting framework includes indicators and sub-indicators (25 qualitative and 19 quantitative).

For key quantitative measures where comparable, city-level data were not available, we created a set of sub-indicators including both country-level data and city-level data availability (see example). In combination, these sub-indicators were intended to assess both progress and intention.

EXAMPLE

Indicator 3.7) Obesity:

No comparable, city-level data were available on prevalence of obesity so we created two indicators which, when taken together, provide a measure of city-level efforts to address this key risk factor:

- **3.7a) Obesity: national data.** National prevalence of obesity among adults, as reported by WHO
- **3.7b) Obesity: city-level data availability.** In the last 5 years, has city-level data on obesity been collected and/or published?

The scores from 3.7a and 3.7b are combined to create a composite score for indicator 3.7: Obesity.

Additionally, data for a set of 14 background indicators were collected to allow for correlation analysis. They provide context but do not contribute to index scores. These indicators include measures of CVD burden, life expectancy and other population measures.

City selection

In this first year of the City Heartbeat Index, we analysed 50 cities from 42 countries, across six regions:

- **Africa:** Addis Ababa, Algiers, Johannesburg, Lagos, Nairobi
- **Americas:** Atlanta, Bogotá, Mexico City, New York City, San Francisco, São Paulo, Toronto
- **Eastern Mediterranean:** Cairo, Dubai, Kuwait City, Riyadh
- **Europe:** Berlin, Budapest, Helsinki, Istanbul, London, Madrid, Moscow, Paris, Rome, Vienna
- **South East Asia:** Bangkok, Colombo, Delhi, Dhaka, Jakarta, Karachi, Kathmandu, Kolkata, Mumbai, Yangon
- **Western Pacific:** Auckland, Beijing, Ho Chi Minh City, Hong Kong, Manila, Melbourne, Osaka, Phnom Penh, Seoul, Shanghai, Singapore, Sydney, Tokyo, Wuhan

Within each region, cities with the largest populations and representing a diversity of World Bank income levels were selected. Scores by both region and income level can be filtered in our interactive data dashboard.

Data collection

A total of 25 qualitative indicators were designed for this study to analyse key factors related to CVD and heart health. These indicators were scored using detailed scoring criteria. (For more details about the indicators, the scoring schema, and the score ranges, see Appendix B: Framework). Country researchers conducted the assessment for the qualitative indicators; the evidence on which the scores are based, including relevant references, is presented in our data dashboard.

The 19 quantitative indicators in the Index draw on raw data from pre-existing datasets such as the WHO Global Health Observatory, the WHO Global Health Expenditure Database, the UN Sustainable Development Goals database and other reputable third-party sources. The majority of quantitative indicators measure national data (see Framework creation, above). Specific sources are referenced in Appendix B: Framework and in our data dashboard.

Methods for estimates and data gaps

Global databases often contain gaps. Where there were missing data for recent years (up to ~5 years), we first checked for the availability of this data for earlier years (up to 10 years). When older data were available, we inputted the older data directly into the Index. When older data were not available, we used one of the following criteria as the basis for estimation:

- **Income level:** we input average figures from countries in the same income-level group, as defined by the World Bank classifications
- **Region:** we input average figures from countries in the same International Labour Organisation (ILO) region
- **Desk research:** we collected values from alternative sources and input the average or most-likely value

We chose a method from the options above based on data availability. For indicator-specific methods see Table A1.

For qualitative indicators where no data could be found from national sources or published academic literature, cities were given a score of zero. The implication of this approach is that some countries might be penalised for their lack of data reporting.

Table A1: Method of estimation used for indicators without full data available

Indicator number	Indicator name	Method
1.1a	Gini Index: national data	Income level
1.2a	Level of education: national data	Desk research
1.4	Access to healthcare	Income level
1.5	Household health expenditure	Income level
2.4a	Food insecurity: national data	ILO regions
3.1a	Tobacco use: national data	Income level
3.4a	Physical inactivity: national data	Income level
3.5a	Hypertension: national data	Income level
3.7a	Obesity: national data	Income level
5.5	CVD management guidelines	Desk research

Source: Economist Impact

Index creation

Overall scores were produced through normalising, weighting and combining the scores of all indicators.

Normalisation

All indicator scores are presented on a normalised scale, from zero (lowest possible score) to

100 (best possible score), allowing us to compare the relative performance of each city.

For all qualitative datasets where cities are scored on a stepped-scale, scores are normalised between the minimum and maximum possible values for each indicator.

EXAMPLE

Indicator 5.5) CVD management guidelines:

Cities were scored using a qualitative rating of zero (no guidelines exist) to one (guidelines exist). On the normalised scale, cities with evidence of active guidelines or standards for the management of major NCDs through a primary care approach were given a score of 100 and countries with no evidence of these guidelines were given a zero for this indicator.

Select quantitative datasets were also normalised using this method (for example, indicator 1.3a Total unemployment: national data, which is a percentage).

EXAMPLE

Indicator 1.3a) Total unemployment: National data:

Measures the percentage of the total labour force that is unemployed. On the normalised scale, cities with 0% score 100, while cities with 100% score 0.

For some quantitative datasets, scores were normalised between the minimum and maximum values observed across all cities included in the Index. We used Tukey's method to adjust for any outliers. With this method, the highest scoring city (or cities) score 100.

EXAMPLE

Indicator 1.5) Household health expenditure:

The minimum score (0.1%) is equal to zero on the normalised scale and the maximum score (8.45%) is equal to 100.

For some quantitative datasets that measure CVD risk factors, there is a recommended threshold value (either a minimum or a maximum) to reduce CVD risk. In these cases, we have normalised between 0 and the recommended value.

EXAMPLE

Indicator 3.2a) Vegetable consumption: national data:

The minimum amount of vegetables that can be consumed (0g) is equal to zero on the normalised scale and the recommended daily consumption (400g) is equal to 100. Any cities with vegetable consumption beyond 400g also score 100.

Weighting

Following normalisation, we weighted all indicators equally, regardless of their domain. However, sub indicators were each worth 50% of the overall indicator (for example, 3.1a and 3.1b are worth 50% of indicator 3.1), as described above.

Index consistency

Overall rankings and scores were calibrated in an iterative process by the Economist Impact team. This allowed us to identify and correct data anomalies. We also used tests of convergent and divergent validity between domain-specific and overall index scores and existing datasets and indices, primarily those listed as "Background Indicators" in the data dashboard.

However, the weights assigned to each domain and indicator are able to be changed to reflect different assumptions about their relative importance. This functionality in the data dashboard allows the user to apply different weights and recalculate overall scores.

Limitations

This type of index has limitations, thus it should be used only as a tool for improving understanding of individual cities' efforts to improve heart health – it is not intended to be a predictive tool. A variety of political, social and economic variables impact all cities' abilities to prevent and address CVD, and while great care has been taken to incorporate as many of these factors as possible, the indicators used in the Index are not necessarily the only relevant measures.

Appendix B: Index framework

Figure B1: Index framework

Domain 1 Social Determinants					
Indicator number	**Indicator name**	**Indicator questions/descriptions**	**Scoring scheme**	**Unit**	**Source**
1.1	Poverty and inequality				
1.1a	Gini Index: national data	What is the current Gini Index score nationally?	Quantitative indicator using existing dataset	Gini Index score	World Bank; Economist Impact estimate
1.1b	Poverty: city-level data availability	In the last 5 years, has city-level data on the population living in poverty been collected and/or published?	0 = No 1 = Yes	Rating 0-1	Economist Impact analyst rating
1.2	Education				
1.2a	Level of education: national data	What is the current proportion of the adult population that attained or completed upper secondary education nationally?	Quantitative indicator using existing dataset	%	World Bank; Economist Impact estimate
1.2b	Level of education: city-level data availability	In the last 5 years, has city-level data on educational attainment been collected and/or published?	0 = No 1 = Yes	Rating 0-1	Economist Impact analyst rating
1.3	Employment				
1.3a	Total unemployment: national data	What is the current level of unemployment among the labour force aged 15 years and over nationally?	Quantitative indicator using existing dataset	%	World Development Indicators
1.3b	Total unemployment: city-level data availability	In the last 5 years, has city-level data on unemployment been collected and/or published?	0 = No 1 = Yes	Rating 0-1	Economist Impact analyst rating
1.4	Access to healthcare	What is the current universal health coverage (UHC) service coverage sub-index on NCDs score?	Quantitative indicator using existing dataset	Index score 0-100	WHO; Economist Impact estimate
1.5	Household health expenditure	What is the proportion of the population with household spending on health greater than 25% of total household budget?	Quantitative indicator using existing dataset	%	WHO; Economist Impact estimate

Domain 2 Physical Environment					
Indicator number	**Indicator name**	**Indicator questions/descriptions**	**Scoring scheme**	**Unit**	**Source**
2.1	Air quality	What is the mean annual concentration of fine suspended particles of less than 2.5 microns in diameter (PM2.5) in urban areas?	Quantitative indicator using existing dataset	$\mu g/m^3$	WHO
2.2	Open spaces and green areas	What is the average share of the built-up areas of cities that is open space for public use for all?	Quantitative indicator using existing dataset	%	UN Habitat; Economist Impact estimate
2.3	Active transport	Does the city have infrastructure for walking (eg, provision of walking space, safe crossing points, audible signals) or cycling (eg, cycle lanes)?	0 = There is no infrastructure for walking and cycling 1 = Existence of infrastructure for cycling OR walking 2 = Existence of infrastructure for both walking and cycling	Rating 0-2	Economist Impact analyst rating
2.4	Food security				
2.4a	Food security: national data	What is the proportion of individuals nationally who have experienced food insecurity at moderate or severe levels in the reference period?	Quantitative indicator using existing dataset	%	UN SDG Indicators Database; Economist Impact estimate
2.4b	Food security: city-level data availability	In the last 5 years, has city-level data on food insecurity been collected and/or published?	0 = No 1 = Yes	Rating 0-1	Economist Impact analyst rating
2.5	Access to public transport	What is the proportion of the population within a 500 metre walking distance of a low capacity transport system (buses and trams) and/or a 1,000 metre distance of high capacity systems (train, subway, ferries)?	Quantitative indicator using existing dataset	%	UN Habitat; Economist Impact estimate
Domain 3 Health Risks					
Indicator number	**Indicator name**	**Indicator questions/descriptions**	**Scoring scheme**	**Unit**	**Source**
3.1	Tobacco use				
3.1a	Tobacco use: national data	What is the proportion of the national population aged 15 years and over who currently use any tobacco product (smoked and/or smokeless tobacco) on a daily or non-daily basis?	Quantitative indicator using existing dataset	%	WHO; Economist Impact estimate
3.1b	Tobacco use: city-level data availability	In the last 5 years, has city-level data on tobacco use been collected and/or published?	0 = No 1 = Yes	Rating 0-1	Economist Impact analyst rating

Domain 3 Health Risks (continued)					
Indicator number	**Indicator name**	**Indicator questions/descriptions**	**Scoring scheme**	**Unit**	**Source**
3.2	Vegetable consumption				
3.2a	Vegetable consumption: national data	What is the average weighted daily consumption nationally of vegetables, including fresh, frozen, canned, or dried vegetables (excluding legumes, salted or pickled vegetables, juices, nuts, seeds and starchy vegetables such as potatoes or corn)?	Quantitative indicator using existing dataset	g/day	IHME: Global Burden of Disease estimates
3.2b	Vegetable consumption: city-level data availability	In the last 5 years, has city-level data on the consumption of vegetables been collected and/or published?	0 = No 1 = Yes	Rating 0-1	Economist Impact analyst rating
3.3	Trans fats consumption				
3.3a	Trans fats consumption: national data	What is the weighted average consumption (in percent of daily energy) nationally of trans fat from all sources, mainly partially hydrogenated vegetable oils and ruminant products?	Quantitative indicator using existing dataset	% energy/ day	IHME: Global Burden of Disease estimates
3.3b	Trans fats consumption: city-level data availability	In the last 5 years, has city-level data on the consumption of foods that are high in trans fatty acids been collected and/or published?	0 = No 1 = Yes	Rating 0-1	Economist Impact analyst rating
3.4	Physical activity				
3.4a	Physical inactivity: national data	What is the proportion of the national population attaining less than 150 minutes of moderate-intensity physical activity per week, or less than 75 minutes of vigorous-intensity physical activity per week, or equivalent?	Quantitative indicator using existing dataset	%	WHO; Economist Impact estimate
3.4b	Physical activity: city-level data availability	In the last 5 years, has city-level data on physical activity or inactivity been collected and/or published?	0 = No 1 = Yes	Rating 0-1	Economist Impact analyst rating
3.5	Hypertension				
3.5a	Hypertension: national data	What is the prevalence of hypertension among adults aged 30-79 years nationally?	Quantitative indicator using existing dataset	%	WHO; Economist Impact estimate
3.5b	Hypertension surveillance: city-level data availability	Has the city conducted a recent adult risk factor survey covering raised blood pressure/ hypertension? Has the country conducted a recent national adult risk factor survey covering raised blood pressure/hypertension?	0 = No survey has been conducted 1 = Either a national survey OR a city survey has been conducted 2 = Both a city survey AND a national survey have been conducted	Rating 0-2	Economist Impact analyst rating

Domain 3 Health Risks (continued)					
Indicator number	**Indicator name**	**Indicator questions/descriptions**	**Scoring scheme**	**Unit**	**Source**
3.6	Diabetes				
3.6a	Diabetes: national data	What is the estimated prevalence of impaired fasting glucose in adults aged 20 to 79 years nationally?	Quantitative indicator using existing dataset	%	International Diabetes Foundation
3.6b	Diabetes: city-level data availability	In the last 5 years, has city-level data on diabetes been collected and/or published?	0 = No 1 = Yes	Rating 0-1	Economist Impact analyst rating
3.7	Obesity				
3.7a	Obesity: national data	What is the national prevalence of obesity among adults (BMI ≥30kg/m2; age standardised estimate)?	Quantitative indicator using existing dataset	%	WHO; Economist Impact estimate
3.7b	Obesity: city-level data availability	In the last 5 years, has city-level data on obesity been collected and/or published?	0 = No 1 = Yes	Rating 0-1	Economist Impact analyst rating
3.8	Cholesterol				
3.8a	Mean blood cholesterol: national data	What is the weighted mean blood low-density lipoprotein (LDL) cholesterol level nationally?	Quantitative indicator using existing dataset	mmol/L	IHME: Global Burden of Disease estimates
3.8b	Cholesterol: city-level data availability	In the last 5 years, has city-level data on high cholesterol been collected and/or published?	0 = No 1 = Yes	Rating 0-1	Economist Impact analyst rating
Domain 4 Health Services					
Indicator number	**Indicator name**	**Indicator questions/descriptions**	**Scoring scheme**	**Unit**	**Source**
4.1	Access to medicines	Do patients identified at risk of developing CVD have access (in terms of availability and affordability) to the essential CVD medicines as defined in the WHO EML 23rd List (2023)? Specifically, do patients have access to ANY of the antihypertensive medicines (or their alternatives), lipid-lowering agents (or their alternatives), and to the fixed-dose combinations included in the WHO EML 23rd List?	0 = Essential CVD medicines are not available or affordable 1 = Essential CVD medicines are either available OR affordable 2 = Essential CVD medicines are both available AND affordable	Rating 0-2	Economist Impact analyst rating
4.2	Hypertension diagnosis coverage	What proportion of adults aged 30-79 years with hypertension have previously received a hypertension diagnosis?	Quantitative indicator using existing dataset	%	WHO; Economist Impact estimate
4.3	Undiagnosed diabetes	What proportion of adults aged 20-79 years have undiagnosed diabetes?	Quantitative indicator using existing dataset	%	Diabetes Atlas

Domain 4 Health Services (continued)					
Indicator number	**Indicator name**	**Indicator questions/descriptions**	**Scoring scheme**	**Unit**	**Source**
4.4	Patient-centred care	Are patient-centred care models with multidisciplinary care teams to support self-management of CVD behavioural and metabolic risk factors adopted by care providers in the city (for example, mental health and lifestyle counselling by nurses, dietitians, counsellors and other allied health professionals)?	0 = No 1 = Yes	Rating 0-1	Economist Impact analyst rating
Domain 5 Governance					
Indicator number	**Indicator name**	**Indicator questions/descriptions**	**Scoring scheme**	**Unit**	**Source**
5.1	Regulatory power	Does the city have the power (autonomy) to introduce health policies addressing the major CVD risk factors that have not been introduced at national level (eg, taxation policies such as sugar taxes)?	0 = No 1 = Yes	Rating 0-1	Economist Impact analyst rating
5.2	Political will	Does the city government have a health department? Is there a clear set of responsibilities and a process for health monitoring activities? Is the city a member of any global, regional or national urban health network or initiative?	0 = No evidence of health department or involvement in urban networks +1 point for each of the following (up to a maximum of 3 points): • City membership of urban health network or initiative • There is a clear set of responsibilities and a process for health monitoring activities • Existence of city government health department	Rating 0-3	Economist Impact analyst rating

Domain 5 Governance (continued)					
Indicator number	**Indicator name**	**Indicator questions/descriptions**	**Scoring scheme**	**Unit**	**Source**
5.3	Urban health plan				
5.3a	Urban health plan: components	Is there an urban public health plan? Does the public health plan specify a budget allocated for health services and/or programmes? Is there an urban health plan for NCD or CVD (separate or a part of the general public health plan)?	0 = No plan exists +1 point for each of the following (up to a maximum of 3 points): • Urban health plan exists • The plan specifies a budget • NCD/CVD plan exists	Rating 0-3	Economist Impact analyst rating
5.3b	Urban health plan: stakeholder engagement	Have stakeholders from different sectors (eg, transport, education, retail, industry, healthcare providers and patients/general population representatives) been involved throughout the urban health plan development phase or in the process of policy development? (This could include providing input or assistance for the development or implementation of any health-related programmes or initiatives.)	0 = No 1 = Yes	Rating 0-1	Economist Impact analyst rating
5.4	Healthy diet policies	Are there any policies to reduce the impact on children of marketing of foods and non-alcoholic beverages high in saturated fats, trans-fatty acids, free sugars, or salt? Has the city/country conducted a recent (ie, in the past 5 years) adult risk factor survey covering unhealthy diet?	0 = No survey or policies exist 1 = A risk factor survey covering unhealthy diet has been conducted OR a policy on food marketing exists 2 = Both a risk factor survey covering unhealthy diet has been conducted AND a policy on food marketing exists	Rating 0-2	Economist Impact analyst rating
5.5	CVD management guidelines	Government approved evidence-based national guidelines/protocols/standards for the management of the four main NCDs – cardiovascular disease, diabetes, cancer and chronic respiratory diseases. Countries who have a "Yes" for this indicator have indicated that national guidelines/protocols/standards exist for all four NCDs (cardiovascular disease, diabetes, cancer and chronic respiratory diseases).	0 = No 1 = Yes	Rating 0-1	Economist Impact analyst rating

Domain 5 Governance (continued)					
Indicator number	**Indicator name**	**Indicator questions/descriptions**	**Scoring scheme**	**Unit**	**Source**
5.6	Treatment guidelines	Are there national or local (eg, by care provider organisations) evidence-based treatment protocols or guidelines that are focused on hypertension detection and treatment and diabetes detection and treatment?	0 = There is no evidence of guidelines' existence 1 = Evidence of hypertension guidelines existence OR diabetes guidelines existence 2 = Evidence of both hypertension guidelines existence AND diabetes guidelines existence	Rating 0-2	Economist Impact analyst rating
5.7	Tobacco control	How many measures for the following indicators have been implemented in the country and to what degree (complete, moderate, minimal, weak)? MPOWER indicators: • Monitoring tobacco use and prevention policies • Protecting people from tobacco smoke • Offer help to quit tobacco use • Warn about the dangers of tobacco • Enforce bans on tobacco advertising, promotion and sponsorship • Raise taxes on tobacco	0 = Country has not implemented any of the six measures 1 = Country has implemented one or two measures 2 = Country has implemented three or four measures 3 = Country has implemented five measures 4 = Country has implemented six measures	Rating 0-4	Economist Impact analyst rating
5.8	Air pollution control	Are there any city monitoring activities of air quality (eg, existence of monitoring stations and data collection)? Are there any city health education campaigns for shifting to clean household energy? Are there any clean city initiatives to reduce the adverse environmental impact of cities, for example, by paying special attention to air quality (eg, scheme to reduce car use)?	0 = There is no evidence of the existence of policies and initiatives to reduce air pollution +1 point for each of the following (up to a maximum of 3 points): • Existence of initiatives to reduce adverse environmental impact of cities • Existence of health education programmes for clean household energy • Existence of air pollution monitoring activities	Rating 0-3	Economist Impact analyst rating

Domain 5 Governance (continued)					
Indicator number	**Indicator name**	**Indicator questions/descriptions**	**Scoring scheme**	**Unit**	**Source**
5.9	Health promotion	Does the city have multisectoral health education policies and programmes aimed at the general public to improve behaviour, health knowledge, attitudes and skills enabling individuals to adopt healthy behaviours (healthcare, education, hospitality, media sectors)?	0 = There is no evidence of health promotion programmes 1 = Evidence of multisectoral health promotion programmes by care providers or other organisations OR evidence of multisectoral health promotion programmes set up by city authorities 2 = Evidence of multisectoral health promotion programmes by care providers or other organisations AND evidence of multisectoral health promotion programmes set up by city authorities	Rating 0-2	Economist Impact analyst rating

Source: Economist Impact

Appendix C: Full rankings in the City Heartbeat Index 2024

Figure C1: City Heartbeat Index rankings and scores

Source: Economist Impact

Rank	City	Score	Rank	City	Score	Rank	City	Score
1	Hong Kong	83.2	18	Bogotá	69.7	34	Mumbai	53.2
2	London	82.6	19	Budapest	69.5	35	Johannesburg	52.5
3	Madrid	79.6	20	Bangkok	68.8	36	Nairobi	52.2
4	New York City	79.1	21	São Paulo	67.1	37	Kolkata	51.8
5	Berlin	77.4	22	Ho Chi Minh City	66.0	38	Lagos	51.6
6	Toronto	77.0	23	Moscow	65.9	39	Phnom Penh	51.4
=7	Singapore	76.1	24	Shanghai	65.3	40	Colombo	50.1
=7	Tokyo	76.1	25	Dubai	65.0	41	Addis Ababa	49.6
9	Melbourne	75.8	26	Paris	64.5	42	Manila	48.8
10	Seoul	75.6	27	Rome	63.5	43	Karachi	44.3
11	Helsinki	75.5	28	Beijing	63.4	44	Riyadh	44.2
12	Vienna	75.1	29	Atlanta	63.1	45	Yangon	43.5
13	Osaka	74.2	--	Average score	62.4	46	Kuwait City	42.1
14	San Francisco	72.0	30	Mexico City	60.9	47	Dhaka	41.8
15	Jakarta	71.7	31	Istanbul	60.4	48	Algiers	41.0
16	Auckland	71.0	32	Wuhan	57.3	49	Kathmandu	40.9
17	Sydney	70.5	33	Delhi	56.8	50	Cairo	40.6

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