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Healthy City Assessments: Reviewing assessment tools for healthy cities

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Abstract: The built environment influences health. The Healthy Cities Movement focuses on creating healthier and more sustainable cities, including healthy urban design. This focus on health is essential in an age of climate change, urban density, and inequality where planners, developers, and communities have the responsibility to design healthy places for all. There are multiple assessment tools for healthy and sustainable cities and buildings design. However, it is unclear which health perspectives are incorporated or overlooked in these tools. This paper aims to (1) map existing assessment tools relating to urban design and health, (2) examine which health-related outcomes are incorporated, to (3) propose criteria for an assessment tool for healthy cities. The methods include a questionnaire, three semi-structured interviews with experts on healthy urban design, and analysis of recent assessment tools. The results include conceptualization of healthy design criteria. The identified criteria additionally show issues for action in urban development regarding sustainable, healthy cities. The outcome can be considered an approach to develop tools for healthier cities. Assessment tools that include holistic perspectives on health may be able to reflect upon urban health and contribute to healthy communities.

Keywords: healthy city; health-driven design; assessment tool; resilience; urban planning

1. Introduction

Predictions suggest that in 2050 70% of the world's population will live in cities (United Nations, 2019). Such global urbanization is associated with a range of health risks that affect the environment and people, both in terms of disease outbreaks and lifestyle-related issues (WHO, 2022a). The challenge is to create healthy cities that improve everyday living conditions and focus on both human health and planetary health. Urban health research examines the impact of the urban environment on human health (Corburn, 2009) and it indicates that urban planning and design can help promote both public health (WHO, 2022a) and planetary health (Corburn, 2009). Consequently, both planetary and human health and well-being are increasingly in the focus of public decision-making processes in urban planning and design (Grant et al., 2017). To stimulate the design of healthy, sustainable communities and cities and to understand the relation between urban design, human and planetary health, several assessment tools have been developed (Grant et al.,

2022; SALUS, 2021). However, these tools have different programmatic foci, and it is unclear which health objectives are considered or overlooked by each tool. This study, therefore (1) maps existing assessment tools relating to urban design and health and (2) examines which health-related outcomes are incorporated to (3) propose criteria for an assessment tool for healthy cities. The paper intends to provide inspiration and orientation for health-driven urban design and development.

2. Theories and Methods

2.1. Theories

This paper relies on several core concepts and theories, including interpretations of health, urban health challenges, determinants of health and the World Health Organization (WHO) Healthy Cities Network.

While there are multiple definitions of health there are three models according to Rohde et al. (2020), (1) medicinal, (2) holistic and (3) wellness. The *medicinal model* states that good health prevails in the absence of disease (Rohde et al., 2020). This medicinal focus on (causes of) disease is also referred to as the pathogenic approach (Sieber, 2017). The *holistic model* defines ‘health’ as proposed by the WHO in 1946 as: ‘*a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*’ (WHO, 2020, p. 1). The holistic model thus considers health as more than biophysical health but the inter-relation between emotions, mental, spiritual, and biophysical aspects. The *wellness model* is based on the salutogenic approach, including health promotion and well-being (Rohde et al., 2020; Sieber, 2017). Health can thus be considered either in terms of disease (pathogenic) or in terms of health and quality of life (salutogenic) (Antonovsky, 1979; Naidoo & Wills, 2019). These health concepts are dynamic and influenced by individual preferences and objectives and thereby often personal perspectives (Schweiker et al., 2021). Moreover, they are often used as interchangeable and without definition (Hanc, McAndrew & Ucci, 2019). According to Huber et al. (2011, p. 1), a new formulation of the definition of health is needed to address current challenges in society, namely ‘health’ as ‘*the ability to adapt and self-manage in the face of social, physical, and emotional challenges*’. Furthermore, the diverse interpretations of health can lead to contradictions in (building) design (Miedema, 2020), which raises questions about the interpretations of health in relation to healthy cities and urban design.

Cities must tackle critical global challenges in a collaborative manner, including the protection and promotion of public health (WHO & UN-Habitat, 2016). The WHO and UN-Habitat emphasize infectious (communicable) diseases (e.g. Covid-19, HIV/AIDS, tuberculosis), non-communicable diseases (NCDs, e.g. cardiovascular diseases, cancer, chronic respiratory diseases, diabetes) and injuries and violence as ‘triple threats’ to urban health (WHO & UN-Habitat, 2016, p. 21; UN-Habitat, 2021). Additionally, the burden of disease is greater in poor countries than in wealthy countries (WHO, 2010).

Individual or population health is influenced by the social, economic, and physical environment together with personal characteristics and behaviors, known as determinants of health (WHO, 2017). The social determinants of health (SDH) can be modified and are thus starting points for health promotion (WHO, 2010). The ‘HealthMap’ (Figure 1) shows the ‘urban components’ of the health determinants and sets goals for human and planetary health in a global context (Grant, 2019). Grant claims that: ‘The HealthMap is a systemic tool [and application stakeholders should treat any definitions of components as loose and all implied relationships as fluid; in each application stakeholders need to reassess the relevance of the map to their local situation’ (ibid.).

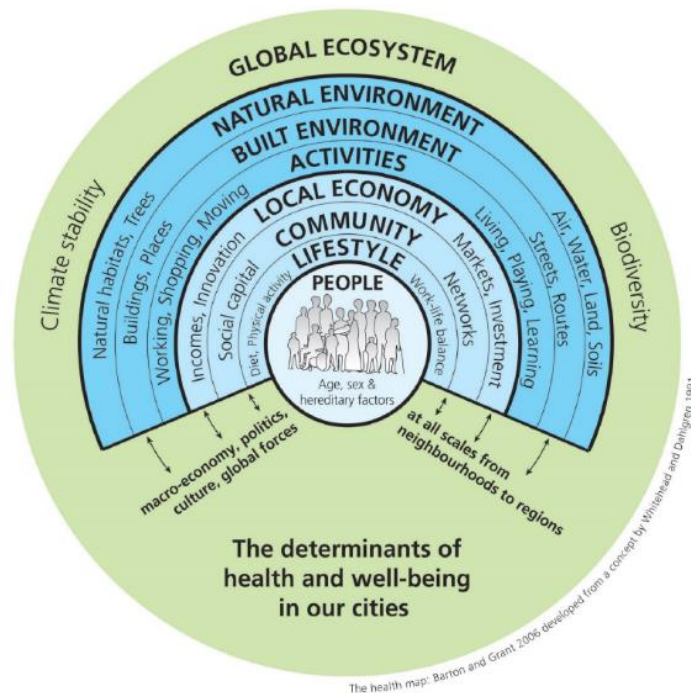


Figure 1. The HealthMap. The determinants of health and wellbeing in our cities (Barton & Grant, 2006 developed from the model by Dahlgren & Whitehead, 1991).

The WHO European Healthy Cities Network (WHO, 2022b), defines a 'healthy city' as follows:

A healthy city is one that continually creates and improves its physical and social environments and expands the community resources that enable people to mutually support each other in performing all the functions of life and developing to their maximum potential.

The healthy city is thus a continuous process, not an achievement of which a final health status can be sufficient (ibid.). According to WHO every city can become a healthy city (ibid.). First, city leaders must understand the current health conditions and be willing to continuously improve them through policies and planning. Then, to succeed, they need healthy city approach, that includes both the practices and the planning and design of urban environment (ibid.).

A rich number of assessment 'tools', or 'systems', 'certification systems', 'rating systems' (Poveda & Lipsett, 2014) for 'sustainable', or 'environmental' building, 'community' or 'neighborhood' and 'urban' or 'city' development have been developed to support and assess the implementation of sustainability in local and multi-level projects of buildings, communities and cities (Wallhagen, 2016; Lind, 2020). The first assessment tools for sustainable buildings exist on the global market since the 1990s (e.g. BREEAM, LEED) and have been complemented by assessment tools for communities and cities in the twenty-first century (ibid.). Fenner and Ryce (2008, p. 55 f.) divide assessment tools into three categories: knowledge-based tools ('manuals and information sources'), performance-based tools ('life cycle assessment and simulation tools') and building rating tools ('design checklists and credit rating calculators'). Several assessment tools provide a 'certificate' or 'label' with different quality levels (e.g. platinum, gold or silver) for a fee, assigning a quality standard to building and urban development projects, such as 'green', 'sustainable' or 'environmental' (Fuerst & McAllister, 2011; Miller et al., 2010). By specifying a set of criteria or indicators, the tools can support project and process participants in achieving sustainability goals for the construction of a building, community, or urban area. Additionally, these tools have the potential to serve as a market driver to establish sustainability in the construction industry and in environmental design (Wallhagen, 2016; Lind, 2020). For this study, the tools are collectively termed 'assessment tools'. They include certification/rating systems, guides and tools that focus on the urban scale and assess environmental, social, and economic sustainability aspects for communities or cities.

2.2. Methods

To identify criteria to be included in an assessment tool for healthy cities, the methods used for this study include (1) a questionnaire to three experts on healthy urban design, (2) semi-structured interviews with the same experts and (3) an analysis of recent assessment tools. The research design comprises of four stages: questionnaire, interviews, tool assessment and development of assessment criteria.

1. The questionnaire mixed qualitative open-ended questions (1,2,4,5,6,7) with one quantitative question (3). Participant were with three experts on healthy urban design (Table 1). The questionnaire focused on assessment tools/certification systems for healthy cities and communities, the perception of a healthy city and suggestions for assessment criteria for healthier cities.
2. Qualitative semi-structured expert interviews with the same experts (n=3) focused also on the certification of healthy cities, the perception of a healthy city and suggestions for assessment criteria for healthier cities. The interview participants were experts in healthy urban design (editor of journal) or developers of assessment tools. The selection of the experts aimed to achieve the most comprehensive picture possible on the topics of 'healthier cities' and the 'certification/assessment of healthy cities'. These experts can be characterized as specialists in their respective fields of research and practice. That is, they were expected to offer an informative contribution to the topic with their detailed, specific wealth of knowledge and experience (Schütz, 1972; Bogner, Littig & Menz, 2014).
3. Thematic analysis of assessment tools relating to urban and building design to health (n=16) focused on their definitions and dimensions relating to health (Table 3). The selection was based on a literature search with snowballing and the use of search terms such as 'health', 'urban design', 'urban planning' and 'assessment tool' or 'certification system' (or synonyms) and expert recommendations. The final selection of resources to be included in the analysis was based on the level of awareness, reputations of the publishers and authors and relevance across different country-specific situations. Eventually, only assessment tools that address the urban scale (e.g. 'neighborhood', 'community' or 'city') were included. The final 16 selected items represent a broad range of stakeholders, settlement types and cities.

Based upon the results from stage 1-3 several assessment criteria for healthy cities were developed and implemented in a reference guide. The triangulation of the results facilitated the recognition of larger structures (Groat & Wang, 2013).

3. Results

3.1. Results from questionnaire and expert interviews

The questionnaire and the expert interviews related to two main themes: certification of healthy cities and interpretations and suggestions for assessment criteria.

Table 1. Questions of the questionnaire.

No.	Question
1	Could you please introduce your educational, research and practice background?
2	How did you become interested in the combination of cities and health?
3	What certificates, labels or guidelines are you familiar or have you worked with? Please mark the appropriate boxes and/or add other. Included assessment tools: BREEAM; Blue Zones Project®; Enterprise Green Communities Certification; LEED; Living Community Challenge; One Planet Living®; STAR Community Rating System; Sustainable SITES Initiative®; WELL Building Standard®; Fitwel; Active Design Guidelines; Integrating health in urban and territorial planning; A sourcebook; Building Healthy Places Toolkit; Assembly: Civic Design Guidelines; A healthy city is an active city: a physical activity planning guide;
4	Could you tell me advantages and disadvantages of certifying healthy cities?
5	Could you explain what a healthy city is to you?
6	What criteria would you suggest using for assessing healthy cities?
7	Finally, could you recommend someone else to interview?

3.1.1. Certification of ‘healthy cities’

One expert showed that obtaining a certified healthy label enhances a location’s attractiveness to investors and can increase market value. Another pointed out that the requirements for a healthy city are defined using the criteria catalogue of a certification system and can help cities to achieve a healthy status. Certificates, labels, and guidelines can with their systems, program and recommendations serve as orientation for the assessment and development of healthy cities. According to two experts, these include, for instance, BREEAM Communities, Fitwel Community, LEED Cities and Communities, STAR Communities, the Blue Zones Project Community, and the WELL Community Standard. Additionally, two interviewees mentioned practical implementation for healthy cities design, including the NY City’s *DDC Active Design Guidelines: Promoting Physical Activity and Health in Design* (2010), *Inclusive Healthy Places. A Guide to Inclusion & Health in Public Space* (2018) by the Gehl Institute and *Integrating Health in Urban and Territorial Planning: A Sourcebook* (2020) by the UN-Habitat and World Health Organization. One expert emphasized that besides technical guides, the process to achieve the goals of a healthy city must be considered, including (1) implementation of health in all policies (HiAP), (2) health impact appraisal for urban plans and policies and (3) leadership and governance for health in cities. When applying a certification system for healthy cities, one must ensure that this system is not generic and considers regional context (ibid.).

3.1.2. Interpretations and suggestions for assessment criteria

All experts mentioned that a ‘healthy city’ strives to improve and promote the physical, social, and mental health of all residents and the environment. One mentioned ‘air quality, access to recreational public space, access to healthy food, provision of adequate health care, opportunities for social interaction’ influence public health. The same expert also refers to physical, social, and mental health as hard factors and adds sociocultural aspects for healthy cities. Another mentioned that emphasis is placed on ‘all’: ‘across all silos and from the top municipal leadership through to local civic leaders and communities, [...] for all, and in all policies’. The joint effort of ‘all’ involved is necessary for creating a healthy city (ibid.). Another mentioned that ‘all’ implies that minorities are considered and included in the planning process. The experts as combined discussed that assessing a healthy city requires criteria that:

- encompass the synthetic construct of (1) human health and (2) planetary health;
- consider the local, regional, and cultural contexts of the city; and
- include transitions between the local and global levels.

These requirements for the criteria show that each city must be considered individually according to its specific characteristics. According to one expert, a methodical approach for practice is ‘to map data on health outcomes with other urban factors. Often poor health outcomes map clearly with the lack of basic amenities such as public open space, poor air quality and access to healthy food’. The Urban Land Institute’s *Building Healthy Places Toolkit: Strategies for Enhancing Health in the Built Environment* (2015) is an expert-recommended entry point for further information on healthy cities and its components (ibid.). One mentioned that ‘[i]nformed local decisions – and responsibilities’ constitute the basis for implementing the criteria for a healthy city.

3.2. Assessment tools relating to health – An analysis

Table 3 shows an overview of the 16 selected resources, i.e. existing assessment tools, and how those relate to health. Each of these resources has been assigned a resource reference number (Ref. No.) and one of three categories (rating system (Ref. No. 1-7), design guide (Ref. No. 8-13), and toolkit (Ref. No. 14-16)) to show its application (Table 2). These categories arose from an analysis of the nature of the resources themselves to organize them in a meaningful way. To enable transparency of the search method, this study includes a search Id (snowball (n=12; Ref. No. 1, 4, 6-10, and 12-16) and expert (n=4; Ref. No. 2, 3, 5, and 11)) for each resource.

Table 2. Categories of resource developed for the assessment tools’ analysis.

Type of resource	Description
Rating system	Comprehensive assessment method with certification option
Design guide	Guide for the design process with arguments and instructions for implementation

Toolkit

Set of tools with evidence and information
for practical action

Table 3. Assessment tools' analysis.

<u>Ref. No.</u>	<u>Resource</u>	<u>Description</u>	<u>Mentioned requirements relating to health</u>
1	Blue Zones, LLC. (2008–2021). <i>Blue Zones Project®. Life Radius®</i>	<p>The Blue Zones Project® community provides strategies for improving public health at neighborhood and city scales. The rating system is based on the research of Dan Buettner and a National Geographic team who studied places worldwide – called Blue Zones – where people tend to live long lives. From the evidence-based lessons of longevity, Blue Zones developed the Power 9: move naturally, purpose, down shift, 80% rule, plant slant, wine at five, belong, loved ones first and right tribe.</p> <p>Keywords: community; health; longevity</p>	<p>Life Radius®</p> <ul style="list-style-type: none"> • <u>The built environment</u>: Improving roads and transportation options, parks, and public spaces • <u>Municipal policies and ordinances</u>: Promoting activity and discouraging junk food marketing and smoking • <u>Restaurants, schools, grocery stores, faith-based organizations, and workplaces</u>: Building healthier options into the places people spend most of their time • <u>Social networks</u>: Forming and nurturing social groups that support healthy habits • <u>Habitat</u>: Helping people design homes that nudge them into eating less and moving more • <u>Inner selves</u>: Encouraging people to reduce stress, find their purpose, and give back to the community
2	BRE, Building Research Establishment Ltd. (2012). <i>BREEAM Communities technical manual. SD202 – 1.2.</i>	<p>BREEAM Communities International Technical Standard aims to integrate sustainable design into large-scale development plans for new neighborhoods or regenerative projects. Projects' performances are assessed through five categories: governance, social and economic wellbeing, resources and energy, land use and ecology, and transport and movement.</p> <p>Keywords: community; sustainability</p>	<ul style="list-style-type: none"> • <u>Social wellbeing</u>: Demographic needs and priorities; Housing provision; Delivery of services, facilities, and amenities; Public realm; Utilities; Green infrastructure; Local parking; Local vernacular; Inclusive design • <u>Environmental conditions</u>: Flood risk assessment; Noise pollution; Microclimate; Adapting to climate change; Flood risk management; Light pollution • <u>Resources and energy</u>: Transport carbon emissions • <u>Land use and ecology</u>: Ecology strategy; Land use; Water pollution; Enhancement of ecological value; Landscape • <u>Transport and movement</u>: Transport assessment; Safe and appealing streets; Cycling network; Access to public transport; Cycling facilities; Public transport facilities
3	Center for Active Design, Inc. (2020). <i>Fitwel Community Scorecard (CM)</i> .	<p>Fitwel Community is an assessment and optimization tool for health promotion in neighborhood-scale projects. Fitwel provides two different options for scoring in design and building. This rating system focuses on improving the mental and physical well-being of communities. Fitwel's seven health impact categories are as follows: impacts surrounding community health, reduces morbidity and absenteeism, supports social equity for vulnerable populations, instills feelings of well-being, enhances access to healthy foods, promotes occupant safety and increases physical activity. The rating system is in the pilot phase.</p> <p>Keywords: neighborhood; health promotion</p>	<p>Fitwel Community Scorecards:</p> <ul style="list-style-type: none"> • <u>Community Composition and location</u>: Land use; Pedestrian network; Community destinations; Open space access; Transit access; Efficient parking; Infill Development; Brownfield remediation; Open space; Project location • <u>Site access</u>: Safe Street infrastructure; Universal accessibility; street lighting; Bike lanes; Bike share; Bike parking; Transit stops; Street trees; Wayfinding • <u>Community open space - Design</u>: Natural elements; Trails and greenways; Playgrounds; Outdoor fitness area; Community gardens; Restorative Garden; Flexible seating; Noise mitigation; Park and plaza lighting • <u>Community open space - Entrances</u>: Tobacco- and Smoke-free signage; Main pedestrian entrance • <u>Community open space - Management</u>: Inclusive open space; Maintenance plan; Integrated pest management; Open space programming; Public art • <u>Outdoor environment</u>: Tobacco- and Smoke-free outdoor spaces; air quality; water quality; Heat Island mitigation • <u>Community Assets</u>: Arts and culture venue; Healthcare facility; Child-care Facility; Community information; Streetscape events; Temporary placemaking plan • <u>Water and restroom access</u>: Universally accessible water supply; Restroom access • <u>Prepared food areas</u>: Grocery and food markets; Healthy food retail; Local produce; food quality • <u>Community resiliency</u>: Community engagement

<u>Ref. No.</u>	<u>Resource</u>	<u>Description</u>	<u>Mentioned requirements relating to health</u>
4	DGNB GmbH (2020). <i>DGNB System Districts Criteria Set. Version 2020.</i>	A rating system assessing and promoting urban districts, business districts, commercial areas, event areas and industrial sites regarding sustainability in urban development. Explains how the integrated criteria can contribute to achieving international sustainable development goals. The structure of the DGNB system for districts includes five subject areas: environmental quality, economic quality, sociocultural and functional quality, technical quality, and process quality. Keywords: sustainability; community	<ul style="list-style-type: none"> • <u>Environmental quality</u>: Pollutants and hazardous substances; Urban climate; Land use; Biodiversity • <u>Sociocultural and functional quality</u>: Thermal comfort in open space; Open space; Workplace comfort; Noise, exhaust, and light emission; Barrier-free design; Urban design; Social and functional mix; Social and commercial infrastructure • <u>Technical quality</u>: Resource management; Smart infrastructure; Mobility infrastructure - Motorised transportation; Mobility infrastructure - pedestrians and cyclists • <u>Process quality</u>: Participation; Governance; Safety concepts; Construction site/construction process
5	IWBI, International WELL Building Institute (2021). <i>WELL Community Standard.</i>	The WELL Community Standard aims to promote the health and well-being of people at a neighborhood scale and to create inclusive, integrated, and resilient communities. The development of the standard is based on evidence-based medical and scientific research. IWBI follows five principles to achieve the goals of the WELL Community Standard: evidence-based, broadly relevant, equitable, transparently developed, and resilient. The rating system is in the pilot phase. Keywords: neighborhood; public spaces; public health; resilience; inclusion	The WELL Community Standard is organized into ten concepts: <ol style="list-style-type: none"> 1. Air 2. Water 3. Nourishment 4. Light 5. Movement 6. Thermal Comfort 7. Sound 8. Materials 9. Mind 10. Community
6	STAR Communities (2016). <i>Technical Guide to the STAR Community Rating System Version 2.0.</i>	STAR aims to help communities achieve their local goals regarding the economic, environmental, and social aspects of sustainability. This rating system measures sustainability in eight goal areas: the built environment, climate and energy, economy and employment, education, arts, and community, equity and empowerment, health and safety, natural systems, and innovation and process. Keywords: sustainability; locality; community; equity; participation	<ul style="list-style-type: none"> • <u>Built environment</u>: Ambient noise & light; Community water systems; Compact and complete communities; Housing affordability; Infill and redevelopment; Public parkland; Transportation choices • <u>Climate and energy</u>: Climate adaption; Waste minimization • <u>Education, arts, and community</u>: Arts and culture; Community Cohesion; Educational Opportunity and attainment; Historic preservation; Social and cultural diversity; Aging in the community • <u>Equity and empowerment</u>: Civic Engagement; Civil and human rights; Environmental justice; Equitable services and access; Human services; Poverty prevention and alleviation • <u>Health and safety</u>: Active living; Community health; Emergency management and response; Food access and nutrition; Health systems; Hazard Mitigation; Safe communities • <u>Natural systems</u>: Green infrastructure; Biodiversity and invasive species; Natural resource protection; Outdoor air quality; Water in the environment; Working lands • <u>Innovation and process</u>: Local innovation
7	U.S. Green Building Council (2021). <i>LEED v4.1 Cities and Communities Existing. Getting started guide for beta participants.</i>	LEED for Cities and Communities evaluates the sustainability and quality of life in a city or community. This tool measures sustainability using nine categories: the integrative process, natural systems and ecology, transportation and land use, water efficiency, energy and greenhouse gas emissions, materials and resources, quality of life, innovation and regional priority. Beyond the program for existing cities and communities, there is an option for projects in the planning and design phase. Keywords: sustainability; life-quality; city; community	<ul style="list-style-type: none"> • <u>Natural systems and ecology</u>: Ecosystem Assessment; Construction activity; Pollution prevention; Green spaces; Credit natural resources; Conservation and restoration; Light pollution reduction; Resilience planning • <u>Transportation and land use</u>: Compact; Mixed use and transit oriented development; Walkability and bikeability; Access to quality transit; Alternative fuel vehicles; Smart mobility and transportation policy; High priority site • <u>Water efficiency</u>: Water access and quality; Stormwater management • <u>Energy and greenhouse gas emissions</u>: Low carbon economy • <u>Materials and resources</u>: Solid waste management • <u>Quality of life</u>: Demographic assessment; Social infrastructure; Affordable housing; Public health; Emergency management and response • <u>Innovation</u> • <u>Regional priority</u>

<u>Ref. No.</u>	<u>Resource</u>	<u>Description</u>	<u>Mentioned requirements relating to health</u>
8	ISGlobal, Barcelona Institute for Global Health (2018). <i>5 Keys to Healthier Cities</i> .	ISGlobal provides an interactive report with five key strategies for creating healthy, and sustainable cities. This guide contains a broad overview of each strategy, design recommendations and references. Keywords; public health; urban health;	5 Keys to Healthier Cities: • Air • Noise • Natural spaces • Physical activity • Temperature
9	Center for Active Design, Inc. (2018). <i>Assembly: Civic Design Guidelines: Promoting Civic Life Through Public Space Design</i> .	The Assembly Guidelines provide evidence-based design and strategies for public spaces to create healthy, socially strong communities. The aim is to develop civic life in which people trust each other, work together and cultivate confidence in their local institutions. Keywords: public space; community; social connectivity	Eight Civic Design Guidelines: 1. <u>Enhance community connections</u> : Put pedestrian needs first; Expand transportation options; Diversify land use 2. <u>Prioritize maintenance</u> : Mitigate litter; Clean up vacant lots; Maintain what matters most 3. <u>Incorporate nature</u> : Improve with trees and plantings; Encourage community gardening; Celebrate unique natural assets 4. <u>Celebrate community identity</u> : Use local arts to inspire and engage; Connect diverse local cultures; Preserve and repurpose historic assets; Showcase local food 5. <u>Make public spaces welcoming</u> : Create welcoming entrances; Use positive messaging; Make navigation intuitive 6. <u>Make public spaces comfortable</u> : Provide seating options; Illuminate public spaces and buildings; Provide water and restrooms; Tailor design to local climate 7. <u>Make space for activity</u> : Provide space for programming and events; Support informal interactions; Reclaim underutilized infrastructure 8. <u>Foster local democracy</u> : Improve voting access and awareness; Increase access to community information; Elevate the visibility of local government; Support community-driven design processes
10	DDC, Department of Design and Construction et al. (2010). <i>Active Design Guidelines: Promoting Physical Activity and Health in Design</i> .	The Active Design Guidelines provide design strategies promoting physical activity and health, based on strong, emerging research evidence and best practices in the field. Keywords: urban spaces; health promoting city; physical activity; obesity; walking; active travel	Five “D” variables for analyzing the relationship between urban design and active modes of travel: Density, diversity, design, destination accessibility and distance to transit. Checklist Urban Design: 1. Land use mix 2. Transit and parking 3. Parks, open spaces, and recreational facilities 4. Children’s play areas 5. Public plazas 6. Grocery stores and fresh produce access 7. Street connectivity 8. Traffic calming 9. Designing pedestrian pathways 10. Programming streetscapes 11. Bicycle network and connectivity 12. Bikeways 13. Bicycling infrastructure
11	Gehl Institute (2018). <i>Inclusive Healthy Places. A Guide to Inclusion & Health in Public Space: Learning Globally to Transform Locally</i> .	A participatory resource and reference document to help assess and create inclusive, healthy public spaces that promote health equity; includes four guiding principles for designing and evaluating public space projects: context, process, design, and program, and sustain. This framework is flexibly applicable to local user needs and various urban scales Keywords: equity; inclusion; health; public spaces	1 - <u>Context</u> : Recognize community context by cultivating knowledge of the existing conditions, assets, and lived experiences that relate to health equity. 2 - <u>Process</u> : Support inclusion in the processes that shape public space by promoting civic trust, participation, and social capital. 3 - <u>Design and program</u> : Design and program public space for health equity by improving quality, enhancing access and safety, and inviting diversity. 4 - <u>Sustain</u> : Foster social resilience and the capacity of local communities to engage with changes in place over time by promoting representation, agency, and stability.
12	Transport for London (2017). <i>Guide to the Healthy Streets Indicators. Delivering the</i>	The Healthy Streets Approach focuses on residents and health in urban planning and development. This guide contains ten indicators for assessing and creating healthy, safe and inclusive streets. Keyword: healthy street	Indicators of a Healthy Street (human experience): 1. People choose to walk, cycle and use public transport 2. Pedestrians from all walks of life 3. Easy to cross 4. People feel safe 5. Things to see and do 6. Places to stop and rest

<u>Ref. No.</u>	<u>Resource</u>	<u>Description</u>	<u>Mentioned requirements relating to health</u>
		<i>Healthy Streets Approach.</i>	7. People feel relaxed 8. Not too noisy 9. Clean air 10. Shade and shelter
13	UN-Habitat & WHO (2020). <i>Integrating Health in Urban and Territorial Planning: A Sourcebook.</i>	<p>Comprehensive overview of urban and cross-sectoral health and includes practical guidance on incorporating health into urban planning and governance to support the integration and implementation of the UNs' New Urban Agenda, which sets global standards for sustainable urban development. Additionally, the sourcebook describes synergistic effects that an integrated health approach to urban development can have on various issues, such as housing, transport, and energy.</p> <p>Keywords: urban planning; urban health; urban health services</p>	<p>Public Health:</p> <ul style="list-style-type: none"> • Protect from harm: Air pollution, noise disturbance and exposure to risk • Promote health: Everyday physical activity, food access and inclusion • Provide services: Accessible nearby facilities and amenities <p>Fostering sustainable urban and territorial planning qualifiers:</p> <ol style="list-style-type: none"> 1. Planning more compact places 2. Planning more socially inclusive places 3. Planning better connected places 4. Planning places that are more resilient to climate change and natural disasters 5. Institutionally integrated planning <p>12 Recommendations for addressing equity and health inequality with implications for urban and territorial planning and design:</p> <ul style="list-style-type: none"> • Achieving equity in political, social, cultural and economic structures • Protecting the natural environment, mitigating climate change and respecting relationships to land • Recognize and reverse health equity impacts of ongoing colonialism and structural racism • Equity from the start – early life and education • Decent work • Dignified life at older ages • Income and social protection • Reducing violence for health equity • Improving environment and housing conditions • Equitable health systems • Governance arrangements for health equity • Fulfilling and protecting human rights <p>Four dimensions of planning for health:</p> <ol style="list-style-type: none"> 1: Basic planning and legislative standards to avoid risk to health 2: Planning codes to limit environments that detract from healthy lifestyles or exacerbate inequality 3: Spatial frameworks to enable healthier lifestyles 4: Urban and territorial processes to capture multiple co-benefits of “building in” health
14	Project for Public Spaces, Inc. (2016). <i>The Case for Healthy Places: Improving health outcomes through placemaking.</i>	<p>The Case for Healthy Places contains five broad action areas and case studies aimed at encouraging healthy placemaking for people. This toolkit includes evidence that demonstrates the benefits of good placemaking for physical, mental and social health.</p> <p>Keywords: public place; health; place-making; participation</p>	<p>Healthy placemaking through:</p> <ul style="list-style-type: none"> • Social support & interaction • Play & active recreation • Green & natural environments • Healthy food • Walking & biking
15	Urban Land Institute (2015). <i>Building Healthy Places Toolkit: Strategies for Enhancing Health in the Built Environment.</i>	<p>Evidence-based design recommendations for healthy places for people and communities, including additional references.</p> <p>Keywords: health promotion; urban design; public spaces</p>	<p>Ten Principles for Building Healthy Places: Put people first; recognize the economic value; empower champions for health; energize shared spaces; make healthy choices easy; ensure equitable access; mix it up; embrace unique character; promote access to healthy food; and make it active.</p> <p>Evidence-Based Recommendations:</p> <ol style="list-style-type: none"> 1. Incorporate a mix of land uses 2. Design well-connected street networks at the human scale 3. Provide sidewalks and enticing, pedestrian oriented streetscapes 4. Provide infrastructure to support biking 5. Design visible, enticing stairs to encourage everyday use

<u>Ref. No.</u> <u>Resource</u>	<u>Description</u>	<u>Mentioned requirements relating to health</u>
		6. Install stair prompts and signage 7. Provide high-quality spaces for multigenerational play and recreation 8. Build play spaces for children 9. Accommodate a grocery store 10. Host a farmers market 11. Promote healthy food retail 12. Support on-site gardening and farming 13. Enhance access to drinking water 14. Ban smoking 15. Use materials and products that support healthy indoor air quality 16. Facilitate proper ventilation and airflow 17. Maximize indoor lighting quality 18. Minimize noise pollution 19. Increase access to nature 20. Facilitate social engagement 21. Adopt pet-friendly policies
16	WHO, Western Pacific Region (2015). <i>Healthy Cities. Good health is good politics. Toolkit for local governments to support healthy urban development.</i> Considerations for developing and applying Healthy Cities (approach) to support the efforts of local leaders; actions a city can take to improve and promote health and includes resources and case studies. For assessing health inequalities and identifying social determinants, Chapter 4 presents different tools, such as the Urban Health Equity Assessment and Response Tool (HEART), the Health Lens Analysis, the Health Impact Assessment (HIA) or a rapid Equity-Focused Health Impact Assessment (EFHIA). Keywords: health impact assessment; urban health	Path to a healthy city: 1. Sidewalks 2. Benches 3. Trees and flowers 4. Street closures 5. Bicycle lanes 6. Public transport 7. Traffic light, speed bumps and raised pedestrian crossings 8. Pedestrian islands 9. Street lightning 10. Signage 11. Waste management 12. Smoke-free indoor and outdoor environments 13. Shops or stands fresh food, fruit, and vegetables 14. Community health centres 15. Community centres and spaces

3.3. Conceptualizing assessment criteria for healthy cities

Based on the analysis of the 16 resources relating to health (see Section 3.2.), 20 assessment criteria for healthy cities were extracted (Table 4). The 20 individual criteria were found in the 16 resources. Each identified criterion is assigned to a category and indicates the resources on which the assumption is based. The categories include transport (1), program (2), access (3), and human and planetary health (4). Additionally, exemplary implementations from assessment tools' analysis for urban design are provided. A cross (x) indicates which target group (individual, local community and/or city) is affected by the assessment criterion. The assessment criteria are intended to promote physical activity, health equity, diversity and resiliency and need to be accessible and inclusive for all.

Listed in order of frequency of mention in the resources, the identified assessment criteria are: Access to nature (12); Public open space (11); Walkability (11); Bikeability (10); Public participation (10); Access to healthy food (10); Access to public transport (9); Noise mitigation (9); Health services and safety (8); Outdoor air quality (8); Access to drinking water (7); Housing provision (5); Maintenance (5); Light pollution (5); Natural resources (5); Thermal comfort (5); Arts and culture (4); Parking (4); Smoke-free environment (4); Land use mix (3).

Table 4. Assessment criteria for healthy cities.

<u>Category</u>	<u>Assessment criterion built from assessment tools' analysis</u>	<u>Ref. No.</u>	<u>Implementation examples from assessment tools' analysis</u>	<u>Individual</u>	<u>Local community</u>	<u>City</u>
Transport	Walkability	2,3,4,5,7,8,10,12,14,15,16	Safe street infrastructure (e.g. street lightning, street closures and bike lanes); Improved wayfinding (e.g. signage and street connectivity); Street trees; Pedestrian islands; Traffic light, speed bumps and raised pedestrian crossings; Benches; Places to stop and rest; Clean air; Well-connected street networks at the human scale; Sidewalks and enticing, pedestrian oriented streetscapes; Visible, enticing stairs; Install stair prompts and signage; Traffic calming; Programming streetscapes; Universal accessibility (barrier-free design);	x	x	
	Bikeability	2,3,4,5,7,8,10,14,15,16	Bicycle infrastructure; Bikeways; Bike lanes; Bicycle network and connectivity; Cycling facilities; Bike share; Bike parking;	x	x	x
	Access to public transport	1,2,4,6,7,9,12,13,16	Public transport facilities; Transit stops; Improving roads and transportation options; Mixed use and transit oriented development; Access to quality transit; Alternative fuel vehicles; Smart mobility and transportation policy; High priority site;	x	x	x
Program	Public open space	1,2,3,4,9,10,11,13,14,15,16	High-quality spaces for multigenerational play and recreation; Children's play areas; Playgrounds; Recreational facilities; Outdoor fitness area; Seating options; Park, plaza and building lightning; Main pedestrian entrance; Welcoming entrances; Intuitive navigation; Open space programming; Public art; Water and restrooms; Tailor design to local climate; Provide space for programming and events; Support informal interactions; Reclaim underutilized infrastructure; Demographic Assessment;	x	x	x
	Public participation	1,3,4,5,6,11,13,14,15,16	Improve voting access and awareness; Increase access to community information; Elevate the visibility of local government; Support community-driven design processes; Provide community centres; Foster social and civic engagement; Civil and human rights; Environmental justice; Social networks;	x	x	x
	Health services and safety	2,3,4,6,7,11,13,16	Emergency management and response; Health centres; Utilities; Healthcare facility; Childcare Facility; Communication and public information; Health systems; Safety concepts;	x	x	x
	Housing provision	2,3,6,7,13	Housing affordability; Infill and redevelopment; Use materials and products that support healthy indoor air quality;	x	x	x
	Maintenance	3,6,7,9,16	Maintenance plan; Litter mitigation; Clean vacant lots; Waste management; Brownfield remediation; Integrated pest management;	x	x	x
	Arts and culture	2,3,6,9	Arts and culture venue; Social and cultural diversity; Connect diverse local cultures; Preserve and repurpose historic assets; Showcase local food; Local vernacular; Streetscape events; Historic preservation;	x	x	x
	Parking	2,3,6,10	Public parkland; Efficient parking; Local parking;		x	x
	Smoke-free environment	1,3,15,16	Tobacco- and Smoke free signage; Ban on tobacco advertising;	x	x	
	Land use mix	7,10,15	Incorporate a mix of land uses;		x	x

Access	Access to nature	1,2,3,5, 6,7,8,9, 10,14, 15,16	Green, blue and natural spaces; Trees, flowers and plantings; Community garden; Restorative garden; Parks; Trails and greenways; Celebrate unique natural assets; Water in the environment;	x	x	
	Access to healthy food	1,3,5,6, 9,10,13, 14,15, 16	Grocery stores; Food markets; Shops or stands fresh food, fruit and vegetables; Healthy food retail; Local produce; Restaurants; Community gardening and farming; Food quality;	x	x	x
	Access to drinking water	2,3,5,6, 7,9,15	Community water systems; Water dispenser; Water pollution prevention;	x	x	x
Human and planetary health	Noise mitigation	2,3,4,5, 6,8,12, 13,15	Noise management;	x	x	x
	Outdoor air quality	3,4,5,6, 8,12,13, 15	Reduce air pollution; Reduce exhaust and transport carbon emissions; Alternative fuel vehicles;	x	x	x
	Light pollution	2,4,5,6,7	Ambient light;	x	x	x
	Natural resources	2,4,6,7, 13	Climate change adaption; Hazard mitigation (e.g. flood risk and stormwater assessment and management); Natural resource protection; Biodiversity and invasive species;	x	x	x
	Thermal comfort	3,4,5,8, 12	Facilitate proper ventilation and airflow; Heat Island mitigation; Shade and shelter;	x		x

4. Discussion

The following section evaluates the main results and findings from the expert interviews and the analysis of the assessment tools and highlights three key learnings.

Outcome 1: Different interpretations of health and a lack of transparency

A variety of assessment tools relate to public health on an urban scale. These tools are based on various interpretations of health (see also Section 2) and sustainability, which must be discussed and evaluated in an application case (certification process). For instance, the BREEAM Communities' criteria catalogue favors assigning aspects of health protection (pathogenic approach), whereas the Life Radius of the Blue Zones Project addresses health promotion (salutogenic approach). Following Section 2 and the 1946 WHO definition of health, 9 out of 16 assessment tools analyzed (see Section 3.2., Ref. No. 1, 3, 5, 6, 9, 11, 13, 14 and 15) contain criteria displaying a holistic approach to physical, social and mental health. Therefore, these tools can support a positive, salutogenic approach to health.

Furthermore, it is not clear to what extent these different assessment tools are built on evidence-based medical and scientific research. In the same vein, one may wish to know what sources, information and studies are used for developing the assessment tools and whether these tools are (freely) accessible and comprehensible. One example of user-friendliness and a transparent approach to the strength of evidence is the NY City's DDC *Active Design Guidelines: Promoting Physical Activity and Health in Design* (2010). For each design strategy, the Guidelines indicate whether it is based on strong evidence, emerging evidence or best practice, including source references (ibid).

Outcome 2: Certification systems – the purpose can differ

The results from the expert interviews provide an opportunity to discuss the role of certification systems in urban development and the related development of 'healthy cities'. The quality of these certification systems varies due to the definition and interpretation of the concept of health and the comprehension of sustainability, which is reflected in different criteria catalogues. Therefore, individual programmatic focal points should be critically reviewed. Additionally, it is questionable which intentions and goals the certificate developers and a city must pursue to obtain a healthy city certificate and whether these meet the local requirements regarding the well-being of the city's residents and global sustainability. One expert explained that a certification process facilitates 'political gaming' and 'with a poor scheme the criteria are met merely as numeric targets, and not in spirit'. Moreover, there is a danger that the weighted scoring of the criteria in the certification process can be manipulated for the better and that alternatives to the weighting are required as a result (ibid.; Grant & Barton, 2013).

One expert mentioned that critical engagement leads to the core idea that the center of decision-making should ideally be the health and common good of residents and the environment rather than the profitability of cities. However, according to another expert, as with realism, capitalism favors market-oriented decisions. Thus, what matters is effectiveness. That is, if a healthy cities certification system ultimately contributes to the health promotion of residents and sustainability for the benefit of the environment, the certification process has served its purpose. Thus, such a system can contribute to the solution on the path to creating healthy cities.

Outcome 3: Salutogenic approach for healthy or health-promoting cities

The difference between a pathogenic and salutogenic approach to public health are theoretically clear, while practically more intertwined (Bauer, Davies & Pelikan, 2006). Still, both approaches are needed and should be incorporated in city design. Healthy cities movement needs to support and encourage individuals and communities to develop healthy behaviors through both extrinsic and intrinsic motivations. This study corresponds to the WHO's (2022b; see Section 2) definition of a healthy city, which does include both of those perspectives.

5. Conclusions

This study highlighted possibilities to facilitate health promotion in cities through urban spatial design and planning, and assessment tools for urban development. The work included an overview of urban health issues and relevant considerations for using assessment tools. Findings on the thematic field of healthy city provide insight into the current state of research and offer incentives for further research and discussions. Thus, this section comprises a summary and considerations for future work.

The study at hand analyzed which assessment criteria must be considered in healthy cities' objective and development planning and identified the obstacles and benefits that assessment tools offer to create healthy cities. The study highlighted the current state of science and discussions about healthy cities and raised awareness and clarified the importance of health promotion through urban spatial planning and development. These findings additionally highlight that engagement in the design of the built environment can contribute to healthier, more equitable societies.

The criteria identified here indicate a need for action in urban development to create sustainable, healthy cities. This outcome can be considered an approach to develop tools for healthier cities. For this study, a limited number of assessment tools (n=16) and the number of interviews (n=3) were used to determine the assessment criteria, influencing the results, and enabling the supplementation of further criteria. Moreover, the study promoted a better understanding of current application-related assessment tools for urban development and their health requirements to explore the framework in which they can contribute to healthier cities. Various perspectives were gathered to provide solutions for the development of healthy cities. Building structures and establishing processes that prioritize health in all policies (HiAP) is key to creating healthy cities. Thus, health promotion through urban planning should be a political process, involving a multitude of decision-makers responsible for developing sustainable, healthy cities.

Contributor statement

Conceptualization: SS and EM with feedback from the others

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Figure

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Tables

All tables are created by the author (SS).