

**From Risk to Resilience: Restructuring Urban India's Built
Environment to Alleviate NCD Burden - A Systematic Literature
Review & Policy Analysis**

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Acknowledgement

"Gratitude can transform common days into thanksgivings, turn routine jobs into joy, and change ordinary opportunities into blessings," by William Arthur Ward

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Abstract

Background: The built environment encompasses urban design/ urban form, transportation, green spaces, air quality, walkability, and the food environment. All these components play a crucial role in contributing to noncommunicable diseases (NCDs), including their risk factors such as physical inactivity, unhealthy diets, and exposure to air pollution. This study explores the association between built environment components and NCDs through a systematic literature review in the global context, followed by a policy analysis of the existing policies in India from various sectors to identify whether they address NCDs or not.

Methodology: In the first part, data for the systematic literature review (SLR) were collected through a transparent process involving multiple electronic databases, 249 records from PubMed, 531 from Scopus, and 270 from Embase. The search strategy was developed by using relevant keywords mainly related to the built environment and NCDs, such as “urban form,” “green space”, “food environment,” “NCD,” “Physical activity,” “BMI”, “association”, and “policy” in alignment with the aim & objectives of the SLR and eligibility criteria. In the second part, a detailed policy analysis was carried out using Walt & Gilson's (1994) triangle to identify the existing status of the policies (whether they address NCDs) across various sectors, such as health, transportation, food, and urban planning.

Results & Conclusion: Final inclusion of 49 studies that analysed the relationship between the built environment and non-communicable diseases (NCDs), along with a separate review of 7 articles regarding the global policy landscape, was carried out. The SLR, on one hand, has provided the synthesis of data that exists worldwide as well as in the Indian context, revealing significant correlations between improved built environments, mainly the availability of green spaces and well-structured urban form components, and their contribution towards reducing the NCDs and their related risk factors.

On the other hand, the policy analysis has highlighted the partial policy coherence, weak integration, and persistent gaps across sectors and ministries on multisectoral collaboration across the country.

The analysis addresses a significant knowledge deficiency by delineating both the epidemiological evidence and the degree to which present Indian urban policies engage with (or neglect) these drivers of NCDs.

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List of Abbreviations:

1. AMRUT - Atal Mission for Rejuvenation and Urban Transformation
2. BMI - Body Mass Index
3. CVD - Cardiovascular Diseases
4. FSSAI - Food Safety and Standards Authority of India
5. HiAP – Health in All Policies
6. HIA – Health Impact Assessment
7. KPI - Key Performance Indicators
8. NCDs - Non-Communicable Diseases
9. NDVI - Normalized Difference Vegetation Index
10. NP-NCDs - National Program for Prevention and Control of NCDs
11. NUHM - National Urban Health Mission
12. NMAP - National Multisectoral Action Plan
13. NCAP - National Clean Air Program
14. MoHUA - Ministry of Housing and Urban Affairs
15. SDG - Sustainable Development Goal
16. SCM - Smart City Mission
17. WHO - World Health Organization

1. Introduction

The World Health Organization (WHO) defines health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (1). Do we ever contemplate the environmental influences that influence our health in our daily lives? The environment where we reside, the air we inhale, the food we consume, and the area where we live and spend our lives, in other words, our built environment.

The built environment encompasses urban design/ urban form, transportation, green spaces, air quality, infrastructure, and the food environment. All these components play a crucial role in contributing to the risk factors for noncommunicable diseases (NCDs), including physical inactivity, unhealthy diets, and exposure to air pollution (2).

Research on the relationship between the built environment and NCDs has emerged as a critical area of study because of its significant implications for public health and urban sustainability. This field also has a few previous explorations of neighbourhood effects on physical activity, obesity, and cardiovascular effects. A few well-structured frameworks that integrate environmental exposures and health behaviours are also in place, but they lack implementation during the urban planning process. (3)(4).

Several factors mentioned above are beyond an individual's control and are influenced by existing urban planning policies. If these policies are regulated during the design, development, and management of the built environment for an individual's daily life, it can help to decrease health risks, NCD rates, and health inequities (5).

In developing countries urbanization is taking place at an accelerated pace, which presents an opportunity and a dire need to guide urbanization and other major urban development trends in a way that safeguards and enhances health. In India, by 2036, the towns and cities will cater 600 million people, or 40% of the population. Thus, constructing the right infrastructure will be very important for making communities that are liveable, climate-resilient, and support the

health and well-being of citizens (6). The growth of cities without planned infrastructure to facilitate healthy lifestyle choices constrains opportunities for improved public health (5).

In low and middle-income countries (LMICs) where urbanization is rapid and health systems are strained, there is limited integration and evaluation of policies targeting built environment factors to mitigate NCDs and related risk factors (7)(8). Despite the proliferation of policies at global, national, and municipal levels, gaps remain in policy implementation, multisectoral collaboration, and the inclusion of health equity considerations (9).

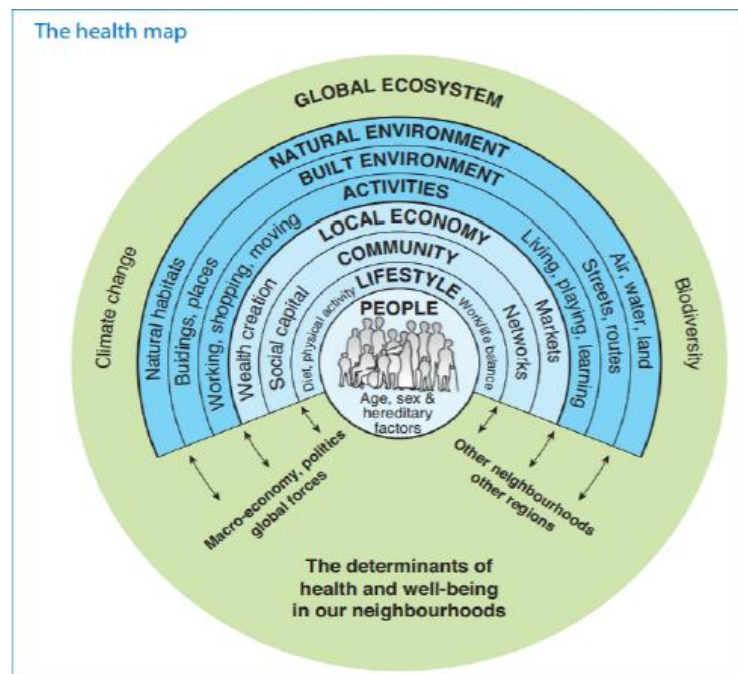


Fig. 1. The Health Map (Barton and Grant 2006, developed from a model by Dahlgren and Whitehead, 1991)

The conceptual framework given by Barton et al has defined the built environment as the physical urban setting which encompasses land use, transportation systems, housing design, and green infrastructure. These physical components interact with the social and behavioural determinants and lead to health outcomes, whether good or bad (10).

This health map explains a multi-layered framework to understand the relationship between various determinants, which range from individual lifestyle factors to community settings and reach up to the global level. This highlights the critical issue of focusing on upstream and systemic factors, illustrated in the picture above, like urban design and environmental factors, to consider while planning interventions for prevention and health promotion in the urban population. The conceptualization of these factors is relevant, if not timely, when considering the current urban health practice and policy environment for research on the built environment and its relationship with risk factors for NCDs.

To explicitly understand the association of the built environment components with NCDs and their risk factors, we will first carry out a comprehensive literature review through a systematic search to identify the existing data at the global level. Through this systematic literature review (SLR), we will identify gaps in knowledge to help us navigate the opportunities for advanced evidence-based strategies.

Subsequently, we will review the existing policies in the Indian setting by identifying and analysing the ones that focus on urban planning and NCDs. This analysis will help us determine how integrating these policies can lead to a better strategic approach for NCD prevention in the urban population. This will lead us to make our cities healthier by reducing poor health outcomes, specifically related to NCDs.

2. Background:

According to the leading global trends of the 21st century, urbanization is one of the factors that has a significant impact on health. More than 55% of the population in the world resides in cities, and by 2050, that number is predicted to rise to 68%. 91% of people living in urban areas breathe polluted air (WHO). Due to urbanization, they have less access to fresh fruits and vegetables, driving demand for unhealthy, processed foods.

Over two-thirds of the world's energy and about 60% of greenhouse gas emissions are due to cities. Inland regions may see temperatures that are 3 to 5 degrees Celsius warmer than those of nearby rural areas because of their extensive concrete and limited open green spaces. All these aspects contribute to the poor health of the urban population. Poor urban planning, design, as well as rapid and unplanned urbanization, are closely linked to the majority of the top ten causes of death. Due to this, cities majorly face the triple burden of diseases with infectious diseases, noncommunicable diseases, violence and injuries, including traffic accidents (11).

NCDs account for at least 43 million people in 2021, equivalent to 75% of non-pandemic-related deaths globally (WHO). Of all NCD deaths, 73% were reported in LMICs (12). In India, roughly 5.87 million deaths, representing 60% of all fatalities in the country, were reported (2017). In addition to this, our country accounted for over two-thirds of the total NCD-related deaths in the Southeast Asia Region of the WHO (13). These statistics make it extremely crucial to dig deeper into the associated risk factors of NCDs for their prevention and better management.

This change reflects a growing recognition that built environments influence physical activity, diet, and exposure to risk factors, which are central to NCD (14).

Data suggest that approximately 75% of global deaths are attributable to NCDs, and the urban population especially faces disproportionate risks due to environmental and social inequities (9)(15).

Studies conducted over the past 20 years have found a growing correlation between urban design elements such as walkability, green spaces, and transportation infrastructure to health outcomes, particularly cardiometabolic diseases and obesity (16)(17). A systematic review, done by Dehkordi et al., has synthesized international evidence by reviewing several studies. In the review, urban planning and design elements (density, land use, transportation

infrastructure) were found to be closely linked to major NCDs and their risk factors (physical inactivity, obesity, and air pollution) (18).

Similar work was done by (19) focuses on low-income urban neighborhoods and underscores how economic, social, and political factors shape the built environments in LMIC settings by exacerbating the NCD risk factors through restrictions on food accessibility and the availability of very few options for safe physical activity.

Furthermore, an Asia-specific review was conducted, investigating major built environment components such as green space, walkability, food environment, and air pollution. (20). They found that the components were working similarly across nations, but also suggested a pressing need for more research in Asian contexts due to the availability of fewer studies in such settings.

In their studies, Babiata et al (9) and Wang et al (21) have emphasized how interventions focusing on cross-sector collaboration and robust intersectoral governance can effectively contribute to NCD prevention by acting on built environmental components. However, multiple persistent challenges related to the specific job responsibilities, multi-governance coordination, and sustained policy formation have led to fragmented implementation and missed opportunities to plan risk reduction strategies (22).

Therefore, the above findings echo that NCD prevention requires strategies and collaboration between health, urban planning, transport, education, and environmental sectors. But currently, joint planning and monitoring mechanisms across sectors are rarely mandated by policies to guarantee that built environment interventions align with NCD prevention goals.

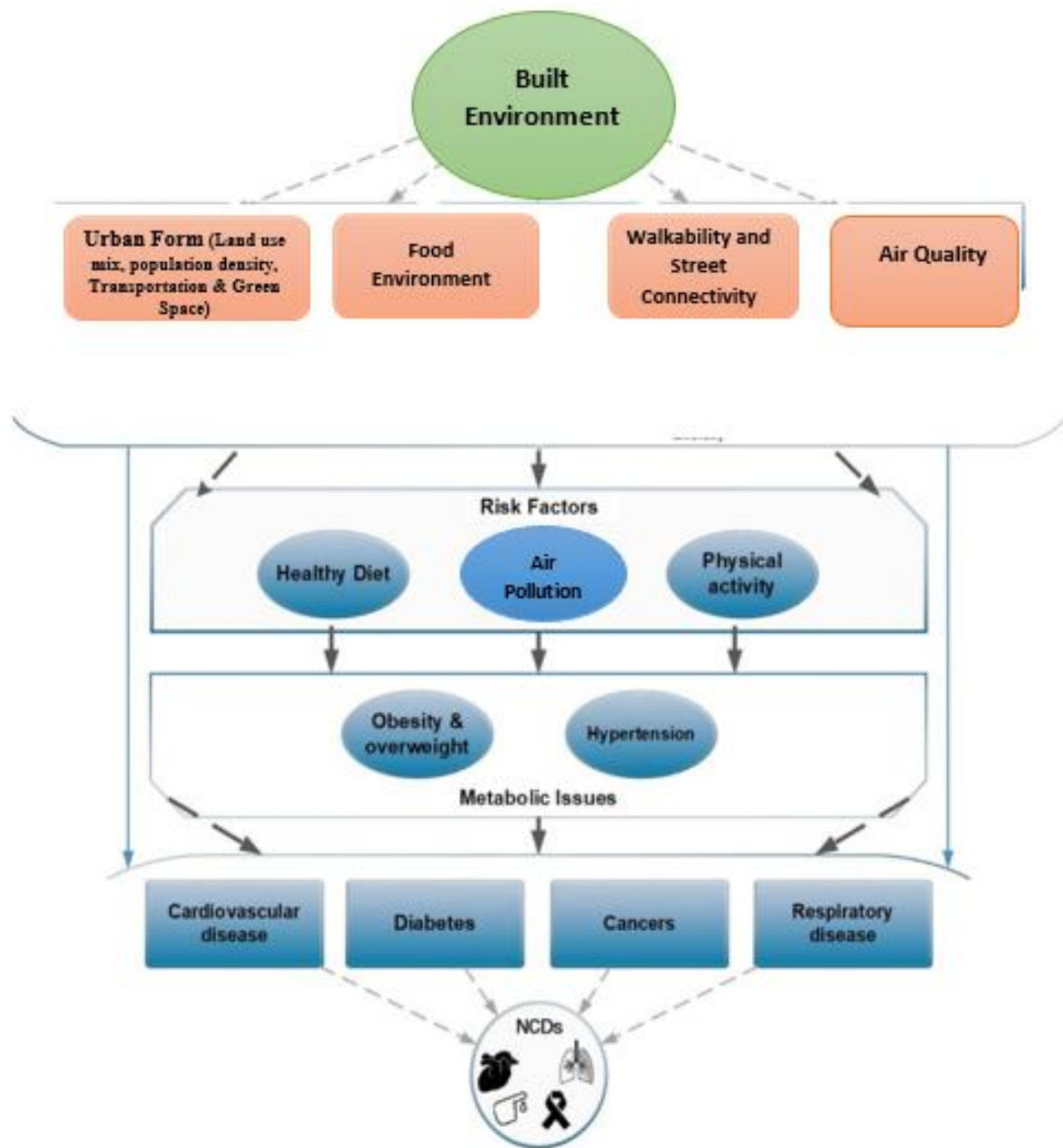


Figure 2. Framework to understand the association between the built environment and NCDs, adopted from a study conducted by Dehkordi et al (Dehkordi ZSF, Khatami SM, Ranjbar E. The Associations Between Urban Form and Major Non-communicable Diseases: a Systematic Review. Journal of Urban Health 2022 Jul 1;99(5):941–58. Available from: <https://doi.org/10.1007/s11524-022-00652-4>)

3. Rationale for SLR:

The rationale for conducting this SLR has arisen from the critical findings that have been observed from the existing studies reported on the built environment to date. Even though numerous studies have shown indications from several studies that highlight the association between the built environment and NCDs but the data that exist are heterogeneous. Many studies have explored multiple regions, employed diverse study design methods, and used various measurement approaches. Results show variation across different countries, but there are consistent connections that link them, highlighting their importance (19).

Thus, to harmonize the various compilations of the present data, it is crucial to identify consistent findings, identify causal pathways, and highlight research gaps (23). This SLR will help to fill the current health and knowledge gap and translate the information from various fragmented studies to create cohesive evidence that enforces healthier, more equitable urban design and governance.

4. Aim & Objectives

4.1. Aim:

To examine the association between built environment components & NCDs and assess the related existing policies in India for a better strategic approach for urban NCD prevention.

4.2. Major objectives:

1. To conduct a systematic literature review to synthesize and analyze the existing literature at the global level.
2. To analyze existing national and sub-national policies related to the built environment components and to identify whether these policies address NCD risk factors or not.
3. To recommend strategies on how these policies can be integrated to create a healthier and resilient built environment.

5. Methodology of the Systematic Review of Literature

A systematic review of the literature was conducted, focusing on the built environment components and NCDs. In conducting our review, we followed a structured PEO (Population, Exposure, Outcome) framework to conduct our search for the literature.

5.1. Data Sources and Search Strategy:

In August 2025, articles were accessed from three electronic databases - Scopus, PubMed, and Embase to conduct the SLR. To focus on the built environment components, we used combined keywords and subject headings related to each PEO component:

- **Population (P):** Urban population/Urban Setting
- **Exposure (E):** Built environment components including urban space, urban form, green space, city planning, transport, walkability, active transport, walkable space, food environment, and air quality.
- **Outcome (O):** NCDs such as diabetes, CVD, Cancer, and related risk factors such as physical inactivity, BMI, air pollution, dietary habits, obesity, and hypertension.
- **Time period of the studies:** 2000 to 2025

To ensure the relevant retrieval of studies, we used Boolean operators and database-specific filters, such as the time period “2000 to 2500”, studies on the “human” population, and specific exposure and outcomes.

5.2. Inclusion and Exclusion Criteria:

- a) Studies were included if they:
 1. Focused on urban populations globally and India-specific.
 2. Explored the association between built environment components (transport planning, walkability, green space initiatives) and NCD risk factors (physical activity levels, air quality measures, access to a healthy food environment)

3. Studies published in English and available in full text
- b) Studies were excluded if they:
 1. Focused on rural settings
 2. Did not address the specified built environment exposures or NCD outcomes.
 3. Studies on school children and specifically on the older population
 4. Were SLRs, reviews, commentaries, protocols, abstracts, posters, or not primary research

5.3. Data Extraction

Data for the SLR were collected through a well-structured and transparent process, which involved multiple steps. Starting with the initial literature search, multiple electronic databases were explored with a well-defined search strategy. The search strategy was developed by using relevant keywords mainly related to the built environment and NCDs, such as “urban form,” “green space”, “food environment,” “NCD,” “Physical activity”, “BMI”, “association”, and “policy” in alignment with the aim & objectives of the SLR and eligibility criteria. The detailed search query is provided in **Appendix 1**. All identified records, 249 from PubMed, 531 from Scopus, and 270 from Embase, were extracted by exporting the CSV files. These records were imported into the Rayyan software for the initial screening. Post the first stage of screening out of 1051 records, 427 duplicates were removed. A total of 623 records were screened based on their titles and abstracts. This led to the inclusion of 311 articles and the exclusion of a total of 312 articles (manually, not automated).

Then, for the 2nd stage, full-text screening was carried out according to the pre-specified inclusion and exclusion criteria. Out of 311 records, 208 were excluded. Of the final 104 full-text articles screened, 10 were not available and were excluded. Out of the remaining 94 reports, further refinement was done, and exclusion was made based on wrong population/outcome (14 records), background, review, and SLR articles (22), foreign language articles (2), leading to an ultimate inclusion of 56 studies to conduct the SLR. From these 56 studies, we first analyzed 49 articles to

understand the relationship between the built environment and NCDs and then reviewed the remaining 7 articles, which addressed the policy landscape at the global level. The policy paper review will be discussed in the 2nd part - policy analysis section.

5.4. PRISMA Flowchart

The given PRISMA 2020 SLR Guideline flowchart visually demonstrates the multi-stage, rigorous, and transparent process of excluding and including relevant literature to ensure quality standards in the evidence base for the systematic review.

5.5. Ethical Consideration

This study is a combination of a systematic literature review and policy analysis that is conducted by synthesizing information on published literature and does not involve direct human participants or primary data collection. Therefore, for this particular study, ethical approval was not required.

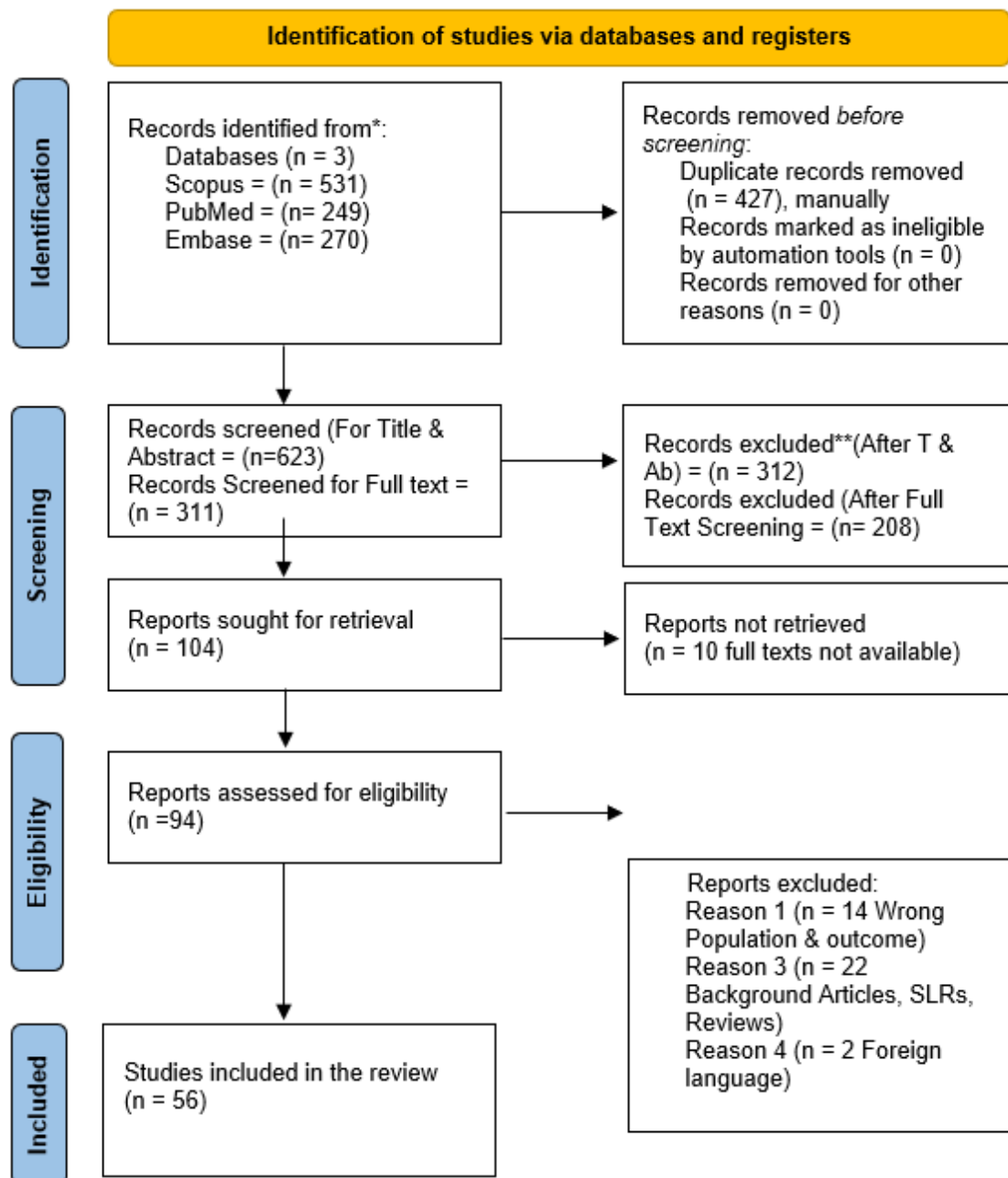


Fig. 3. PRISMA 2020 Flow Diagram

6. Results:

6.1. Descriptive Summary of the SLR:

A total of 49 studies were included in conducting the SLR, which focused on different built environment components, such as urban forms, one of the main indicators for highlighting physical characteristics of neighbourhoods (density, street connectivity, land use mix, and proximity to amenities). These studies encompass a broad range of geographic areas and diverse populations, yielding several observations that shed light on the relationship between built environment and NCDs.

Studies on urban form characteristics by Frank et al. (2022), Joaquin et al. (2019), Adlakha et al. (2018), and Moller-Riemenschneider et al. (2013) show that higher residential density, with better street connectivity, and land use mix are very well associated with increased physical activity resulting in lower obesity rates, and reduced risk of diabetes and CVD (14)(24) in different geographic regions, including the US, China, South Korea, India, Iran, and Lithuania. Availability of such BE characteristics promotes physical activity, active commuting, and provides much better accessibility to healthy food options and recreational spaces.

Another subgroup of research studies conducted by Yang et al. (2025), Sun et al. (2024), and Grazuleviciene et al. (2020) also sheds light on the protective nature of green spaces on air pollution and its related health risks, indicating differences related to exposure and health effects among socioeconomic groups (25) (26). Though trade-offs exist, as higher density can lead to reduced access to green spaces and, at the same time, increase exposure to air pollutants can exacerbate CVD and asthma (21) (27).

With socioeconomic differences playing a key role in modulating these associations, the urban form benefits by varying gender, age, as well as social status.

Most of the research evidence from the SLR data originates from cross-sectional studies, signalling the underlying need for more robust longitudinal research to create a better understanding of causal

pathways, which is currently less explored. This is crucial for guidance in transformations by creating a supportive built environment through well-informed urban planning policies that promote equitable health outcomes.

In summary, interventions to alter and better plan and restructure urban planning stand out as a fundamental approach in reducing the burden of NCDs by introducing well-planned green spaces, transportation, and food environments that encourage healthier lifestyles.

The table provided below outlines the features of the study, including the distribution of studies across different country categories, the number of studies focusing on specific Built Environment components & NCDs, and risk factors addressed.

Table 1. Tabular format for descriptive summary of the studies

S.no	Total Countries covered	Built Environment Component Addressed	NCD Addressed	Risk Factor Addressed
1	US (16)	Urban Form, including Land use mix, population density & Public Transit (18)	Diabetes (17)	Physical Activity/Inactivity (21)
2	China (5)	Green Space (17)	CVD and related Health diseases (10)	BMI (17) Obesity (13)
3	UK (4)	Food Environment (15)	Cancer (1)	Air Pollution (10)
4	Australia (3), Lithuania (3)	Walkability (14) & Street connectivity (3)	Asthma (1)	Dietary pattern (8)
5	Brazil (2) India (2) Korea (2)	Air Quality (8)		Hypertension (4)
6	Single study each from Canada, Madrid, France, Portugal, Iran, New Zealand, Netherlands, Sweden, South Asia (Bangladesh & Sri Lanka), and one global level study			HbA1c, Glycaemic Control (2)

6.2. Thematic Review of Literature:

Residential density, Public Transit & Land use mix

The majority of studies have investigated the core elements of urban form, such as residential density, proximity to transit, and land-use mix. These components have a huge impact on the overall physical activity levels of the population residing in a particular area, which leads to obesity risk and CVD outcomes. In a few studies, the results have also shown mixed effects of residential density on health, while the beneficial activity rate has increased, but on the other hand, it has led to possible exposure risks from air pollution (27) (28). Whereas higher density might improve walkability and reduce vehicle emissions, it also results in limited green space access, which leads to complex exposure trade-offs. It is clearly visible from the study findings that broader urban form patterns directly and indirectly affect air pollution, green space access, and weight change over time, as also observed in the study done by Gražulevičienė et al. (2020) & Coogan (2011) (26) (29). Land use diversity, another important BE component, helps by providing support for carrying active lifestyles and may moderate the prevalence of obesity and hypertension (30).

Green Space

A high number of studies identified through the SLR shed light on one of the most important BE components, which is green spaces. Through the studies, it is evident that green spaces, proximity to parks, and higher Normalized Difference Vegetation Index (NDVI) are the constant factors that play a huge role in reducing the prevalence of diabetes, hypertension, obesity, and CVD. Greenery contributes by forming a buffer or shield against air pollutants, which in turn promotes physical activity and thus offers a multi-dimensional protective role. Moderate to high physical activity when combined with higher greenness exposure results in reduced risks of hypertension (20-85%), coronary heart disease (35-75%), and stroke (25-45%). More benefits of green space are pronounced among older adults, women, and low-socioeconomic status groups (14)(31)(32).

Food Environment

Availability and accessibility of healthy and unhealthy food shape the dietary behavior of the population. The presence of healthy food outlets versus fast food chains influences eating habits and leads to an increase in BMI and risk of NCDs. Transit stops near fast-food joints are linked to higher obesity. The density of healthy food vendors, such as fruit/vegetable stores and supermarkets, leads to reduced exposure to fast food, and processed food outlets are linked to healthier diets, improving the food environment. Key studies by Jiang et al. (2022), Pineda et al. (2023), and Li et al. (2019) provide strong evidence supporting that changes in local food environments over a period can greatly impact the diet patterns and NCD prevalence, and urbanicity commonly influences these associations (28) (23) (27).

Walkability and Street Connectivity

The availability of green spaces, better street connectivity, and walkable areas holds importance in increasing physical activity and lowering cardiometabolic risk (27) (33). Neighbourhood walkability, well-planned public transit access, and pedestrian-friendly environments result in higher rates of physical activity and active commuting while lowering the risk and rate of obesity, diabetes, and CVD outcomes (24). These built environment components play an integral role because they shape daily opportunities for physical movement, become part of a healthy lifestyle, and may also mediate access to other resources or health-promoting environments (14) (34).

Air Quality and Pollution

Studies conducted by Zhao et al. (2022) and Wang et al. (2024) explain that exposure to particulate air pollution (PM_{2.5}, NO₂, PM₁₀) is positively correlated with risks of NCD, such as diabetes, CVD, and asthma, and increases the risk of hypertension (35)(21). One of the main reasons lies with the transportation infrastructure that increases hypertension indirectly via PM_{2.5} concentration. Positive interactions between air pollution and other BE components, such as green space, which acts as a

buffer, can help to lessen the magnitude of the produced effects. It is also reported that higher Urban density lesser in the PM_{2.5} emissions, but this condition may also limit green space access to the population.

7. Limitations of the literature:

Most studies that were part of this SLR were cross-sectional, which makes it hard to establish the causality between built environment components and NCD outcomes. A greater number of research studies that are longitudinal and experimental in nature will provide greater support in truly understanding the causal pathways involved. Data collection methods in many studies were self-reported measures and secondary data, which have introduced recall and reporting biases. Many studies detailed spatial or temporal analysis, which led to a limited ability to assess how and to what extent the changes in the built environment can impact health over a period. These limitations, when addressed, can help in improving a fair understanding of context-specific pathways that support more effective, equitable interventions in urban health promotion.

8. Overall Synthesis and Conclusion of SLR:

The findings addressed through the thematic areas highlighted in this systematic literature review underpin the essential impact of the association between the built environment and non-communicable diseases (NCDs) and related behaviours across different countries.

The descriptive table and findings suggest a strong positive association between the availability of green spaces and the decreased risk of diabetes, cardiovascular diseases (CVD), through the encouragement of physical activity and the reduction of air pollutants.

Similarly, walkability leads to enhanced active transportation and exercise, thereby facilitating people to lose weight, thus reducing diabetes prevalence. However, the effectiveness of walkability on reducing diabetes can be altered by the presence of air pollutants. Air quality as a risk

factor remains a strong indicator of CVD, hypertension, and respiratory diseases, where the pollutant exposure elevates the risks, while green spaces may offer a protective shield against NCDs.

Regarding the food environment, easy access and availability of fast food and processed foods contribute to the rise in obesity and hypertension rates. A healthy food environment that has easy access and affordable options of healthy food can assist with nutrition and obesity, and help with better dietary habits and lower BMI. Factors such as land-use mix, residential density, and street connectivity strongly impact the behaviour of physical activity among the urban population. This relationship underscores the need for integrated urban design to maximize health advantages. Finally, broader urban form characteristics not only influence environmental exposures but also affect social inequality while impacting perceived quality of neighbourhoods, emphasizing the complex interplay of factors related to urban health determinants. Furthermore, access to public transit facilitates and promotes active commuting, thereby introducing a healthier lifestyle.

Overall, the findings from this SLR emphasise the adoption of a comprehensive, multi-sectoral approach for better urban planning, which prioritizes “health” at the centre, while designing urban infrastructure. Until and unless all the built environment components are addressed in an integrated manner and continue to be treated in silos, the strategies to alleviate the burden of NCDs will be unsuccessful in achieving health equity outcomes in urban communities.

9. Policy Analysis of the Existing Policies in India:

9.1. Significance of Policy Analysis:

The findings in the SLR conducted above highlight that fostering healthy cities requires not only evidence-based architecture and planning, but also conducive policy frameworks. Drawing on the abundance of evidence presented in this text at the global level, in our next section, we aim to look at India's national and urban frameworks and policies. We will explore how the existing policies address the built environment components that are linked to NCDs and their risk factors in the Indian context.

Through this analysis, we will focus on the presence of strengths, gaps, and prospects for integrating urban development and health policies to promote a more preventative and health-centric approach in city planning.

10. Background & Context

While there is emerging evidence that links-built environment components and lifestyle-related NCDs, policy response from India remains fragmented across the health department, urban development, food, and transport sectors. The available frameworks are disconnected among the ministries and government organizations at national and sub-national levels, leading to inconsistent implementation of policies at the grassroots level.

The majority of the NCD policies in India, such as the National Multi-sectoral Action Plan for Prevention and Control of Common NCDs (36), focus primarily on health promotion, screening, and medical management, with less emphasis on modifying the built environment to support healthy behaviors (22). Furthermore, policies related to urban planning, transportation, and food environment are often developed in silos, which lack coordination with health policies to address NCD risk factors (37).

The food policy analysis review conducted by Pineda et al. in South Asia showed that in India, food environment policies and infrastructure assistance present a mixed outcome, where certain policies demonstrate moderate implementation while others are at a low level of implementation. India was the only nation among the other 3 (Sri Lanka, Bangladesh, Pakistan) that exhibits to possess food policies and infrastructure support throughout all Food-EPI areas. On one hand, 43% of the indications were assessed as weak, while on the other 57% were found to be intermediate. It is important to highlight that these policies were missing the integration of the "health in all policies" concept, and the related "platforms" were evaluated as inadequate. The reason behind this is the lack of mechanisms present to assess health implications from non-food-related policies and the absence of established common

platforms for engaging the government, commercial sector, and civil society regarding food policies (23).

To improve strategic ways to prevent NCDs, it is crucial to establish collaboration and integration within different sectors. This policy analysis will help us to address the importance of inter-sectoral coordination during urban planning to improve health equity by addressing the need for inclusion of built environment components to reduce the NCD burden. The goals of the policy analysis align and contribute towards SDG 3 - Good Health and SDG 11 - Sustainable Cities.

11. Policy Landscape Overview:

In India, there are several national and sub-national policies, programs, and initiatives that exist and harmonize with urban planning and NCDs prevention objectives. The National Program for Prevention and Control of NCDs (**NP-NCDs**) under the National Urban Health Mission (**NUHM**) (38) Ayushman Bharat Health and Wellness Centers (39) work towards providing preventive care, NCD screening, and urban primary healthcare for the population who cannot access the necessary health services.

Another important and national-level framework established by the Indian government is the National Multisectoral Action Plan (**NMAP**) (40). This master plan outlines policy integration by putting the “Health in All Policies” approach into action. The Smart Cities Mission and Atal Mission for Rejuvenation and Urban Transformation (**AMRUT**) (41) run by the Ministry of Housing and Urban Affairs (MoHUA) are contributing to city development by providing finances for basic infrastructure, transportation, water and sanitation, and green public spaces that play a huge role in shaping a healthy lifestyle of the urban population. The National Clean Air Program (**NCAP**) (42) is an excellent example of environmental regulations that focus on monitoring the air quality across the country, which can directly impact the risk of heart disease and diabetes. Another great initiative by FSSAI is the **Eat Right Movement** (43), aimed towards creating a healthy food ecosystem by reaching out to both the consumers and food industry partners to adopt healthier food practices.

All these strategies are implemented to enhance infrastructure, public health capacity, air quality, access to care, and governance systems. However, the gap exists due to a lack of inter-sectoral coordination. All these programs and initiatives work independently, and the goals of most of the programs fail to address NCDs and their risk factors. Therefore, we will analyze a few policies currently in place to determine whether they target built environment components that affect NCDs or not.

12. Literature Review for Policy Analysis

The review of seven articles on policies obtained from the systematic literature search is provided in the table below (Table 2).

Title	Author	Country	Problem Statement	Main findings	Main challenges
Assessing the options for local government to use legal approaches to combat obesity in the UK: putting theory into practice	Mitchell et al	UK	How can local government in the UK effectively utilize legal approaches to combat obesity?	Priorities: traffic restriction, active travel, healthy food access, sustainable places	Limited clarity on legal levers, political will, scope beyond local, and case law lag
Diabetes and the Built Environment: Evidence and Policies	Amuda et al	UK	What is the relationship between the built environment and type 2 diabetes, including its risk factors and policies to reduce risk?	Walkability/green space protective; fast-food density harmful; mixed density results; policy plausibility > proof	Confounding by composition, scarce policy evaluations, housing policy gaps, and the need for standardization needs
Intersectoral Action for Addressing NCDs through the Food Environment: An Analysis of NCD Framing in Global Policies and Its Relevance for the African Context	Weimann et al	Africa	How do global and African diet-related policies frame the NCD problem and its relevance for intersectoral action?	Evidence/development/socioeconomic frames dominate; food security is underlined by NCDs	Data gaps, underreporting, context misfit, lifestyle framing eclipsing structural determinants
Community and Regional Food Planning: Building Institutional Support in the United States	Pothukuchi et al	US	How did concerns related to food issues come together into a multidisciplinary movement for sustainable local food systems?	APA guided advanced food planning: health framing, mobilized funding, and action	Resource limits, sectoral silos, market barriers, and accessibility of processes to advocates
Australia regulatory views	Shill et al	Australia	What obesity-prevention regulations are feasible? What are the barriers/facilitators to regulatory change in Australia?	Strong support for marketing limits, pricing, labelling, outlet controls; need whole-of-government	Industry influence, deregulation agendas, conflicting policies, and evidence thresholds for adoption
Spain policy package	Bordonada et al	Spain	How can the epidemic of obesity and associated non-communicable diseases be reversed in Spain?	PODER: ad rules, healthy supply, SSB tax, Nutri-Score, reformulation; economic and health benefits expected	Industry resistance, neoliberal market structure, leadership/advocacy gaps, and low public demand
US active transport guidance	Young et al	US	How to scale active travel to address low physical activity rates and associated health issues?	Combine macro/meso/micro design; Safe Routes effective; funding share lags mode share	Low activity prevalence, inequitable access, first/last mile, car-prioritized policies

Table 2. The table provided is a compilation of policy analysis carried out using Walt and Gilson's Policy Triangle (1994)

13. Policy Analysis (Results): In the second part, a detailed policy analysis was carried out using Walt & Gilson's (1994) triangle to identify the existing status of the policies (whether they address NCDs) across various sectors, such as health, transportation, food, and urban planning.

Policy Triangle Framework (*Walt and Gilson 1994*)

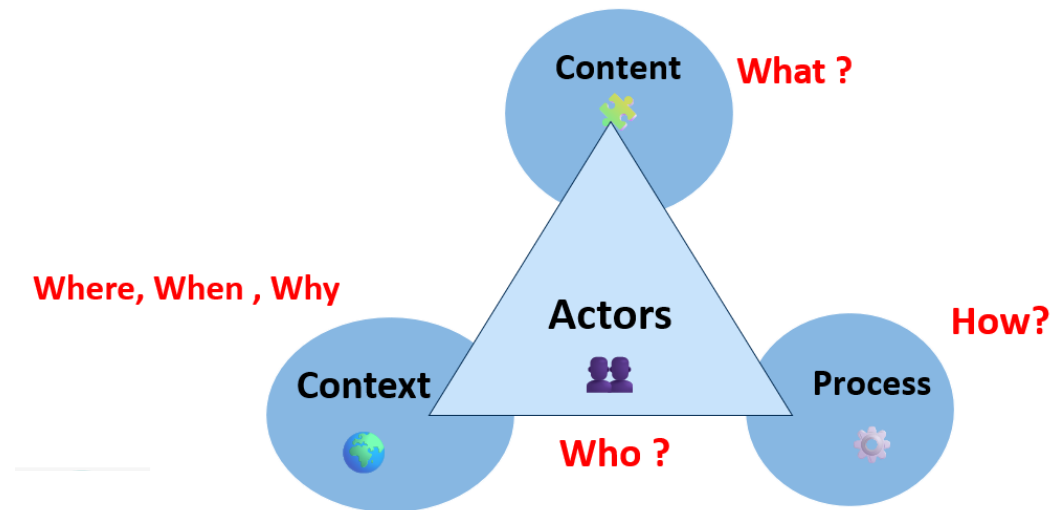


Fig. 4. Policy Analysis Triangle by Walt and Gilson (1994)

Table 3. The table provided below is a compilation of policy analysis carried out using Walt and Gilson's Policy Triangle

S.No	Policy	Level; Domain	Context (Specific Goals and Details)	Content (Details of the Policy)	Actors (Stakeholders)	Process (Methods used to create & implement the policy)
1	National Program for Prevention and Control of NCDs (NP-NCD)	National Program: Health	Rising NCD burden in India requires prevention, early detection, and control through primary care platforms	Operational guidelines for population-based screening, treatment protocols, referral, and health promotion	MoHFW, state health departments, NHM units, primary healthcare facilities, and HWCs	National guidelines with state implementation; persistent low control rates and capacity constraints
2	National Health Policy, NHP (2017)	National: Health	Responds to India's rising NCD burden, health inequities. Addresses the need to shift from curative to preventive and promotive care. Focuses on achieving Universal Health Coverage and federal/state implementation realities	NHP prioritizes prevention, health promotion, and primary care through intersectoral action; it focuses on reducing air pollution, improving diets, increasing physical activity, and creating safe environments	MoHFW - leads; Implementation - State Health Departments, NHM units, and urban health systems; Coordination across MoHUA, FSSAI, and local governments	Formulated as an overarching framework guiding other national programs (NP-NCD, NUHM, and HWCs). Emphasis on prevention and intersectoral action
3	National Multisectoral Action Plan (NMAP) for NCDs	National Framework; Multisectoral	Fulfilling the need for multisectoral action on tobacco, alcohol, diet, activity, and environmental determinants	Health-in-All-Policies framework with sectoral roles and coordination architecture	MoHFW with MoHUA, MoEF&CC, Transport, Education, FSSAI, and others	Framework issued; weak institutionalization of joint accountability and shared indicators across sectors
4	National Urban Health Mission (NUHM)	National Mission: Health	Urban health inequities among slum and informal populations related to environmental health risks	Urban PHCs, outreach, and convergence with city services to address environmental health	MoHFW, state urban health societies, Urban Local Bodies, community platforms	Expanded to 1,100+ cities, but with variable service quality and staffing model limitations
5	Ayushman Bharat Health and Wellness Centres	National Programme: Health	Need to strengthen comprehensive primary care, including NCD services and overall wellness	Service packages for NCDs and facility norms for accessibility, ventilation, and green space	MoHFW, state health systems, frontline teams and U-HWCs	Rapid scale-up but uneven adherence to built environment standards across facilities and states
6	Smart Cities Mission	National Mission: Urban Development	Service deficits and low livability in growing cities are impacting health behaviors, exposures, and lifestyle	Area-based development and pan-city solutions for mobility, water, sanitation, and safety	MoHUA, city SPVs, ULBs, private partners, utilities	High project completion with mixed outcome attainment and weak health co-benefit key performance indicators

7	Atal Mission for Rejuvenation and Urban Transformation (AMRUT)	National Mission; Urban Infrastructure	Gaps in water, drainage, parks, and non-motorized transport affect urban environmental health	Universal water supply, sewerage expansion, storm drainage, parks, & non-motorized transport corridors	MoHUA, state missions, ULB engineering wings	Strong output gains: Operational & management capacity and health outcome attribution remain challenging
8	National Clean Air Program (NCAP)	National Program; Environment	Hazardous urban air pollution concentrated in non-attainment cities with NCD implications	City action plans, emission control, monitoring networks, performance-linked grants	MoEF&CC, CPCB/SPCBs, ULBs, transport, and industry agencies	PM levels are improving in many cities, but enforcement and health-linked targeting are uneven
9	FSSAI "Eat Right India"	Regulatory Initiative; Food Safety	Unhealthy urban diets and food safety concerns in everyday food environments	Standards, labeling, certification, and institutional procurement reforms for healthier food environments	FSSAI, state food safety departments, ULBs, food businesses, and institutions	Active rollouts; enforcement heterogeneity across jurisdictions and informal vendors
10	National Urban Transport Policy (NUTP)	National Policy; Transport	Congestion, pollution, and low levels of active mobility contributing to NCD risks	People-centric transport with public transit, NMT, and demand management measures	MoHUA, state/metro transport agencies, ULBs, traffic police	Policy guidance exists; NMT scale-up and safety remain limited despite demonstrated health co-benefits

Table 4. The table provided below summarizes policy analysis based on whether the policy addresses NCDs directly or indirectly, linking to the built environment, along with their strengths and limitations.

Policy	NCD & Risk Factors Addressed (Direct or Indirect)	Linkages to Built Environment	Strengths for the built environment–NCDs	Gaps/Limitations for the built environment–NCDs
National Programme for Prevention and Control of NCDs (NP-NCD)	Tobacco, alcohol, diet, inactivity, hypertension/diabetes control (Direct)	Health promotion intersects with neighborhood, workplace, and facility environments	Provides a national platform for population-based screening, risk reduction, and health promotion. These services can be integrated with place-based interventions in neighborhoods, workplaces, and facilities.	Due to consistently low awareness, treatment, and control rates, limited translation of environment-linked prevention results in outcomes. The workforce and cross-sector coordination constraints weaken community and settings-based prevention
National Health Policy (2017)	Tobacco use, harmful alcohol use, unhealthy diet, physical inactivity, and environmental exposures (indoor and outdoor air pollution) (Direct)	Recognizes the built environment as a health determinant. Promotes intersectoral action on transport, housing, sanitation, and environmental quality	Explicitly recognizes air pollution, diet, physical activity, and safe environments as determinants, giving policy cover to align with health goals.	Health-in-All Policies is only partially operationalized. Environmental co-benefits are not systematically embedded in urban and sectoral programs.
National Multisectoral Action Plan (NMAP) for NCDs	Behavioral and environmental determinants (Direct)	Embeds Health-in-All-Policies to align built environment decisions with NCD goals	The Framework for Health-in-All-Policies clarifies sector roles and enables linkage of built environment decisions to NCD prevention objectives across ministries	Weak institutionalization of inter-ministerial accountability and data sharing limits joint delivery and outcome tracking.
National Urban Health Mission (NUHM)	Multiple environmental and behavioral risks (Direct)	Emphasizes healthy cities and environmental health services in urban areas	Anchors urban primary care and environmental health functions, enabling convergence with ULB systems and services in high-risk areas	Variable city capacity, contractual staffing, and uneven convergence with non-health departments limit environmental health actions and sustained place-based risk reduction.

Ayushman Bharat Health and Wellness Centres	Multiple risks via primary prevention and early detection (Direct)	Infrastructure guidance on accessibility, ventilation, natural light, and green space	Facility design norms (accessibility, ventilation, natural light, green space) connect service settings to healthier environments	Adherence to build environment standards is uneven across states and facilities, weakening user experience, accessibility, and preventive uptake in urban contexts
Smart Cities Mission	Physical inactivity, air pollution, stress (Indirect)	Area-based development and pan-city ICT shape active travel, access, and services	Invests in complete streets, public transport, safety, and ICT that can increase active mobility, reduce exposure, and improve access to services	Health co-benefit metrics (activity, injury, exposure, equitable access) are rarely mandated or monitored, yielding mixed outcomes despite high project completion
Atal Mission for Rejuvenation and Urban Transformation (AMRUT)	Inactivity, urban environmental exposures (Indirect)	Direct upgrades to services and walkability with health co-benefits	Delivers core environmental services (water, sewage, drainage) and parks/NMT that directly affect exposures and physical activity in cities	Operations and maintenance, and health-outcome attribution are weak at the city level, and inter-state variation limits consistent environment–health gains
National Clean Air Program (NCAP)	Ambient PM2.5/PM10, NO2, SO2 exposure (Indirect)	Environmental pathway to NCD risk reduction via air quality	City action plans, monitoring, and performance-linked grants are reducing particulate levels in many non-attainment cities, lowering cardiopulmonary risks	Enforcement and source-specific targets vary, and health indicators are not routinely integrated with air quality dashboards for co-benefit tracking
FSSAI "Eat Right India"	Unhealthy diet, adulteration, nutrient deficiencies (Indirect)	Improves food environment in schools, workplaces, markets, and eateries	Standards, labeling, and institutional procurement reforms improve food environments in schools, workplaces, markets, and eateries, advancing healthy diets	Enforcement capacity is heterogeneous across states and informal vendors. Diet outcomes are not consistently linked to program dashboards
National Urban Transport Policy (NUTP)	Physical inactivity, air pollution, injuries (Indirect)	Street design and transit systems enable active mobility and cleaner air	People-centric transport policy supports public transit and non-motorized networks that increase physical activity and reduce emissions when implemented	Execution of safe, continuous NMT and use of health co-benefit evidence in prioritizing investments remains limited despite strong potential shown in the Delhi model

14. Recommendations and Policy Reform Directions

Operationalization of Health in all Policies: Through the policy analysis conducted above, it is evident that policies in India exist in different forms (Programs, master plans, initiatives etc.) but needs to be reframed as a Health-in-All-Policies delivery model, that builds health co-benefits into urban environment in all necessary sectors including transport, housing, food, and primary-care programs to reduce NCD risks at population scale. *Example - By integrating the program goals and indicators of the NP-NCD program and Smart Cities Mission, considering the “Health-in-All-Policies” strategy while implementing the actionable objectives can improve walkability, air quality, and physical activity outcomes.* This targeted approach will help India to move from disease management to disease prevention through translating existing policies and programs running in fragments into joint planning, shared indicators, and performance-linked financing so infrastructure reliably delivers active mobility, cleaner air, healthy housing/food environments, and stronger NCD prevention and control.

Health Impact Assessment: Conducting HIAs before initiation (screening stage), during preliminary design phase (Scoping stage), followed by other phases till the implementation of the project for all the urban projects & master plans. This strategic initiative will guide the design process of heavily funded national and sub-national programs by embedding health evidence and equity safeguards into urban planning and delivery rather than treating health as a downstream by-product. *Example: If Smart City Mission and AMRUT state missions together include health co-benefit criteria tied to health KPI before approval, it will be a great strategic move.*

Integration of Data Systems: The process of data sharing and cross-sector evaluation is an integral step to inform policy adjustments on a routine basis, which is currently missing in our country. Interoperable data sets are in place that connect all programs running under different sectors can be a stepping stone to guide urban planners and health agencies to turn built-environment investments into targeted and measurable NCD risk reduction strategies. This will enable to creation of a link between what cities build (inputs/outputs) to how people live and breathe (outcomes), enabling timely course-correction and shared accountability across departments.

15. Conclusion and Way forward

The integration of this systematic literature review and policy analysis has facilitated an advanced and comprehensive assessment of the urban built environment components and their association with the non-communicable diseases (NCDs) and related risk factors at the global as well as national level.

The rigorous SLR, on one hand, has provided the synthesis of data that exists worldwide and in the Indian context, revealing significant correlations between improved built environments and reduction of non-communicable disease risk. On the other hand, the policy analysis highlights the partial policy coherence, weak integration, and persistent gaps across sectors and ministries on multisectoral collaboration across the country.

Only two articles were identified during the SLR, which were India-specific, thus highlighting the criticality of subsequent longitudinal and experimental research to be carried out in our country to identify the causal pathways and assess the efficacy of policy interventions concerning the urban built environment and NCDs.

The analysis addresses a significant knowledge deficiency by delineating both the epidemiological evidence and the degree to which present Indian urban policies

engage with (or neglect) these drivers. National initiatives such as the Smart Cities Mission and National Urban Health Mission acknowledge the need of healthy urban design; nevertheless, their operational guidelines sometimes lack concrete, actionable strategies for incorporating health into urban development. This disparity between evidence and policy highlights the necessity for more vigorous, health-oriented urban governance.

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17. Appendix

17.1. Appendix 1

PUBMED Query:

("built environment"[Title/Abstract] OR "urban space"[Title/Abstract] OR "green space"[Title/Abstract] OR "urban form"[Title/Abstract] OR "city planning"[Title/Abstract] OR "walkability"[Title/Abstract] OR "active transport"[Title/Abstract] OR "walkable space"[Title/Abstract] OR "food environment"[Title/Abstract]) AND ("non communicable diseases"[Title/Abstract] OR "NCDs"[Title/Abstract] OR "diabetes"[Title/Abstract] OR "type 2 diabetes"[Title/Abstract] OR "CVD"[Title/Abstract] OR "cardiovascular disease"[Title/Abstract] OR "heart diseases"[Title/Abstract] OR "cancer"[Title/Abstract] OR "hypertension"[Title/Abstract] OR "obesity"[Title/Abstract] OR "overweight"[Title/Abstract] OR "risk factors"[Title/Abstract] OR "physical activity"[Title/Abstract] OR "physical inactivity"[Title/Abstract] OR "air pollution"[Title/Abstract] OR "low AQI"[Title/Abstract] OR "respiratory diseases"[Title/Abstract] OR "poor diet"[Title/Abstract] OR "healthy diet"[Title/Abstract]) AND ("association"[Title/Abstract]) AND ("Policy"[Title/Abstract] OR "Policies"[Title/Abstract] OR "Legislation"[Title/Abstract] OR "Public Policy"[Title/Abstract] OR "Policy making"[Title/Abstract] OR "Health Policy"[Title/Abstract] OR "Health in all policies"[Title/Abstract] OR "HiAP"[Title/Abstract] OR "Governance"[Title/Abstract]))

SCOPUS Query:

(TITLE-ABS("built environment") OR TITLE-ABS("urban space") OR TITLE-ABS("green space") OR TITLE-ABS("urban form") OR TITLE-ABS("city planning") OR TITLE-ABS("walkability") OR TITLE-ABS("active transport") OR TITLE-ABS("walkable space") OR TITLE-ABS("food environment")) AND (TITLE-ABS("non communicable diseases") OR TITLE-ABS("NCDs") OR TITLE-ABS("diabetes") OR TITLE-ABS("type 2 diabetes") OR TITLE-ABS("CVD") OR TITLE-ABS("cardiovascular disease") OR TITLE-ABS("heart diseases") OR TITLE-ABS("cancer") OR TITLE-ABS("hypertension") OR TITLE-ABS("obesity") OR TITLE-ABS("overweight") OR TITLE-ABS("risk factors") OR TITLE-ABS("physical activity") OR TITLE-ABS("physical inactivity") OR TITLE-ABS("air pollution") OR TITLE-ABS("low AQI") OR TITLE-ABS("respiratory diseases") OR TITLE-ABS("poor diet") OR TITLE-ABS("healthy diet")) AND TITLE-ABS("association") AND (TITLE-ABS("policy") OR TITLE-ABS("policies") OR TITLE-ABS("legislation") OR TITLE-ABS("public policy") OR TITLE-ABS("policy making") OR TITLE-ABS("health policy") OR TITLE-ABS("health in all policies") OR TITLE-ABS("HiAP") OR TITLE-ABS("governance")) AND PUBYEAR > 2004 AND PUBYEAR < 2026 AND (LIMIT-TO (AFFILCOUNTRY,"India")) AND (LIMIT-TO (PUBYEAR,"2013") OR LIMIT-TO (PUBYEAR,"2018") OR LIMIT-TO (PUBYEAR,"2019") OR LIMIT-TO (PUBYEAR,"2020") OR LIMIT-TO (PUBYEAR,"2022") OR LIMIT-TO (PUBYEAR,"2023") OR LIMIT-TO (PUBYEAR,"2024") OR LIMIT-TO (PUBYEAR,"2025")))

EMBASE Query:

('built environment':ab,ti OR 'urban space':ab,ti OR 'green space':ab,ti OR 'urban form':ab,ti OR 'city planning':ab,ti OR walkability:ab,ti OR 'active transport':ab,ti OR 'walkable space':ab,ti OR 'food environment':ab,ti) AND ('non communicable diseases':ab,ti OR ncd*:ab,ti OR diabetes:ab,ti OR 'type 2 diabetes':ab,ti OR cvd:ab,ti OR 'cardiovascular disease':ab,ti OR 'heart diseases':ab,ti OR cancer:ab,ti OR hypertension:ab,ti OR obesity:ab,ti OR overweight:ab,ti OR 'risk factors':ab,ti OR 'physical activity':ab,ti OR 'physical inactivity':ab,ti OR 'air pollution':ab,ti OR 'low aqi':ab,ti OR 'respiratory diseases':ab,ti OR 'poor diet':ab,ti OR 'healthy diet':ab,ti) AND association:ab,ti AND (policy:ab,ti OR policies:ab,ti OR legislation:ab,ti OR 'public policy':ab,ti OR 'policy making':ab,ti OR 'health policy':ab,ti OR 'health in all policies':ab,ti OR hiap:ab,ti OR governance:ab,ti) AND [2000-2025]/py

17.2. Appendix 2

The table provided below summarizes all 49 studies that were included in the final stage of the systematic literature review to explore the association of built environment components and NCDs in the global context.

S. No	Title	Author	Year-Journal	Country/Region	Built Environment Component Addressed	NCD Outcome Addressed	Risk factor Addressed	Population Sample	Study Design	Findings
1	Chronic disease and where you live: Built and natural environment relationships with physical activity, obesity, and diabetes	Lawrence D. Frank et al	2022-Environment International	Canada	Green Space (Park availability), walkability index	Diabetes, Obesity, Physical Activity, BMI	Physical Activity, Obesity, and BMI	My Health My Community survey (n = 22,418); British Columbia Generations Project (n = 11,972)	Cross-Sectional	Walkable neighborhoods with park availability lower diabetes and obesity; higher physical activity levels.
2	Relationship between Built-Up Environment, Air Pollution, Activity Frequency and Prevalence of Hypertension -An Empirical Analysis from the Main City of Lanzhou	Haili Zhao et al	2022-International Journal of Environmental Research and Public Health	China	Air Quality, Green Space, Road, and transportation facilities	NA	Hypertension, Physical Activity, Air Pollution	103,877 hypertensive patients 41.20% males and 58.80% females.	NA	Roads and transportation facilities indirectly increase hypertension prevalence; increased PM2.5 concentration and activity frequency
3	Effects of PM2.5 components on hypertension and diabetes: Assessing the mitigating influence of green spaces	Hongyue Sun et al	2024-Science of the Total Environment	China	Green Space - Normalized Differential Vegetation Index (NDVI) , Air Quality	Diabetes	Hypertension, Air Pollution, BMI, Dietary Intake	223,000 residents	Prospective Cohort Study	PM2.5 positively correlated with hypertension & diabetes, while NDVI negatively correlated Joint exposure to green spaces significantly reduces the risk associated with PM2.5 and its components.
4	Effects of built environment factors on obesity risk across three types of residential community in Beijing	Yuxiao Jiang	2022-Journal of Transport & Health	China	Population Density, Land Use Mix, Food Environment	NA	Obesity (BMI)	71,784 total, hypertensive-41,070 & diabetes-65,824	NA	Negative associations between obesity odds and land-use mix, supermarkets/groceries, street intersections & (NDVI) - Transit stops are positively associated with obesity; linked to fast-food restaurants near bus stations

5	Cardiovascular diseases in middle aged and older adults in China: the joint effects and mediation of different types of physical exercise and neighborhood greenness and walkability	Xianjie Jia et al	2018-Environmental Research	China	Walkability, Green Space	Coronary Heart Disease, Stroke	Hypertension, Physical Activity,	1944 participants	Community-based cross-sectional study using surveys	- Moderate to high physical activity reduced risk of hypertension (20-45%), coronary heart disease (35-55%), and stroke (25% for walking/square dancing), but not on CVD risk factors. Higher greenness exposure (NDVI-based) reduced risk : hypertension (55-85%), coronary heart disease (75%), and stroke (45%)
6	Investigating Environmental Determinants of Diet, Physical Activity, and Overweight among Adults in Sao Paulo, Brazil	Patricia Constante Jaime	2011-Journal of Urban Health: Bulletin of the New York Academy of Medicine	Brazil	Green Space (Parks), Sports facilities, Food environment (Retail food stores, large fast-food chains, food courts), Public transport system	NA	Overweight, Diet, and Physical Activity	2,122	Cohort Study	Positive correlation between regular fruit and vegetable (FV) intake and density of FV specialized food markets; no relationship between fast-food restaurant density and overweight prevalence. Negative association between overweight prevalence and density of parks & public sports
7	Association between perceived neighbourhood characteristics, physical activity and diet quality: results of the Brazilian Longitudinal Study of Adult Health (ELSA-Brasil)	Dora Chor et al	2016-BMC Public Health	Brazil	Perceived neighbourhood characteristics - Walking environment - Healthy Food Availability	Diabetes, CVD	Physical Activity and Diet Quality	14,749 individuals	Cross-sectional	Walkable areas have 1.69 times greater odds of engaging in leisure time for more than 150min/week & 1.39 times for up to 150 min/week. Perceiving better availability of healthy foods was associated with a healthier diet, 1.48 times greater odds for fruits and 1.47 times for vegetables more than once per day, compared to perceiving less availability

8	Neighbourhood walkability and cardiometabolic risk factors in Australian adults: an observational study	Falk Müller-Riemenschneider et al	2013-BMC Public Health	Australia	Neighbourhood Walkability	Type-2 diabetes mellitus	obesity, hypertension, Hypercholesterolaemia, Physical Activity	5,970	Cross-Section Study	Protective association between neighbourhood walkability & obesity Lower odds of type-2 diabetes in high walkability areas No consistent association between walkability and hypertension or hypercholesterolaemia
9	Exploring associations of greenery, air pollution, and walkability with cardiometabolic health in people at midlife and beyond	Alison Carver et al	2024-Geriatrics & Gerontology International	Australia	Greenery Walkability (Walk Score)	Diabetes (non-gestational) Heart disease Stroke	Air Pollution, Physical Activity	308,108, with 150,866 residents aged ≥45 years	Cross-Sectional	- Greenery is negatively associated with diabetes and stroke prevalence - PM2.5 and NO2 are positively associated with diabetes - Higher walkability is associated with lower diabetes prevalence, but only in areas with lower levels of PM2.5 - No significant associations were found between PM2.5 & prevalence of heart disease
10	BMI and the Food Retail Environment in Melbourne, Australia: Associations and Temporal Trends	Cindy Needham et al	2023-Nutrients	Australia	Food Environment	NA	BMI	47,245 participants	Secondary Data Analysis	A lower BMI was consistently associated with higher access to supermarkets, as well as healthy and unhealthy outlets, over the 8-year study period.
11	Association between objectively measured built environments and adult physical activity in Gyeonggi province, Korea	Eun Young Lee et al	2018-International Journal of Public Health	Korea	Distance to public physical activity facilities (public parks, public transit) - Population density - Street connectivity - Land-use mix (LUM)	NA	Physical Activity, BMI,	82,419 individuals from the Korean Community Health Survey, (KCHS)	Community Health Survey	Short distance to parks increased odds of physical activity (PA) by 42%. Low population density decreased the odds of PA by 21%. Distance to public PA facilities and transit, street connectivity, and land-use mix were not significantly associated with PA in the full model, despite bivariate associations.

12	Inequalities in residential green space and trajectory of cardiometabolic multimorbidity: Different associations by sex and socioeconomic status	Teng Yang et al	2025-Environmental Pollution	UK	Residential Green Space	CVD, Cardiometabolic multimorbidity (CMM) First cardiometabolic disease (FCMD) Type 2 diabetes (T2D)	Physical Activity	328,260 participants (UK Biobank)	Prospective Cohort Study	Residential green space benefits early transitions in cardiometabolic multimorbidity (CMM), specifically from baseline to first cardiometabolic disease (FCMD), from baseline to death, and from FCMD to death. but not from FCMD to CMM and then to death. The transition from baseline to T2D appeared to benefit most from access to green space.
13	Neighbourhood physical food environment and cardiovascular risk factors in India: Cross-sectional evidence from APCAPS	Yingjun Li et al	2019 - Environmental International	India	Food Environment (Accessibility & Availability) (Fruit/Vegetable vendor density, Processed food vendor outlet)	NA	Adiposity measures, glucose-insulin, blood pressure, lipid profile	5764 participants Andhra Pradesh Children and Parents Study (APCAPS)	Cross-Sectional	- Higher density of fruit/vegetable vendors within 400m was associated with lower BP - Higher density of highly processed/take-away food vendors within 400m was associated with higher BMI, waist circumference, and BP - No associations between neighbourhood accessibility (distance to nearest vendor) and CVD risk factors, and between access to highly processed and take-away food vendors with fasting glucose or insulin
14	Exploring Neighbourhood Environments and Active Commuting in Chennai, India	Deepti Adlakha et al	2018-International Journal of Environmental Research and Public Health	India	Active commuting, Public Transit, Residential density, Land-use mix, Street connectivity	NA	Physical Activity	370 participants (155 Urban wards in Chennai)	Cross-Sectional	Transit stop availability within a 10-minute walk strongly increased the likelihood of active commuting - A mix of land uses was associated with higher

										active commuting and public transit use
15	Density of Green Spaces and Cardiovascular Risk Factors in the City of Madrid: The Heart Healthy Hoods Study	Elena Plans et al	2019-International Journal of Environmental Research and Public Health	Madrid	Green Space, Public transit	Diabetes	Obesity Hypertension High cholesterol	1625 participants (aged 40–75)	Observational cross-sectional study	- A moderate protective relationship was found between green space density and several cardiovascular risk factors - Associations were significant only in women - The relationship between green spaces and hypertension was only present in larger buffers (1000 and 1500 m), and for high cholesterol and diabetes was stronger for smaller buffers (300 and 500 m)
16	Association between urban green space and the risk of cardiovascular disease: A longitudinal study in seven Korean metropolitan areas	Sumin Seo et al	2019-Environment International	Korea	Green Space	Coronary heart disease and its related events	CVD Events (Acute myocardial infarction (AMI) - Total stroke - Hemorrhagic stroke - Ischemic stroke)	- The study population consisted of 351,409 participants from the	Longitudinal (8-year Follow-Up)	- Residing in urban regions with greater green space coverage was associated with a reduced risk of total CVD (significant for participants aged over 40, but not for those under 40) - No significant reduction in risk for hemorrhagic stroke
17	Identifying built environmental patterns using cluster analysis and GIS: Relationships with walking, cycling and body mass index in French adults	Hélène Charreire et al	2012-International Journal of Behavioral Nutrition and Physical Activity	France	Green Space, Walkability, Cycling	NA	BMI, Physical Activity	- The study included 1,309 participants (603 men and 706 women)	Cluster Analysis	Subjects in neighborhoods with high accessibility to green areas and facilities, and high density of cycle paths, were more likely to walk/cycle (OR = 2.5, 95%CI 1.4-4.6) Body mass index (BMI) did

										not differ across the identified patterns.
19	Exploring associations of greenery, air pollution and walkability with cardiometabolic health in people at midlife and beyond	Miguel Ángel Royo-Bordonada	2019-Gaceta Sanitaria	2023-Geriatrics & Gerontology International	Greenery (NDVI), Air Pollution, Walkability	Diabetes (non-gestational) Heart disease Stroke	Air pollution	A total of 308,108, with 150,866 residents aged 45 years or older	Cross-Sectional	- Greenery was negatively associated & PM2.5 and NO2 were positively associated with diabetes and stroke prevalence. - Higher walkability was associated with lower diabetes prevalence, but only in areas with lower PM2.5 levels - No significant associations were found between PM2.5 and heart disease prevalence
20	Differences in the influence of the built environment on physical activities for people with normal weight, overweight, and obesity	Yuxuan Zou et al	2024-Health and Place	China	Land use mix, Park Density, Transportation	NA	Physical Activity	2138 individuals from Shanghai	Survey	Population density, public transit, and land use mix are key built environment variables, exhibiting distinct nonlinear associations and threshold effects on PA engagement that vary across weight groups .
21	Association of the retail food environment, BMI, dietary patterns, and socioeconomic position in urban areas of Mexico	Elisa Pineda et al	2023 - PLOS Global Public Health	US	Food environment variables (density of food retailers)	NA	Physical Activity, Unhealthy diet, BMI	General Characteristics = 5,080 Dietary Information = 1,572	Secondary analysis of cross-sectional, population-based survey data	Low availability of fruit and vegetable stores is associated with unhealthier dietary patterns, high density of convenience stores linked to higher BMI

22	Longitudinal changes in the retail food environment in Mexico and their association with diabetes	Carolina Pérez-Ferrera et al	2020-Health and Place	US	Food environment variables (density of food retailers)	Diabetes (Recent and Already diagnosed)	Dietary Pattern	2808 adults aged 20 years and older (from 53 cities in Mexico) -	Longitudinal Study	Neighbourhoods with declining fruit/vegetable store density, had higher odds of diabetes - Change in convenience stores and supermarkets alone, not independently associated with diabetes
23	Accessibility and use of urban green spaces, and cardiovascular health: findings from a Kaunas cohort study	Abdonas Tamosiunas et al	2014-Environmental Health	Lithuania (Europe)	Green Space (Distance from parks)	Diabetes and CVD (Fatal & Non-fatal)	Physical Activity, BMI, Blood Pressure	5,112 individuals aged 45-72 years	Cohort Study	Park users- lower prevalence of CVD risk factors and diabetes compared to non-users - An increased risk of total CVD observed for those living further from green spaces compared to those living closest
24	Environmental Quality Perceptions and Health: A Cross-Sectional Study of Citizens of Kaunas, Lithuania	Regina Gražulevičienė et al	2020-International Journal of Environmental Research and Public Health	Lithuania (Europe)	Green Spaces , Urban Form (Pathways and cycling routes), Air Quality	NA	Physical Activity Obesity (BMI) Diastolic Blood Pressure, Air Pollution	576 citizens from Kaunas City	Cross-Sectional Study	- Less physically active and rated the quality of pathways and cycling routes lower; visited natural environments irregularly; obese citizens gave poor ratings - Environmental issues for hypertension - poor access to green spaces by walking - Despite good infrastructure for walking/cycling, only 11.8% of participants met recommended physical activity levels.

25	Neighborhood Social and Built Environment and Disparities in the Risk of Hypertension: A Cross-Sectional Study	Regina Grazuleviciene et al	2020-International Journal of Environmental Research and Public Health	Lithuania (Europe)	Greenness (NDVI) and Perception of neighborhood Quality	Chronic Health Disease Status	Hypertention, Physical Activity , Obesity(BMI)	580 participants, aged 18–75 years, residing in 11 districts of Kaunas city, Lithuania	Cross-Sectional Study	- Social differences exist in the joint effect of built neighborhood quality and urban green spaces on hypertension risk. - Low socioeconomic status (SES) individuals residing in areas with low exposure to green spaces had a higher risk of hypertension. - The social environment and built environment quality had a complex effect on disparities in hypertension risk.
26	Association between area-level walkability and glycated haemoglobin: a Portuguese population-based study	Regina Sá et al	2024-BMC Public Health	Portugal	Area level walkability	Diabetes (Previously diagnosed)	HbA1c	4352 individuals, Portugal	Cross-Sectional Study	Residing in moderately walkable areas significantly reduced average HbA1c levels by 9.4% compared to the least walkable areas. Unexpectedly, higher area-level walkability (hyper-proximity of destinations) might reduce cumulative physical activity, and suburban areas (the worst of two worlds) might present a double burden

27	Obesity and the built environment: the case of Babol city	Mojtaba Shahabi Shahmiri et al	2024-Proceedings of the Institution of Civil Engineers - Urban Design and Planning	Iran	Population & Residential density Accessibility to public transport (quantity of bus and taxi stops within 100, 200, 400, and 800-metre buffers, and distance to the closest bus and taxi station) Green spaces (green space area within a 200-metre buffer)	Diabetes Cardiovascular diseases	BMI (Body Mass Index), Blood pressure	The study included 1200 participants from Babol city, Iran.	Cross-Sectional Study	Access to green spaces within a 200-meter radius did not show a significant association with diseases, which was an unexpected finding. Changing from lower to higher residential densities reduced the likelihood of developing heart disease by about 74% and diabetes by 44.4%
28	A geospatial analysis of Type 2 Diabetes Mellitus and the food environment in urban New Zealand	Jesse Wiki et al	2020-Social Science & Medicine	New Zealand	Food environment variables (fast food outlets, takeaways, dairy/convenience stores, supermarkets, fruit/vegetable stores)	Type 2 Diabetes Mellitus	Diet Intake	Cohort of 167,272 records	Spatial Analysis	T2DM prevalence is influenced by demographic factors, is spatially clustered, and is associated with environmental exposures - Fruit/vegetable stores consistently shows a protective effect on T2DM - Supermarket accessibility, associated with *increased* T2DM risk
29	The association of unhealthy and healthy food store accessibility with obesity prevalence among adults in the Netherlands: A spatial analysis	Benjamin Aretz et al	2022-SSM - Population Health	Netherlands	Food Environment (accessibility to fast food stores, fresh food stores, and supermarkets)		Obesity	Spatial units 2836 neighbourhoods (six-digit postal codes, wijken)	Ecological Study	Worse accessibility to unhealthy food, globally associated with lower obesity prevalence while, Better accessibility to fresh food stores and supermarkets was not Association btwn worse accessibility to unhealthy food and lower obesity was strongest for urban neighborhoods

30	Measured and perceived food environment influences on women's nutritional health in marginalized areas of northern Mexico: a structural equation modeling analysis	Zahid García et al	2025-Frontiers in Public Health	US	Food environment (perceived accessibility, affordability, convenience, and desirability of foods)	Presence of any NCDs	Waist circumference	Randomized sample of 104 adult women (18 years or older) and 80 food retail stores	Cross-Sectional Study	Participants had an average BMI of 31.0 kg/m², a high prevalence of abdominal obesity (90%), and NCDs (40%) A more nutritious food environment, the perception of availability and lower prices of healthy foods, was negatively associated with waist circumference and indirectly with the prevalence of NCDs
31	Health Impacts of the Built Environment: Within-Urban Variability in Physical Inactivity, Air Pollution, and Ischemic Heart Disease Mortality	Steve Hankey et al	2012-Environmental Health Perspective	US	Air Quality, population density, street connectivity, land use mix	Ischmic Heart Disease	Physical Inactivity, Air Pollution	30,007 individuals in southern California	Regional Travel Survey	Physical Activity (PA) more strongly associated with IHD mortality overall (51 additional deaths/100,000/year) than air pollution exposures Estimated IHD mortality from air pollution showed comparable magnitudes of difference between neighbourhoods (PM2.5: 9 more deaths/100,000/year)
32	Associations of street-view greenspace exposure with cardiovascular health (Life's Essential 8) among women in midlife	Sheryl L. Rifas-Shiman et al	2025-Biology of Sex Differences	US	Greenspace (total greenspace, trees, grass, other greenspace)	Cardiovascular Health	Diet Quality, Physical Activity, BMI, Blood Pressure, Blood Lipids, and Glycemic Index	767 women	Longitudinal Study	Greater street-view greenspace exposure (particularly visible trees) is associated with better CVH among midlife women % of trees associated with better scores for most individual CVH components, including diet, physical activity, BMI, and blood glucose

33	Association of Food Deserts and Food Swamps With Obesity-Related Cancer Mortality in the US	Malcolm Seth Bevel et al	2023-JAMA Oncology	US	Food Environment (Food Swamp & Food Desert score)	Cancer	Obesity	3038 individuals (among US counties)	Cross-sectional ecologic study	77% increased odds of high obesity-related cancer mortality rates in US counties with high food swamp scores Positive dose-response relationship observed among the 3 levels of food desert and food swamp scores and obesity-related cancer mortality
34	Active living-oriented zoning codes and cardiometabolic conditions across the lifespan	Shannon N. Zenk et al	2022-TBM	US	Food Environment, Walkability - Active living-oriented zoning environment (AL-OZ)	NA	Body Mass Index (BMI) Hyperlipidemia Hypertension	7,441,991 patients (292 counties in 44 states), aged 5 years and older	Retrospective, Cross-sectional Analysis	No evidence found about people in counties with more AL-OZ had lower BMI or lower prevalence of hyperlipidemia or hypertension
35	Urban form and its impacts on air pollution and access to green space: A global analysis of 462 cities	Nazanin Rezaei et al	2023-PLoS ONE	Global	Green Space, Air Quality (PM2.5 transportation emission & concentration), Urban Form(Street Connectivity)	NA	Air Pollution	462 metropolitan areas worldwide. Geographically , 56% of the cities are in Asia, 13.5% in Africa, 12% in Latin America and the Caribbean, 10% in Europe, 7.5% in North America, and less than 1% in Oceania	NA	Higher density, while reducing PM2.5 emissions from driving, is associated with less green space access and more PM2.5 exposure - Street connectivity shows a stronger association with reduced PM2.5 emissions from transportation compared to density

36	Independent and combined associations between fast-food outlet exposure and genetic risk for obesity: a population-based, cross-sectional study in the UK	Thomas Burgoine et al	2021-BMC Medicine	UK	Food Environment (Neighbourhood fast-food outlet exposure, Number of supermarkets in the home neighbourhood)	NA	BMI, BMI-Genetic Risk Score, weight status	12,435 UK adults	Cohort Study	There was no evidence of an interaction between fast-food outlet exposure and genetic risk on BMI, risk of overweight, or risk of obesity A combination of higher genetic risk (BMI-GRS) and the highest fast-food outlet exposure was associated with a 2.70 times greater risk of obesity
37	Exposure to green space, nighttime light, air pollution, and noise and cardiovascular disease risk: A prospective cohort study	Huihui Wang et al	2024-Environmental Pollution	UK	- Green space (residential greenspace, domestic gardens, water environment), Air Quality	Cerebrovascular diseases Heart failure Myocardial infarction	Air Pollution, BMI, Dietary Intake	292,634 participants from the UK Biobank cohort study	Cohort Study	Participants with more domestic gardens (DGG) showed increased cerebrovascular disease risk from exposure of PM10, while those with fewer gardens (GSG) did not. It suggests natural green spaces may buffer these effects. For heart failure onset, environmental exposures raised risk in GSG but not in DGG, indicating domestic gardens may help mitigate HF risk linked to environmental hazards.
38	Associations of residential green space with incident type 2 diabetes and the role of air pollution: A prospective analysis in UK Biobank	2023-Science of the Total Environment	Teng Yang et al	UK	Green Space, Air Quality (PM2.5 and NO2)	Type 2 Diabetes	NA	379,238 participants (UK Biobank)	Prospective Study	Residential green space level associated with lower risk of T2D Air pollution, specifically NO2, modifies this association, with green space offering higher protection against T2D in low NO2 levels PM2.5 partially mediates the association between green space and T2D, accounting for 37.0% of the effect .

39	Neighborhood walkability, physical activity, and walking behavior: The Swedish Neighborhood and Physical Activity (SNAP) study	2011-Social Science & Medicine	Kristina Sundquist et al	Sweden	Walkability, Moderate-to-vigorous physical activity (MVPA)	NA	Physical Activity	2269 individuals	Multilevel Analysis	Individuals in highly walkable neighborhoods had 77% higher odds for walking for active transportation and 28% higher odds for walking for leisure, compared to less walkable neighborhoods
40	Food environments and obesity: A geospatial analysis of the South Asia Biobank, income and sex inequalities	2022-SSM - Population Health	Petya Atanasova et al	South Asia (Bangladesh & Sri Lanka)	Food Environment (Densities of supermarkets & fast-food restaurants)	NA	BMI, Waist circumference, Obesity	12,167 adults from Bangladesh (8,534) and Sri Lanka (3,633)	Cross-Sectional Study	A higher supermarket share is associated with reduced BMI and waist circumference, and lower obesity probability, whereas higher fast-food restaurants are linked to increased obesity probability. Obesity prevalence is higher among high-income individuals, but fast-food availability is significantly associated with higher obesity probability among low-income individuals
41	Neighborhood walkability and cardiometabolic disease in Texas	Mei Yang et al	2025-Scientific Reports	US	Walkability	Diabetes Heart disease CVDs	BMI, High blood Pressure, Physical Activity	1994 observations	Observational Study	Higher neighborhood walkability significantly correlates with lower BMI and reduced diabetes risk No statistically significant association between walkability and high blood pressure, heart disease, or CVDs

42	Longitudinal Assessment of Urban Form and Weight Gain in African-American Women	Patricia F. Coogan	2011-Am J Prev Med	US	Urban Form (Housing density, interconnectedness of streets,public transit accessibility, sidewalk coverage)	Presence of Chronic disease	Obesity (weight change over 6 years)	- The study included 17,968 African-American women from New York City,	Prospective Cohort	- Women in the most urban quintile gained 0.79 kg less weight than those in the least urban quintile, with a significant trend (p=0.003) - Moving to neighborhoods of higher or lower urbanicity significantly changes 6-year weight gain or obesity risk among movers
43	Independent and Joint Associations between Multiple Measures of the Built and Social Environment and Physical Activity in a Multi-Ethnic Urban Community	Amy Schulz et al	2013-Journal of Urban Health: Bulletin of the New York Academy of Medicine	US	Urban Neighborhood Environment (Structural features Condition of the built environment)	NA	Physical Activity	Sample of 919 non-Hispanic Black, non-Hispanic White, and Hispanic	Observational Study	Sidewalk condition showed a direct association with physical activity. Street condition, physical deterioration, and the quality of parks and playgrounds influenced how structural characteristics related to physical activity. Greater integration and connectivity linked to slightly higher physical activity levels when parks and playgrounds were well-maintained.
44	Association of community food environment and obesity among US adults: a geographical information system analysis	Meifang Chen et al	2019-J Epidemiol Community Health	US	Food environment	NA	Obesity	20,897 adults	NA	Significant inverse association exists between community food environment and obesity ($\beta=-0.0210$; $p<0.0001$) Greater access to healthy food outlets is strongly related to lower BMI in some regions (e.g., Northern California, Central Texas) but significantly associated with higher BMI in others (e.g., merging areas of Pennsylvania, Maryland, Washington DC)

45	Built Environment and Obesity by Urbanicity in the U.S	Yanqing Xu et	2015-Health Place	US	Neighbourhood variable (street connectivity, walkability, fast-food to full-service restaurant ratio, urbanicity (NCHS urban-rural classification and continuous urbanization ratio)	NA	Physical inactivity Obesity	328,156 observations	Survey Study	Poorer street connectivity and a higher ratio of fast-food restaurants associated with higher obesity risk, especially in areas with certain urbanicity levels Better walk score linked to lower risk of obesity in large central metro areas, or highly urban areas, but this effect is primarily valid for women
46	Work and Home Neighborhood Design and Physical Activity	Jordan A. Carlson ET AL	2018- American Journal of Health Promotion	US	Neighborhood built environment attributes related to physical activity (MVPA), Active Transportation	NA	moderate-to-vigorous physical activity (MVPA)	1085 adults	Observational Epidemiology Design	Both worksite and home neighborhood environments independently relate to total MVPA and active transportation Mixed land use and street connectivity consistently show positive associations with physical activity outcomes
47	Transportation-related Environmental Mixtures and Diabetes Prevalence and Control in Urban/Metropolitan Counties in the United States	Margaret C. Weiss et al	2023 - Journal of the Endocrine Society	US	Public transportation usage Walkability Air Quality	Diabetes	Air Pollution (PM2.5 & PM10)	1473 urban and metropolitan US counties	Ecological Study	Increased particulate matter air pollution, reduced public transportation usage, and lower walkability were linked to higher diabetes prevalence Mixtures of poor transportation factors and worse air quality are associated with increased diabetes prevalence and reduced diabetes control
48	Environmental characteristics and disparities in adult asthma in north central Texas urban counties	J. Li et al	2023-Public Health	US	Green Space, Air Pollution	Asthma	Air Pollution	NA	Secondary Analysis	Asthma exacerbations were positively associated with traffic-related air pollution, but negatively linked to green space

49	Role of walkability, bike infrastructure, and greenspace in combatting chronic diseases: A heterogeneous ecological analysis in the United States	Behram Wali et al	2024- Sustainable Cities and Society	US	Walkability, Green space(parks), Redidential Density, Access to Transit	NA	Hypertention & Obesity	71,913 census tracts	Ecological Study	Walkability index, access to green space, and bicycle infrastructure were negatively correlated with hypertension and obesity, Improvements in walkability were associated with greater health benefits in high-risk areas: hypertension prevalence decreased 3.4 times more and obesity prevalence 1.8 times more at the lowest walkability levels (10th percentile) compared to the highest (95th percentile)
50	Associations of Residential Socioeconomic, Food, and Built Environments With Glycemic Control in Persons With Diabetes in New York City From 2007–2013	Bahman P. Tabaei et al	2017- American Journal of Epidemiology	US	Food environment, Walkability	Diabetes	Glycemic control (HbA1c level)	182,756 adults	Longitudinal Observation al Study	Residential areas with greater resources (healthy food, walkability) were associated with improved glycemic control People living in more advantaged areas achieved glycemic control faster (9.9 vs. 11.5 months). Moving to more advantaged neighborhoods reducing HbA1c by 0.40%, while moving to less advantaged areas HbA1c by 0.33%

