

# Planning Cities of the Future to Reduce Communicable Diseases

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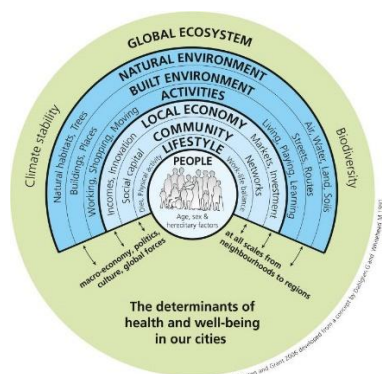
**Abstract:** *Urban health is the practice of promoting health among urban population by controlling exposure to agents of diseases. The research studies relation between urban health and urban planning, the topic also focuses on communicable disease. Communicable, or infectious diseases, are caused by microorganisms such as bacteria, viruses, parasites and fungi that can be spread, directly or indirectly, from one person to another. Some are transmitted through bites from insects while others are caused by ingesting contaminated food or water[1]. The study also discusses about how the spatial area contributes to the spreading of communicable disease. The reason for the spread is due to high density, overuse of private vehicles, improper drainage facility, improper drinking water, collection of wastes and so on. The main aim of the project is to study the components in planning cities for the future to reduce spread of communicable diseases. A methodology was framed for conducting the study. Methodology includes the literature study conducted on the history and influences of communicable disease on planning and it also identifies the factors. Further study was conducted based on two case studies. First case study is about urban mission based on UHRC (Urban Health Resource Center) at Agra and Indore, India and second case study focused on sustainable development in planning of Curitiba, Brazil, 3 best practices were also studied, they are solid waste management in Chittagong, Bangladesh, "Urban and transport planning, pathways to carbon neutral livable and healthy cities: A review of the current evidence" and "San Francisco use of neighborhood indicators to encourage healthy urban development" followed by the kind of tool indicators to encourage healthy Urban living. Case studies were analyzed between national and global, followed by a comparative study that was done between best practice and tool indicators. Based on the comparative analysis, strategy and recommendations were formulated.*

**Keywords:** Urban Health, Physical Environment, Communicable diseases, Framework

## 1. Introduction

Quality of life is an emerging issue, as it has been observed that people's perception, aspirations and behavior influence to a great extent many socio - economic dynamics and even certain developments in the urban context. The urban world is changing rapidly [2]. The World Health Organization (WHO) defines Health in the following way: "Health is a state of complete physical, mental and social well - being and not merely the absence of disease or infirmity" [3]

into the foreseeable future, cities are important determinants of future sustainability and human health and wellbeing. The value of linking urban environment and health and wellbeing outcomes is now well recognized. Health status is better in urban areas than in rural areas. The many positive aspects of urban life, such as employment, higher incomes, better opportunities for education, and access to health care, encourage rural to urban migration [4].



**Figure 1.1:** The determinants of health and well - being in our neighborhoods

Source: *Human ecology model of a settlement, Barton and Grant, 2006.*

Urbanization is irreversibly increasing around the world. In 2009, the level of urbanization around the world crossed the 50% mark. By 2050, the world's population will exceed 9 billion and an estimated 67% will live in urban areas [4]. With more than half of world's human population now living in cities, and with that proportion projected to increase

### Urban Health Facts

- *The urban transition is here; by 2050, 6.3 billion people will live in urban areas.*
- *Virtually all of the world's total population growth will be in urban areas of developing countries.*
- *Most growth is and will be in small and medium - sized cities.*
- *Megacities (cities with at least 10 million inhabitants) continue to grow.*
- *Urban slums predominate.*
- *The urban poor are underserved and underrepresented.*
- *Poor governance, inequity, social/economic stress, unemployment, and corruption can fuel political unrest across low - and middle - income countries.*

In September 2000, the United Nations (UN) General Assembly adopted the Millennium Declaration, establishing a global partnership of countries and development partners committed to eight voluntary Millennium Development Goals (MDGs), with an end date of 2015. Three of these eight MDGs were focused on health, and several of the MDG targets – such as those for nutrition, water and sanitation – had important health implications. On 1 January 2016, the MDGs were replaced by the Sustainable Development Goals (SDGs) – an all - encompassing and transformative global development agenda that commits

Volume 10 Issue 8, August 2021

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both developed and developing nations to work together to address the economic, social and environmental dimensions of sustainable development. In contrast to the MDGs, which set a limited number of development goals, the SDGs comprise 17 goals around five core themes – people, planet, prosperity, peace and partnership [5].

## 2. Aim and Objectives

### Aim

The research aims to study components in planning cities for the future to reduce spread of communicable diseases (CDS).

### Objectives

- To study the factors responsible for spread of communicable diseases (CDS) and analyze them spatially.
- To identify and define the key indicators of planning cities to reduce risk of communicable diseases (CDS).
- To identify and study the measures to evaluate planning of cities to reduce communicable diseases (CDS).
- To develop a framework of planning cities for communicable diseases (CDS).

## 3. Scope and Limitations

### Scope:

- To provide a model for planning of cities for communicable diseases.
- To understand the key factors to be considered for planning of cities for communicable diseases.

### Limitations:

- The study is limited to literature sources of study, no primary data collection done for this research.
- The study is context based (i.e. India).

## 4. Methodology

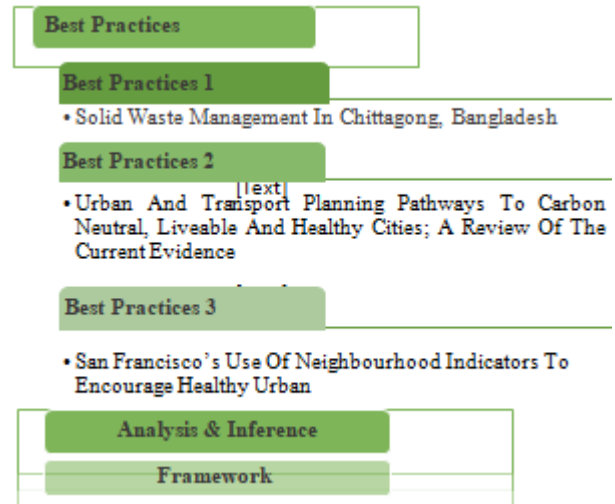
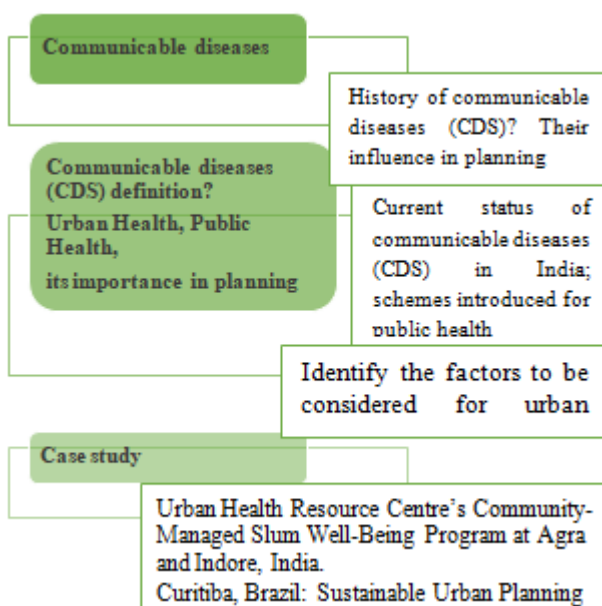


Figure 1.2: Methodology of the study  
Source: Author generated, 2020.

## 5. Literature Study

### 5.1 Urban health and urban planning

The practice of promoting health in urban populations by controlling exposure to the agents of disease first came to fruition in the mid - nineteenth century. This idea provided the initial indication that health and urban planning were directly associated due to the unpleasant effects of industrialization and urbanization [6].

The traditional aspects of health that influence urban planning are:

- 1) Disease control
- 2) Illness Prevention
- 3) Accident Reduction
- 4) Safety

### 5.2 Health implications of traditional urban planning

Health is both a social issue and a political issue, in order to improve the health situation in cities across the world, it is necessary to start where the people are and to involve them effectively in the processes of change. A primary focus must be on changing basic conditions – risky environments – in order to create long - term, sustainable improvements [6].

### 5.3 Urban health in global level

Urbanization affects the spread of infectious diseases in both developed and developing countries, in wealthy enclaves as well as informal settlements. Cholera, plague and yellow fever caused severe epidemics worldwide in the mid - nineteenth century, causing major disruptions in society and the economy. Especially in Europe, cholera epidemics caused high mortality between 1830 - 1847[7].

During the first International Sanitary Conference, Paris 1851, participating countries agreed on a regime that consisted of two basic parts; obligations on States Parties to [7]

- Notify each other about outbreaks of specified infectious diseases in their territories; and

- Limit disease - prevention measures that restricted international trade and travel to those based on scientific evidence and public health principles.

#### 5.4 Spatial planning and health

Spatial planning has a clear and strong influence on healthy choices made by individuals, and can be seen as a force for social justice in positively addressing the issues highlighted below [7].

The following issues impact on physical and mental health: The location, density and mix of land uses, Street layout and connectivity, Access to public services, employment, local fresh food and other services, Safety and security, Open and green space, Affordable and energy efficient housing, Air quality and noise, Extreme weather events and a changing climate, Community interaction, Transport [7].

#### 5.5 Factors to be considered for urban planning for public health

The key factors affecting health in cities can be considered within 3 broad themes:

- The Physical environment: The urban physical environment includes the built environment: the air city dwellers breathe, the water they drink, the indoor and outdoor noise they hear, the park land inside and surrounding the city, and the geological and climate conditions of the site where the city is located.
- The Social environment: The social environment has been broadly defined to include "...occupational structure, labour markets, social and economic processes, wealth, social, human, and health services, power relations, government, race relations, social inequality, cultural practices, the arts, religious institutions and practices, and beliefs about place and community"
- Health and Social services: The relation between provision of health and social services and urban living is complicated and varies between cities and countries. In wealthy countries, cities are characterized by a rich array of health and social services. The poorest urban neighbourhood often has dozens of social agencies, each having a distinct mission and providing different services.

## 6. Best Practices

### 6.1 Solid Waste Management in Chittagong, Bangladesh

In 1993, the World Health Organization declared Chittagong as a participant in the Healthy Cities movement. Representatives of a multitude of organizations, both public and private, have committed themselves to using a holistic view of urban management as a means to address environmental degradation and the related health problems. The project organizers started by dividing the city into several wards. The first area, the Jamal Khan Healthy Ward, is centrally located and thus makes supervision and monitoring by the Chittagong Healthy City Programme manageable. Their objective is to create success on a small level and then to replicate this success across other wards[8].

Total population of Chittagong City Corporation in the census, the year 1991 and 2001 were 1, 392, 860 and 2, 023, 489 respectively, which shows a population growth rate nearly about 4.53% per annum. During the same period national urban population growth rate was 3.27% [8].

### 6.2 Urban and Transport Planning Pathways to Carbon Neutral, Livable and Healthy Cities; a Review of The Current Evidence.

Half the world population lives in cities and this is likely to increase to 70% over the next 20 years. Cities provide jobs, are centres of innovation and wealth creation, but also often are hotspots of air pollution (e. g. particulate matter, NO<sub>2</sub>), noise, heat and disease[9].

From an urban and transport planning and health view, current urban developments have not been a great success. Many cities follow 2 dominant urban forms[9];

- Being either dense with large concrete structures such as high rises and road infrastructure for motorised traffic (e. g. Shenzhen) or
- Being of low density with lots of sprawl and extensive road infrastructure (e. g. Atlanta, Los Angeles, and Melbourne).

Land use often is described in terms of the five Ds: **density, diversity, design, destination accessibility, and distance to transit**. Higher population and development density lead often to shorter travel distances because destinations become closer to origins. Shorter distances are easier and more convenient to walk or cycle and reduce car use [9].

### 6.3 San Francisco's use of Neighborhood indicators to encourage Healthy Urban Development

Social indicators are measures that assess progress toward addressing social priorities. The indicators can be used to draw attention to problems, focus action, encourage collaboration, and monitor results. Neighbourhood indicators, a subset of social indicators, measure the physical and social characteristics of a place. Because neighbourhood indicators are proxies for several determinants of health, they can be used to promote population health. Neighbourhood indicators have several uses in urban planning and community development. Indicators identify neighbourhoods and neighbourhood attributes that need improvement. In 2007 the San Francisco Department of Public Health, working with multiple public agencies and over thirty local organizations, developed a system of neighbourhood indicators to evaluate how well decisions about land use planning met the needs and achieved the objectives of population health [10].

**Table 1:** Selected Healthy Development Targets for Affordable, Safe, and Adequate Housing in San Francisco.

Target
At least 20 percent of units are affordable housing.
At least 25 percent of units have two bedrooms and at least another 25 percent have three bedrooms.
There are at least twenty - five units per residential acre, or at least forty units per residential acre for projects half a mile or less from regional mass transit stops.
If the project results in the demolition or loss of permanently affordable, public, inclusionary, or rent -

controlled housing, it replaces the demolished or lost housing stock at a 1: 1 ratio and provides access to replacement housing for existing tenants at existing rents. The project provides mechanical ventilation that is consistent with standard 62.6 of ASHRAE (formerly the American Society of Heating, Refrigerating, and Air Conditioning Engineers).

6.4 Analysis and Inferences

According to the study we can infer that the key factors affecting health in cities can be considered within 3 broad themes: The Physical Environment, The Social Environment, Access to Health and Social services. From these The Physical Environment can be considered in planning and further can be classified as: The built environment, Drinking water & Sanitation, Pollution, Access to Green Space and Urban Climate.

Table 2: Analysis of Tools applied in the Best Practices with respect to domains

Domain	Sub - domain	Objectives	Best Practices		
			1	2	3
Living Conditions	Housing	Rate of homeless people by ethnic group, gender and age		■	■
		Rate of premature death among homeless people during winter or summer extreme weather events			
		Rate of social homes		■	■
		Rate of homes judged unfit to live in		■	■
	Leisure time	Increase leisure time opportunities for all		■	■
		Improve access to recreational opportunities		■	■
	Access to services	Improve health of the population	■	■	■
		Improve accessibility to health services	■	■	■
		Improve accessibility to social services	■	■	■
		Improve accessibility to education and vocational training opportunities		■	■
		Improve/maintain accessibility to private services		■	■
	Safety	Increase the level of safety		■	■
	Mental health	Improve mental health, quality of life and emotional well - being	■	■	■
	Environmental issues	Air quality	Reduce air pollution and improve air quality		■
Indoor air quality		Improve Indoor Air Quality			
Waste		Promote recycling	■		
		Reduce generation of waste	■	■	■
Greenhouse emissions	Reduce greenhouse gas emissions		■	■	
Planning and transportation issues	Energy usage	Reduce energy usage increasing the usage of energy saving materials		■	

		for new buildings			
Traffic & Congestion	Improve choice in transport; improve access to education, jobs leisure and services; and reduce the need to travel by private cars		■	■	■
Park, green areas and playground	Increase the number of green areas and playgrounds, improve accessibility to parks, playgrounds and green areas.			■	■

Source: Author generated, 2020

7. Developed Framework

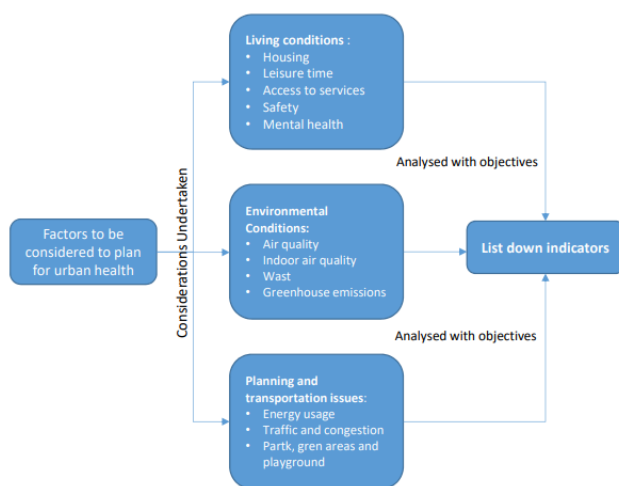


Figure 1.3: Structure of formulated framework

Source: Author generated, 2020.

Table 3: Framework

Living Conditions issues	
Sub - Domain	Indicators
Housing	<ul style="list-style-type: none"> <li>Rate of homeless people by ethnic group, gender and age</li> <li>Rate of premature death among homeless people during winter or summer extreme weather events</li> <li>Rate of social homes</li> <li>Rate of homes judged unfit to live in</li> </ul>
Leisure time	<ul style="list-style-type: none"> <li>Level of attractiveness of parks, green areas and playgrounds</li> <li>Level of satisfaction of the cultural activities implemented by season in the area</li> </ul>
Access to services	<ul style="list-style-type: none"> <li>Healthy Life Expectancy at birth</li> <li>Proximity of health services</li> <li>Level of satisfaction of the health services in the area</li> <li>Rate of health services accessible to disabled</li> <li>Proximity to pharmacies in the area</li> <li>Self - reported health status</li> <li>Proximity of social services</li> <li>Level of satisfaction of the social services in the area</li> <li>Rate of people using social services by gender, age, ethnic group</li> <li>Rate of social services accessible to disabled</li> <li>Rate of voluntary organisations providing social services</li> </ul>

	<ul style="list-style-type: none"> <li>• Rate of volunteers by age, gender and ethnic group</li> <li>• Illiteracy rate</li> <li>• Rate of education attainment by age, gender and ethnic group</li> <li>• Proximity of schools by grade</li> <li>• Proximity of vocational training venues</li> <li>• Rate of schools accessible to disabled</li> <li>• Rate of vocational training venues accessible to disabled</li> <li>• Proximity of shops</li> </ul>
<b>Safety</b>	<ul style="list-style-type: none"> <li>• Level of crime</li> <li>• Rate of reported domestic violence</li> <li>• Self - reported level of safety by age, gender and ethnic group</li> </ul>
<b>Mental health and emotional well - being</b>	<ul style="list-style-type: none"> <li>• Rate of death by suicide</li> <li>• Rate of hospitalisations for intentional self-harm</li> <li>• Residents' rating of how happy they are</li> <li>• Residents' satisfaction with their own lives in general</li> <li>• Residents' rating of experiencing negative stress over the past 12 months</li> </ul>

Sub - Domain	Indicators
Environmental issues	
Air Quality	Contamination per capita
Indoor Air Quality	Contamination per capita
Noise	Contamination per capita
Contaminated land	Contamination per capita
Radiation	Contamination per capita
Waste	Rate of recycled waste per total kg of waste
	Rate of waste produced per capita
Greenhouse gas emissions	Greenhouse gas emission per capita
Planning and transportation issues	
Energy usage	Used electricity per household/person
Traffic and congestion	Road traffic per day Modal share
	Number of car owned per 1000 capita Values of investment per different modes (public road / public transport / pedestrian infrastructure / bicycle infrastructure / airports)
Parks, green areas and playgrounds	Green areas square metres per capita Playground square metres per child under 15

Source: Author generated, 2020

## 8. Conclusion

Urban health depends on the multiple factors influencing humans and their living conditions as well as the interrelations between them (Lawrence, 2005). Public health and urban planning have common origins rooted in an understanding of cities as unsanitary and disorganized spaces, requiring intervention strategies focused on creating cleaner and more restrained environments (WHO, 2010). Through the literature study, the history of communicable diseases and its importance in planning were studied. Various schemes, programmes and their implementation were analysed. The key factors were identified for urban planning for urban health. Case studies were done at national level (under the Urban Health Resource Centre at Agra and

Indore, India) and in global level (Sustainable Urban Planning at Curitiba, Brazil).

Three best practices were done, Solid Waste Management in Chittagong, Urban and Transport Planning Pathways to Carbon Neutral, Liveable And Healthy Cities; A Review of The Current Evidence and San Francisco's Use of Neighbourhood Indicators to Encourage Healthy Urban to understand the various strategies and indicators taken in order to plan a city for public health. And further tools are studied for planning urban settlements on health, domain and indicators are obtained through this study.

Then the analysis of case study is done, and the analysis of best practices with respect to tools were conducted using the key factors for health in urban planning, and further a framework for planning was formulated. The framework formulated has certain limitations in implementing, they can be done in a neighborhood level/ regional level. Up to a certain stage it can be done using secondary sources of data and for further stage primary data collection is required.

## References

- [1] WHO, "World Health | Organization Regional Office for Africa, " 2021. [Online]. Available: <https://www.afro.who.int/health-topics/communicable-diseases#:~:text=at%20this%20time-,Overview,ingesting%20contaminated%20food%20or%20water.>
- [2] "Health & Quality Of Life In Urban Areas, " URBAN - NEXUS, 2013.
- [3] WHO, 1948.
- [4] "Global Health: Science and Practice, " 2014.
- [5] WHO, "Health in the SDG era, " 2017.
- [6] A. S. L. J. Duhl, "HEALTHY CITIES AND THE CITY PLANNING PROCESS, " WHO REGIONAL OFFICE FOR EUROPE, 1999.
- [7] B. K. P. Baridalyne Nongkynrih, "Current Status of Communicable and Non - communicable Diseases in India, " *The Journal of the Association of Physicians of India* · March 2004, 2014.
- [8] N. H. Md. Tashfique Uddin Chowdhury, "Solid Waste Management in Chittagong City, " 2018.
- [9] M. J. Nieuwenhuijsen, "Urban and transport planning pathways to carbon neutral, liveable and, " 2020.
- [10] R. Bhatia, "Case Study: San Francisco's Use of Neighborhood Indicators to Encourage Healthy Urban Development, " *Building Healthy Communities*, November 2014.

## Author Profile

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