Chapter 2: Epidemiological Patterns in the Urban Landscape: A Literature Review

The study of epidemiological issues has evolved over time, inferring that this is a dynamic science that changes its focus as new health and demographic issues arise. The present chapter aims to critically review available literature on the complex interplay between urbanisation, epidemiological patterns, and access to healthcare, with a specific focus on the context of sub-Saharan Africa and Harare, Zimbabwe. It seeks to synthesise existing knowledge on how urban environments influence the spread of infectious diseases, the challenges posed by a dual burden of disease, and the role of spatial factors in shaping health outcomes and access to health facilities. Frerot *et al.* (2018) have traced the changing definitions of "epidemiology" for the period 1978-2017 as an indicator of such dynamism. As such, the inference of epidemiological patterns was highlighted by Lilienfeld and Lilienthal (1980: 416) who assert that "Epidemiology is concerned with the patterns of disease occurrence in human populations and the factors that influence these patterns". This definition was further elucidated by Salathe´ (2018) who explains that the goal of epidemiology is to understand the patterns of disease and health dynamics in populations and the causes of these patterns to use such knowledge to mitigate and prevent disease and to promote public health. On the other hand, Buck (1988) argue that the study of epidemiological phenomena is of great significance to public health as it brings up the prospect that the society is the epicentre for explaining health problems and their solutions. In this context, the chapter reviews epidemiological dynamics in urban areas hinging upon the presumption that accessibility of health services counters the infectivity, pathogenicity, and virulence of disease outbreaks in urban populations.

The United States Department of Health and Human Services (2012) refers to epidemiological patterns as the occurrence of health-related events by time, place, and person. In this regard, time patterns refer to any time period that may influence disease or injury occurrence. Subsequently, personal factors that affect epidemiological changes are demographic variables such as age, sex, and socio-economic characteristics that may influence the occurrence of a health risk. On the other hand, place patterns connote any geographic

variation, and this includes urban and rural differences. As such, looking at the three factors of time, place, and personal characteristics of populations, the study is about descriptive epidemiology within an urban set-up.

There is no universal definition of what constitutes an urban area. However, population sizes and densities are the indicators that are commonly used to demarcate urban areas. As such, urban areas are mostly characterised by high population growth owing to both natural population growth and urbanisation factors. Boyce *et al*. (2019:1) observe how "…urbanisation continues to be a major driver of demographic change in today's world." On the other hand, the demographic factors that contribute to natural population growth (low infant mortality rate, lower morbidity, and higher life expectances) connote epidemiological transitions. Defo (2014), rectifying Omran's definitions (Omran, 1971), explains epidemiological transitions as the long-run shift in mortality and cause-of-death patterns inherent in the secular mortality decline from high to low levels embedded in a series of concurrent changes in population health. Focussing on urban areas, epidemiological transitions would infer such demographic changes within urban space and as such would be explained through urbanisation and thus a relatively young population structure. By and large, epidemiological transitions describe epidemiological patterns within a specified population and space.

On a global scale, epidemiological patterns across urban space vary from country to country, and from urban area to urban area. Nonetheless, as compared to rural areas, it is evident that the patterns vary. Urban life has the advantage of relative proximity to health facilities as compared to rural life (Norwegian Institute of Public Health, 2020). However, Moore *et al*. (2003) argue that decreases in activity, whether someone is working or not, combined with access to processed food high in calories and low in nutrition, contribute to the burgeoning epidemic of obesity and diabetes worldwide. Moreover, high population densities that characterise urban life are associated with various public health problems. Moore *et al.* (2003) aver that diseases transmitted through respiratory and faecal-oral routes are more frequent in situations involving crowding, for example tuberculosis, rheumatic heart disease, and helminthic infections. Additionally, as cities are

characterised as economic hubs that attract high mobility, disease transmissions are rapid in such environments.

Brizuela *et al.* (2020) aver that urban design determines the densities and relative locations of housing, jobs and services inside a city and this helps shape interaction networks through that diseases are spread as determined by transport networks. This concurs with the findings of Gosce and Johansson (2018) who submit that there is a positive relationship between public transport and airborne transmission of diseases. Analyses of the SARS outbreak in 2003 in Beijing suggest that the geographical spread was affected by population density, health care resources and public transport routes (Norwegian Institute of Public Health, 2020). On the other hand, modelling studies confirm that air transport significantly contribute to the spread of epidemics, notably outbreaks of influenza A(H1N1), SARS and COVID-19 and major cities are the major hosts of such outbreaks owing to such mobility (Wilson and Chen, 2020).

During the outbreak of global epidemics, public health preparedness is often found wanting. Such a lack of preparedness contributes to the spread of diseases as noted during the pneumonic plague outbreak in Madagascar in 2017 that spread to urban areas, where health care workers were not used to diagnosing the plague, leading to delayed diagnoses and continued transmission and rapid spread due to population density and susceptibility (Roberts, 2017). On the other hand, lack of preparedness during the outbreak of COVID-19 exposed a lack of surge capacity in most health centres worldwide. This was evident in that there was a shortage of intensive care beds, mechanical ventilators, and facilities for screening patients, laboratory capacity and supplies, PPE, medical equipment, and pharmaceuticals in most health facilities (Norwegian Institute of Public Health, 2020). Additionally, the imposition of infection control measures such as non-pharmaceutical control measures in most cities were ineffective during the onset of the outbreak. For example, cities like Paris and Rome had challenges implementing full lockdown for their homeless population during the COVID-19 outbreak. By and large, such a lack of preparedness has cost lives due to delayed intervention measures.

There are inherent inequalities within urban areas due to socio-economic factors. These inequalities pose a threat to effective epidemic control as there are varied intervention measures and responses owing to such disparities. The 2014-2015 Ebola outbreak in West Africa confirm such sentiments of inequalities whereby it was proven that the outbreak was more severe across urban informal settlements (Eisenstein, 2016). As such, Boyce *et al.* (2019) argue that populations residing in specific high-density neighbourhoods, and especially in informal settlements or slums, are at an increased risk for infectious disease due to over-crowdedness and limited accessibility to health facilities. By and large, as a preventive measure to infectious diseases, Saha *et al.* (2018) argue how model simulations for the low-income residential areas in Delhi affirm that vaccinating slum residents would be effective in curbing epidemics.

During pandemics, urban people lose faith in primary health care and subsequently favour referral health care (Yuan *et al.*, 2009). However, such actions result in inefficient health care delivery as most hospitals would not have the surge capacity to control the disease. Subsequently nosocomial spread has become a common feature during disease outbreaks. Transmission is facilitated by the close contact between patients and staff, large number of patients during outbreaks, the presence of families visiting the sick, the vulnerability of patients due to underlying medical conditions and the connectivity between health care facilities found in urban areas (Norwegian Institute of Public Health, 2020). For example, the outbreak of the 2015 MERS in South Korea had nosocomial spread characteristics whereby the disease was transmitted across health facilities (Kim *et al.*, 2017). On the other hand, during the outbreak of COVID-19, Chinese urban hospitals were overwhelmed by large numbers of patients, and this resulted in nosocomial transmissions before fever clinics for triage were constructed (WHO-China Joint Mission, 2020).

On the other, the spread of the SARS epidemic in Toronto was partly owed to a transmission of the disease into at least 128 cases within a singular hospital (Skowronski *et al.*, 2006). Additionally, one of the first COVID-19 cases in Norway was an ophthalmologic doctor returning from vacation, that resulted in an outbreak among health care workers at the hospital in March 2020

(Norwegian Institute of Public Health, 2020). Such a feature of epidemics is also evident in Sub-Saharan urban health facilities. However, easy access to primary health care services will lower the burden on hospitals. Moreover, health-care workers need to be prioritised in vaccination programmes to avoid such a type of transmission (Taylor *et al*., 2010). Nonetheless, Yang *et al*. (2016) observe how most governments in developing countries, particularly in Sub-Saharan Africa, are not able to fund immunisation for most epidemics and are thus usually bailed out through donations and the cities in this region have poor infrastructure for mass vaccinations. By and large, Vearey *et al*. (2019) aver that the sub-Saharan Africa epidemiological patterns are characterised by a dual burden of disease. Non-communicable diseases (NCDs) are becoming more prevalent even while infectious diseases remain a substantial source of morbidity and mortality, especially among children; moreover, many NCDs, including diabetes, obesity, and heart disease, are strongly associated with urbanisation (Boyce *et al*., 2019). In the African context, urbanisation is associated with poor neighbourhoods and informal settlements where accessibility of health facilities is limited (Turok and Mcgranahan, 2013).

Urban inequalities in accessing amenities are more pronounced in African cities whereby the poor face some challenges in accessing them. This is because of a combination of factors tied to rapid urbanisation, limited resources, and historical patterns of segregation. The fast pace of urban growth often outstrips the capacity of governments to provide essential services, and pre-existing inequalities related to income, infrastructure, and spatial planning exacerbate these challenges, leaving poorer residents disproportionately underserved. These factors contribute to significant disparities in access to amenities for the urban poor in African cities. As such, people living in informal settlements face higher risks during epidemics as they lack in the provision of social amenities. Additionally, some diseases spread more rapidly depending on the housing factor, a fact that portrays the risk in high-density suburbs and informal settlements in African towns and cities. Diseases showing increased prevalence or transmission in high population density urban environments include respiratory diseases, viral haemorrhagic fevers, malaria, and enteric diseases (Boyce *et al*., 2019). For malaria, research has confirmed that the disease in Africa flourishes in

situations where temporary housing structures are prevalent, and this characterises slum settlements (Killen *et al*., 2019). On the other hand, Sasaki *et al*. (2008) reveal that in Lusaka, cholera was more prevalent in areas with poor sanitation infrastructure such as lack of access to a latrine and poor drainage systems.

In sub-Saharan Africa, the prevalence of one epidemic disease correlates with the epidemiology of other health problems. For example, the risk for respiratory infections, and specifically tuberculosis, can be impacted by the burden of HIV in urban environments or by close contact with others infected with tuberculosis (Boyce *et al*., 2019). On the other hand, Murewanhema and Makurumidze (2020) submit that in Zimbabwe, poorly controlled chronic diseases (hypertension, diabetes, and HIV) during the outbreak of COVID-19 increase the odds of death from the pandemic. Interestingly, Wong *et al*. (2015), researching on the transmission of infectious diseases in the slum areas of Kenya, discovered that for HIV-negative people living with HIV-positive people, the probability of them contracting respiratory and diarrheal infections was high. By and large, such positive correlations among various infectious diseases in Africa are promoted by poor epidemic preparedness among the responsible authorities.

In sub-Saharan Africa, the necessary quick access to health facilities is derailed by various factors. Magalhães *et al*. (2012) find distance as a hindrance to access malaria treatment in northern Angola urban areas. On the other hand, exclusive urban planning is seen as a causal factor for the inaccessibility of health facilities in poor neighbourhoods (WHO, 2019). However, when considering infectious pathogens with high case-fatality rates such as viral haemorrhagic fevers (VHFs), including Ebola, Lassa Fever, Marburg, and Crimean Congo Haemorrhagic Fever (CCHF), rapid diagnosis and timely, high-quality delivery of treatment are critical, and these features are lacking in most African urban public health matrices (Boyce, 2019). As such Polonsky *et al*. (2014) submit that typhoid fever in the African urban set-up is re-emerging under the challenges of increasing urbanisation, chronic underinvestment in water and sanitation infrastructure, and emerging drug-resistance.

In the Zimbabwean context, morbidity and mortality trends in the urban areas show that the population is still affected by common preventable and treatable diseases and conditions including nutritional deficiencies, communicable diseases, pregnancy, childbirth and new-born-related conditions (JICA, 2012). On the other hand, the evolving epidemic of HIV in Zimbabwe continues to have a major influence on the incidence and pattern of occurrence of cancer, particularly Kaposi sarcoma, non-Hodgkin lymphoma and cervical cancer, and these are associated with HIV&AIDS in urban areas (Chadambuka *et al*. (2011).

Urban health service delivery during pandemics, particularly the COVID-19 outbreak, is poor. Just like most urban health facilities in sub-Saharan Africa, the COVID-19 outbreak exposed a lack of surge capacity in controlling the epidemic. The referral hospitals were overwhelmed by patient inflows and the local authorities, particularly Harare City Council, were ill-prepared for a health pandemic of such a magnitude. As such, Murewanhema and Makurumidze (2020) assert that health delivery during such a public health crisis epitomized the three-tier delay model as the epidemic led to: reduced consultations due to lack of PPEs; challenges in transporting patients from primary level to higher-level facilities since most of the treatment was accessed in referral hospitals; and lastly supply chain disruptions that led to the shortage of medicines and ventilators. The situation was not helped by the fact that the government had imposed a national lockdown as a control measure to curb the spread of the epidemic and, therefore, accessing health facilities, was a challenge since the only legible public transport were those affiliated to the transport parastatal, the ZUPCO. On the other hand, UNOCHA (2020) highlighted that people living in urban informal settlements are at increased risk of contracting COVID-19 due to inadequate access to essential health care, clean water and sanitation services and crowded living conditions.

Most epidemics have underlying causal factors. As such, if local authorities are well prepared for the occurrence of such epidemics, the epidemics were controlled before they become too widespread. Polonsky *et al*. (2014) reveal that the enteric infection epidemics that were experienced in Zimbabwe, mostly in Harare Metropolitan Region, between 2008-2014 were mostly

linked to chronic underinvestment in the maintenance of water and sanitation infrastructure, leading to irregular water supplies, difficulties in protecting drinking-water supplies, and the breakdown of sanitation systems. These conditions triggered the occurrence of typhoid and cholera in Harare Metropolitan Region.

On the other hand, it was reported that there was nosocomial transmission of COVID-19 among the local authority health workers in Harare (UNOCHA, 2020). The lack of preparedness, as evidenced by a lack of PPEs exacerbated this health problem. On this note, Norwegian Institute of Public Health (2020) notes that such shortages were made acute due to the fact of relying on importations from China that had since impose a national lockdown to contain the COVID-19 epidemic. Nonetheless, these workers need to be prioritised in vaccinations since they are front-line workers who are exposed to the disease through providing health care to the patients. By and large, UNOCHA (2020) submits that it is critical that the capacity of the health system to test, isolate and treat all cases of suspect, confirmed and probable COVID-19 cases is enhanced.

As observed by the United Nations (2017), there is no universal definition of what constitutes an urban area, but countries use population density and size as indicators of urbanity and thus delineate urban areas. Nonetheless, United Nations (2018) projects the number of megacities to increase from around 33 to 43 by 2030, with most of them being concentrated in Asia and Africa. There is a positive relationship between urbanisation and accessing health facilities (Norwegian Institute of Public Health, 2020). In this light, it were pointed out that as urban space increases, the number of health facilities is also deemed to increase. However, accessing these facilities is dependent upon mobility factors on the part of the urban population (Brizuela *et al*., 2020). On the other hand, despite the increased advocacy towards sustainable urban health development, little is being done towards addressing emerging infectious diseases on a global level.

Banton and Grant (2013) note that the World Health Organisation (WHO) European Healthy Cities programme does not include planning measures to tackle risks associated with respiratory pathogens, despite the programme

having twelve objectives towards urban health planning. Therefore, despite an envisaged increase in health facilities, the key factor towards accessing health services is urban planning and designing. For example, China promoted the construction of fever clinics and dedicated hospitals as a means to solve the low surge capacity of referral hospitals in dealing with the COVID-19 epidemic (Meng *et al*., 2020). Such flexible planning bridged the gaps associated with three-tier health-care delivery systems (that is, primary, secondary, and tertiary healthcare systems).

On the other hand, WHO (2018: 83) argue how health systems in sub-Saharan Africa region are underperforming, operating at around 49% of what they can and this is owed to low system resilience. However, Vearey *et al.* (2019) assert that between 2015 and 2050, over half of the expected global population growth were in Africa, and this highlights the need to plan towards sustainable and resilient urban health within the region. However, since the African urban space is characterised by intra-urban inequities, as depicted by increasing housing informality within the region's urban areas, accessing health facilities would prove to be a challenge for most urban dwellers (UN-Habitat, 2014). African cities are inherently unjust spaces typified by inequality and inequity (Vearey *et al*., 2010; Friel *et al*., 2011).

Referring to the city of Nairobi, Boyce *et al.* (2019) buttress the fact that inequality in accessing health facilities lead some urban dwellers to seek health services from unlicensed vendors. This is the same in the Zimbabwean context whereby accessing health facilities is hindered by the income factor and this has pushed people to seek some medications from the streets (Parliament of Zimbabwe, 2019). However, such trends imply that surveillance mechanisms for early detection of epidemics would be disrupted since the unlicensed practitioners would be able to report to the responsible authorities if there is an outbreak. By and large, UN-Habitat (2014) argue that the sub-Sahara region urbanisation is characterized by a generally *laissez-faire* approach to urban management, and this has led to the proliferation of unplanned, underserviced settlements, where diseases, associated with poor water and sanitation, are rife.

The United Kingdom Home Office (2019) argues that in Zimbabwe, 14% of the health facilities in urban areas while 86% are in rural areas. Despite the fact that cancer is among the diseases that contribute to morbidity in Zimbabwe, cancer screening services are only available at referral hospitals in the country, and these are in urban areas. On the other hand, without health insurance, the high costs of biopsies, surgery, and treatment for cancer mean that many cancer patients cannot afford proper care and end up dying from a disease that is now mostly preventable and this is a morbid example of inequity in Zimbabwean health service delivery system. On the other hand, research carried out by Isbell and Krönke (2018) on the Zimbabwean health system revealed many aspects of urban public health in the country. The following are some of the research findings: 61 % of Zimbabweans living in urban areas live in areas with a nearby clinic and these mostly were within walking distance.

Expectedly, health facility access was found to be more common in cities (75%) than in rural areas (52%) and this confirms the urban advantage of accessing health care. Harare Province has seven quaternary-level healthcare facilities and forty-five primary level clinics (Isbell and Krönke, 2018). Despite these health facilities, in 2018, there was another cholera epidemic that was fuelled by poor sewage and water systems and inadequate health-care infrastructure and shortages of medicine, intravenous fluid, and protective clothing (Isbell and Krönke, 2018). In such a crisis, the local authority is always caught unprepared. For example, in 2020, there was another typhoid outbreak in Harare with 695 cases and 10 deaths and during such a crisis, the local authority, Harare City Council Health Department needed five new incinerators (UNOCHA, 2020). By and large, it is deduced that controlling health emergencies is not an event but rather requires a systematic approach whereby the central authority must collaborate with the local authority to prepare for such public health emergencies.

Morino *et al.* (2021) argues how the prompt delivery of services is essential in ensuring that the maximum time is available for urban dwellers to do accomplish other social functions besides accessing health services. On the other hand, Hullard *et al.* (2019) argue how health system accessibility is not merely a function of traveling to hospitals, clinics, and health posts, but is also

a function of community response to infectious disease threats. This means that the population would be comparing the opportunity costs of accessing the health facilities. In other words, if the facilities are distant and thus take more time, or the journey involves some travelling challenges, the people would be reluctant to access the facilities. In this sense, WHO (2018:42) submits that access to health and health related essential services involves the removal of physical barriers faced by the population that hinder their use of such services. As such, besides removing the travel challenges, there is need to ascertain that that the people would not be delayed by poor services when they reach the health centres. Such a delay is limited by making available hardware needed to deliver services, that is, health workforce, infrastructure and equipment, and the availability of medicines. In this sense, a measure of achievement implies that efficient health and health-related services are close to households and communities, allowing their utilisation as and when needed.

In the African region, health investments in the workforce, infrastructure and supplies remain low. This is reflected by the low access index of 0.32 and this indicates that the health systems in the region are only able to assure 32% of the potentially possible access to essential health services (WHO, 2018). The access index varies significantly between countries, ranging from a low of 0.12 (Central African Republic) to a high of 0.70 (Mauritius). However, noteworthy is the fact that the proxy indicators for health accessibility are largely resource-dependent, without a measure of distance or travelling time needed to reach the health facilities. Nonetheless, in comparing countries by income level, there is a consistent improvement in access to services, the higher the GNI of the country (WHO, 2018: 46). Therefore, it is expected that the more economically developed a country is, the more accessible, even considering the time taken to access the health services, the health facilities are.

In the Zimbabwean context, accessibility of health facilities with respect to time use is influenced by two factors: distance and the funds needed to secure the health services. For example, in the 2010-11 ZDHS, 36% and 10% of the women in the urban areas cited money to pay for treatment and distance, respectively, were hindering factors for them to access health facilities (JICA,

2012). This implies that, instead of spending time accessing health facilities, the women would rather use the time to make more money since travelling to the health facility makes them lose the opportunity to make more money and depleting their disposable income by paying for the health services.

Morino *et al.* (2021) argue that the time saved from mobility in accessing health facilities is critical as urban dwellers do not only waste time on the roads, but they also incur high opportunity costs during commuting. On this note, Liu (2019) asserts that in the United States, an average of 54 hours per year are lost during travelling owing to traffic jams and congestions for every American driver. By and large, due to such traffic problems, Morino *et al.* (2021: 101) estimate that on average, traffic delays lead to a consumption of USD 1010 per year per person, that cumulatively translates to over USD 166 billion per year nationally. This points out to the fact that proximity to health facilities has some advantages, and these are not only financial. By and large, during an epidemic such as the ongoing COVID-19, lives are sometimes lost due to delays in accessing health services. If a person dies, all the human capital investment on the person at individual and national level would have been lost.

With regards to health service accessibility in Zimbabwe, Isbell and Krönke carried out research and it was found that in general, health service delivery in the country is characterised by inefficiency (Isbell and Krönke, 2018). The research highlighted that in addition to difficulties in obtaining health care, many Zimbabweans complain of long waiting times, with only 19% of the respondents submitting that they are assisted promptly. Contrariwise, 45% of urban dwellers, as compared to 32% of rural area respondents, revealed that the delays in accessing healthcare were more acute and such scenarios worsened during health crises such as cholera outbreaks (Isbell and Krönke, 2018). This indicates that the opportunity costs for accessing health services are higher for urban populations than people in rural areas in the country.

As observed by Moreno *et al.* (2021), the 15-Minute City concept hinges upon the philosophy of chrono-urbanism. This concept, as expounded by Mulíˇcek *et al.* (2014), seeks to conceptualize access to urban utilities through the lens of time, asserting time taken to access basic amenities as an indicator of

wellbeing. In other words, the philosophy propounds that "the quality of urban life is inversely proportional to the amount of time invested in transportation, more so using automobiles" (Moreno *et al*., 2021: 100). In this context, it is advocated that basic amenities for urban people need to be acquired within a 15-minute walkable distance, or rather cycling distance.

Li *et al.* (2019) trace the conception of the 15-minute City concept to Japan's urban planning and design in the 1960s when the "local life circle" and "settled circle" concepts were introduced. These concepts were meant to introduce the aspect of proximity of basic services to the people. As such, the concept was modified and modified in Asia whereby the residential design of South Korean cities was influenced by it. Additionally, Xiao *et al.* (2014) reveal that the development plan for Taiwan in 1979 was also hinged upon such a proximity concept. the concept has gathered momentum with the Shanghai local administration incorporating it in the 2016 Shanghai Master Plan whereby the "15-minute community life circle" was subsumed to be the basic unit of building community life (Shanghai Administration, 2016). On the other hand, Li *et al.* (2019) carried out research and found that the third-tier city of Baoding was planned as observed by the 15-minute city concept. Specifically, the research results showed that "the allocation of convenient commercial facilities, dining facilities and medical facilities is relatively good; the allocation of community cultural facilities, primary and high schools needs to be improved; and the community pension service facilities need to be constructed urgently" (Li *et al*., 2019: 602). In other words, the 15-minute City Concept is an emergent concept that seeks to incorporate the input of local communities into urban planning through prioritising and localising their interests. By and large, these findings cement the conviction that the adoption of the Concept into urban planning leads to urban dwellers enjoying six essential urban functions: living, working, commerce, healthcare, education, and entertainment within a walkable distance (Moreno *et al*., 2021).

Moreno *et al.* (2021) have modified the concept by including the following components into the concept: proximity, diversity, density and digitalisation. In line with this concept, it is realised that density has a direct link to travel and diversity as propounded by Ewing and Cervero (2010) that high densities in urban areas, as facilitated by ultra-high-rise buildings would lead to

diseconomies of scale in travelling. Therefore, the Concept advocates for density to imply people per square kilometre whereby the optimal number of people that a given area can comfortably sustain in terms of urban service delivery and resource consumption would be considered in planning. On the other hand, the component of proximity in this Concept denotes both spatial and temporal connotations that infer that within the 15-minute walkable distance, basic services would be accessible for urban residents. Although such a chrono-urbanism aspect is arbitrary, the significant factor is that these services would be readily available to the people without wasting valuable time and travel resources to access them. Of importance to urban planning and accessibility of urban utilities is the fact that the Concept favours diversity through mixed use of urban space and multiculturalism. In this context, the urban land-use zone concepts are discouraged and thus planning is inclined towards compact usage of urban space and such planning promotes urban sustainability and inclusivity (DeLisle and Grissom, 2013; Sinxadi *et al*., 2020).

Noteworthy is the fact that the digitalisation component actualizes the three preceding ones. Moreover, digitalisation in this context aligns the 15-Minute City Concept to the Smart City one since the factor promotes resident inclusivity and participation in planning through technology advancement (Dembski *et al*., 2020). Nonetheless, the 15-minute Concept is more inclusive than the Smart City Concept in that technology advancement in the latter concept is the major key to urban sustainability, yet it has proven to be costly to the urban poor and thus promote inequalities (Pandey, 2020).

By and large, Boyce *et al*. (2019) commend that urban planning were an under-utilised yet important tool, even in resource-limited settings. This implies that there is no substitute for urban planning as its absence has dire consequences, especially in sub-Saharan Africa. Sasaki *et al*. (2009) argue that poor urban planning in African urban areas is a colonial era legacy that promoted exclusivity as facilitated by racial segregation. By and large, Boyce *et al*. (2019) asserts that such poor urban planning in the African urban landscape increases the risk factor for disease outbreaks such as malaria, particularly in the city of Lusaka, due to poor drainage and inaccessibility of some health facilities that were favourably located near white residential

areas during the colonial era. By and large, UNOCHA (2020) portray distance and unpreparedness as limiting factor to access COVID-19 treatment for people in Harare Metropolitan Region as COVID-19 patients were attended in referral hospitals only and these had an acute shortage of equipment such as ventilators during the outbreak. However, since Harare City Council is condoning urban sprawl and mixed-land use initiatives within the city centre, and at the same time shunning mixed-land use within residential areas (as evidenced by Operation Murambatsvina and other like operations) such a standing in urban planning is not sustainable during an epidemic as COVID-19, as evinced by the 15-minute City Concept.

Brizuela *et al.* (2020) argue that the agglomeration of jobs and services drives large fractions of a city's population increases contact rates between the residents of distant neighbourhoods and this exponentially increases the spread of respiratory diseases such as COVID-19. By and large, it is herein submitted that people have unequal roles in spreading such respiratory diseases and the heterogeneity depends on the distance they travel on a daily basis. Such inequalities lead to spatial inequalities in the size, timing and growth rate of epidemics (Merler and Ajelli, 2009).

The empirical research in Guadalajara City, Western Mexico, by Brizuela *et al.* (2020), revealed that the mobility of urban residents determines the success of epidemic control interventions. The researchers observed that efficiency of vaccination campaigns is likely to vary depending on the target population, that is whether inhabitants of the city centre, its visitors, or people living in suburban areas. On the other hand, the observation highlights that the success of such non-pharmaceutical interventions as lockdown measures need to be widespread to reduce the interaction of other people from distant neighbourhoods. Inversely, there is need for total containment of people within their local neighbourhoods if such intervention measures as lockdowns are to be successful. By and large, the research findings included the following: by evenly distributing activity hubs throughout a city (instead of clustering them in the city centre), city planners can segregate subsets of the population and potentially inhibit the rapid transmission of pathogens across distant neighbourhoods. Noteworthy is the fact that the research results affirm the need for urban planning to promote decentralisation of

basic urban utilities to reduce the travel time for urban dwellers and thus promote physical distancing between residents from distant neighbourhoods and thus affirm the need to adopt the 15-Minute City Concept in urban planning.

Urban areas have inherent socio-economic inequalities and inequities (Vearey *et al*., 2019). During the colonial era, such discrepancies in accessing urban basic facilities such as health were fuelled by racial segregation, but today, disposable income disparities are the drivers. Therefore, housing informalities, particularly slum settlements, carry the inequality burdens and this makes them risk areas in epidemic outbreaks (UNOCHA, 2020). As such, WHO (2018: 84) recommends that "there is need to find means of taking services to previously unreached populations; not only those physically unreachable but even those unreached when in plain sight – like the urban informal settlements." The declaration reveals that health inaccessibility for some urban dwellers is hindered by urban planning as health facilities cannot be established in "illegal settlements" as propounded by corresponding master plans.

To curb inequality problems in cities, one particular blueprint is used worldwide, and this is the Urban Health Equity Assessment and Response Tool (HEART). This is a guide for policy and decision-makers to identify inequities in health between people living in various parts of cities, or belonging to different socioeconomic groups, and to facilitate decisions about effective strategies, interventions and actions that should be used to reduce health inequities (Norwegian Institute of Public Health, 2020: 30). Through this tool, local authorities are able to prioritise areas within their jurisdiction that may need health interventions. As such, the blueprint is a tool for redistribution of health resources during health emergencies and crises. Of importance is the fact that Urban HEART is a package that incorporates the following response strategies: incorporate health in urban planning and development; emphasise and strengthen the role of urban primary health care; strengthen the health equity focus in urban settings; put health equity higher on the agenda of local governments; and pursue a national agenda (World Health Organisation & WHO Centre for Health Development, 2010). Of particular importance to African cities, particularly Harare, the capital city of

Zimbabwe, is the need for the Harare City Council to promote primary healthcare so that the people would not find it necessary to travel long distances to referral hospitals during a health emergency.

In line with the Urban HEART tool, health provision in cities need to be guided with the following institutions: good clinical governance practice; person-centred provision; and health resilience. WHO (2018: 67) advocates that "Clinical governance is focused on ensuring that a standard quality of preventive, promotive, clinical or rehabilitative care is provided to each person, irrespective of where they access services." In the Zimbabwean context, both central and local authorities need to collaborate to ensure that good healthcare is also accessed in public institutions, not in private health centres only where the fees are exorbitant. On the other hand, person-centredness in healthcare provision ensures that a patient is the fulcrum of decision-making regarding healthcare. This means that the responsible authorities would consider the opportunity costs incurred by the patient in accessing the health facilities, and thus during planning, they would strive to reduce these costs by offering quality healthcare that is accessible in terms of travel-time, for example. By and large, there is need to promote resilient healthcare provision and this is characterised as "the inbuilt capacity of the system to sustain provision of essential health and health-related services even when challenged by outbreaks, disasters, or other shocks (WHO, 2018: 42).

The epidemiological patterns in urban areas are mainly determined by urban design and planning. These in turn are influenced by socio-economic factors that tend to favour the urban affluent. In this regard, the inherent inequalities in accessing urban utilities are more exposed during epidemics. The poor have limited resources to access healthcare, yet at most, the local authorities are ill-prepared to control and intervene in health emergencies. As such, the urban poor carry the epidemiological burden of accessing healthcare over long distances since primary healthcare in most cases, lacks the surge capacity to offer the needed healthcare. However, in epidemics such as the ongoing COVID-19, healthcare delivery in urban areas is further derailed by lockdown measures that are non-pharmaceutical interventions by governments to contain the disease. Resultantly, morbidity for people with chronic diseases

such as HIV, diabetes, and hypertension problems is increased since they would must travel long distances to access efficient healthcare. By and large, it is proposed that urban planning need to adopt chrono-urbanism as elaborated by the 15-Minute City Concept. The adoption of the 15-Minute City concept implies that the basic amenities such as healthcare would be accessed within some walking distances and thus will not strain resources for the urban dwellers. Moreover, the Concept promotes the need for proximity to cut opportunity costs incurred during travelling to access other basic facilities. By and large, issues such as chrono-urbanism, urban inequalities, good clinical governance practices, and healthcare resilience in urban areas are emerging issues that aim to promote the welfare of urban dwellers during crises such as the COVID-19 epidemic.

The present chapter has focused on reviewing the existing body of literature concerning urbanisation, epidemiological patterns, and access to healthcare, particularly in the context of sub-Saharan Africa. It has argued that rapid urbanisation in African cities presents unique challenges, leading to a dual burden of disease, with both infectious and non-communicable diseases becoming prevalent. The chapter underscores the importance of understanding the spatial dimensions of health risks, influenced by factors like sanitation, infrastructure, and socioeconomic disparities. Furthermore, it emphasises the need to explore the relationship between disease outbreaks, the location of health facilities, and the impact of these factors on urban public health management. The literature review highlights gaps in current research, particularly the need for studies that integrate spatial analysis with epidemiological data to inform policy and improve health outcomes in urbanising areas.