Chapter 1
Introduction: The City During Outbreak Events

I can be changed by what happens to me. But I refuse to be reduced by it.
—Maya Angelou.

1.1 Introduction: A General Overview

As the largest quarantine in human history, the City of Wuhan, China, with more than 11 million people went under a complete lockdown situation on 23 Jan 2020. An unprecedented situation that lasted longer than ever imagined. This occurred solely due to the spread of the novel coronavirus disease (later renamed as "COVID-19"), just one day before the celebration of the Chinese New Year. The situation became more intensified and new measures were gradually introduced and implemented. The lockdown measures were later practiced at a larger scale as it covered a larger area at the provincial level, taking into account a total population of more than 57 million people. Soon after, the spread of this novel disease reached other locations, pushing many cities and provinces to implement similar lockdown measures. By then, Wuhan's lockdown was no longer the largest quarantine. The situation of the lockdown was applied to more cities, regions, provinces, states, and also at the country level (Cheshmehzangi 2020). Only two months after Wuhan's lockdown, more than a quarter of the world's population was living under some form of lockdown. Despite all our technological advancement and economic progressions of the last two centuries, a novel virus managed to put everything at a halt.

The idea of this book was developed during this specific outbreak event, while the author experienced the situation from inception to later stages. The combined knowledge from this unique experience and a range of professional research studies provided a unique opportunity to not only portray what has occurred in this particular event but also what should be done in the future occasions of such kind. As the disease became widely-spread both nationally and internationally, it became more evident that this was a major test for the city's resilience against disruptive disease outbreak

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A. Cheshmehzangi, *The City in Need*, https://doi.org/10.1007/978-981-15-5487-2_1

events. From the beginning, as the cities prepared themselves to control the spread of the disease, their resilience for other aspects became more vulnerable. Hence, the city authorities needed to pay more attention and have better preparedness in place, as it is only a matter of days or weeks before a city could literally collapse.

In their report on 'Health Emergency and Disaster Risk Management Framework', the World Health Organisation (WHO) (2019) announced that from 2012 to 2017, a total number of 1,200 outbreaks were recorded across 168 countries. This was later increased with a further 352 cases in 2018 before we experienced the newest outbreaks in China and Nigeria in late 2019 and early 2020. The numbers are not something that we see in our daily news reports but are certainly very alarming in many ways. It also proves how frequent we face outbreak events, and how important it is for us to study various methods of tackling the outbreak impacts on our cities and communities.

In an outbreak event, whether we deal with epidemic and pandemic events, cities suffer tremendously, societies can become extremely vulnerable, and economies can fail. Till the time normalisation can happen, there may be a lot of losses—from human life losses to impactful economic losses. Globally, there is no single city with an adequate healthcare capacity that can accommodate thousands of infected patients, set aside a scenario in which millions of people are infected in relatively small proximity of the city level. It has been proven that even the least deadly disease can spread at a gradual pace and have a gradual increase in mortality rates. This can occur mainly due to a lack of healthcare infrastructure (comprised of both capacity and provision) to accommodate larger groups of patients at the same time. In a similar situation, the City of Wuhan struggled to maintain the needs of patients in a timely manner. An example of which was the attempt to build a hospital in less than a week, indicating the importance of disaster management strategies and the need for urgently increasing the capacity of the healthcare infrastructure and facilities. In such events, time is exceptionally scarce and responses need to be fast. Unfortunately, not all responses will be accurate in this process and not all can respond effectively. Nevertheless, the process needs to happen at a large scale, and covering a range of factors; particularly if there were no or little preparedness in place. In this process, decisions are made rapidly but carefully. They are often short-lived or temporary, while the situation remains uncertain during multiple phases of the outbreak event. These phases will be discussed more thoroughly in the next chapter.

In general, the second generation of human-to-human cases in an outbreak event may raise new concerns about the handling of the situation. As such, containing the disease is no longer the only priority. More than ever, the city would then need to focus on enhancing the resilience of multiple aspects and manage the situation promptly. Hence, urban resilience and city management measures are highly important, as they can essentially save 'the city in need'. Such an approach requires holistic planning with its three primary characteristics of (1) predictive, (2) prescriptive, and (3) preventive. In an attempt to strengthen urban health resilience, such outbreaks require urgent attention to maintain and support the needs of residents, visitors, and those who are directly and indirectly affected. This requires the city's preparedness to maintain and manage multiple and essential city systems, such as health, food

and clean water (including both supply and delivery), assets, medical support, safety and security, and social stability. Most importantly, this requires people's resilience and how society can handle the situation effectively. Through many global examples of outbreak events, we verify that (urban) resilience should be strongly backed up by regional management and national strategies. It requires support both internally and externally. This needs to be planned and implemented in a network of multiple stakeholders, enabling the resilience to be at multiple levels and considering multiple health aspects. Throughout the whole process of an outbreak, we need to have careful measures for urban resilience; and these should be holistic and inclusive to better contain people, health, infrastructure, and management of the situation.

This book is an immediate response to a major pandemic outbreak event at the dawn of this new decade. It started as an outbreak in the central part of China. It did not take long for it to be an epidemic event. It remained as a case of the epidemic for about two months, before it was characterised and declared a pandemic. It took more than two months for the infected cases to reach 100,000 cases globally. But then it took less than two weeks to double the number of cases, and only a few days till it passed 300,000 cases. The numbers were then much higher than initially expected. This declaration of change from epidemic to pandemic was due to deep concerns about the irrepressible spread of the disease and its severity, lack of resilience, and alarming levels of inaction at the global level (WHO 2020b). This decision was believed to be delayed already (announced on 11th of March 2020), which marks a difference between reality and realisation. However, we are rest assured that there are lessons to be learned from what has been done in the past, what has been experienced, and what can be done in the future. In all cases, cities play a major part in managing the situation as well as to avoid the widespread disease, and to contain the situation as promptly as possible. All these require careful planning. But before we delve into the details, this chapter will serve as an introduction to first explain what is 'outbreak event'? And how it differs from other events and patterns of large scale outbreaks, such as an epidemic, pandemic, and endemic? Afterward, the following sub-sections will explain the issues associated with city vulnerability and urban resilience. This is narrated through a broader understanding of theories, literature review, and current practices. This chapter will conclude with an overview of three R's in the practice of urban resilience, namely 'reflections', 'readiness', and 'responses'. The eventual discussions of this chapter will set a good foundation for the following chapters in order to assess the multiple stages of outbreak events and provide a range of theoretical and practical suggestions. The later suggestions are shaped around the idea of a comprehensive urban resilience framework in outbreak events, which is novel in the field of resilient cities and health-related city management scenarios (e.g. health emergency and health crisis). But before we do so, it is important to understand the definition of outbreak event and how it differs from other definitions in the field.

1.2 What Is "Outbreak Event"?

There are common misinterpretations between different health-oriented and disease events. In the field of epidemiology, a typical outbreak event is defined as the sudden spread of a contagious disease that occurs at a particular spatial scale in a certain period. Epidemiology itself is an interdisciplinary field, bridging between scientific disciplines like biology, statistics for investigation and analysis, social sciences for multiple uses, and engineering for exposure assessment. It is a discipline that is now commonly used in research and practices of biological sciences, public health, and clinical research (Porta 2014). In epidemiology, there are a variety of research studies that stretch from outbreak investigation to clinical trials, covering a range of analytical, scientific, and comparative studies that investigate the cause and spread of disease, analyse the pattern and progress, as well as control and guidelines to support information dissemination, knowledge share, and decision making processes.

The World Health Organisation (WHO) (WHO webpage, on *environmental health in emergencies*, sub-section 'Disease Outbreaks' 2020a) define outbreak diseases as the ones usually:

> "*…causes by an infection, transmitted through person-to-person contact, animal-to-person contact, or from the environment or other media. Outbreaks may also occur following exposure to chemicals or to radioactive materials*".

While there is an immediate need to investigate the actual cause or source of an outbreak, the investigation can take a long time, and often result in the development of potential scenarios, hypothesis, or continuing scientific research. WHO (ibid) also categorises the outbreak events into three distinct categories of: (1) Communicable disease outbreaks, (2) Disease outbreak events caused by Chemicals, and (3) Disease outbreaks of unknown etiology. The first category generally includes particular environmental factors as the main source of the outbreak, this can be caused by humans, but the source itself comes from the environmental factors influencing the spread of disease; such as from air quality, food, water, and sanitation as four common examples. The second category occurs less frequently and is mostly due to exposure to chemicals or toxins in a particular area. The third category occurs more regularly around the globe, and usually the cause if not clear from inception and it may remain undetected for a while. This category is the focus of this book, through which we try to address resilience and management measures to overcome the urban challenges and diverse disruptions of disease outbreak events.

One factor to note is that there are different ways of dealing with different outbreak events, e.g. there are differences between different categories (i.e. shown in the above three categories) and our responses to them, clear differences between natural disasters and disease outbreaks (Alwidyan et al. 2020), as well as differences between different stages of a particular event (see Chap. 2). Some studies refer to disease outbreaks as disaster scenarios (Sandi and Kangbai 2019) or include them in the same category (Lee et al. 2012). However, even though there are some overlapping factors and measures between the two, the author suggests refraining from categorising outbreak events as disaster events or scenarios. The rationale behind this is due to

the apparent differences in the nature, progression, and multi-stage characteristics of outbreak events. Also, not only that disease outbreak events are different themselves, but some of them may be defined differently at different times and in different contexts, such as the reoccurring case of Dengue disease outbreak (Brady et al. 2015). Nevertheless, the stages of disease outbreaks are very similar in how they develop over a period, and only differ in terms of how they can progress, spread, and eventually become contained. In each event, the city resilience and management measures and methods are not the same, but they are generally similar in terms of how we should respond to the impacts and vulnerabilities caused by the situation.

In addition, disease outbreaks are different in scale and have patterns of occurrence, recognised as 'epidemic', 'pandemic', and 'endemic' situations. These are different to the general outbreak categories of 'common source' (both continuous source and point source), 'propagated' that is generally transmitted between person to person, 'behavioural risk related', and 'zoonotic' that is normally transmitted from animals to humans (extracted from 'Glossary of Epidemiology Terms'). There are common misunderstandings between these patterns of occurrence, and some research studies confuse one with another. Each of these categories represents a different stage at different scales of a disease spread. In most cases of outbreak events, there exists a later or immediate epidemic situation; hence, it is usually regarded as an 'epidemic disease outbreak'. If the spread is contained in just one location, then it can be regarded as just a disease outbreak. However, as this is generally unlikely, it is often regarded as an 'epidemic outbreak'. This is a common case as the spread can occur only in a few days and can easily go beyond the boundaries of a particular region. In most cases, this is almost inevitable as we frequently commute and mobilise, and as we are constantly in contact with multiple groups of people who do the same, too. This cycle of mobility provides an opportunity to increase the probabilities of disease spread or transmission and helps to transfer it from one location to another in a blink of an eye. On the other hand, Green et al. (2002) acknowledge the distinction between the two terms, namely "outbreak" and "epidemic", and argue that the difference is indeed related to the size of the event, referring in particular to the scale a disease eventually spreads. In this regard, an epidemic situation is defined as the further expansion of the outbreak event, normally including a larger number of cities and communities, beyond just a particular contained region. This is very common for novel diseases. Also as Brady et al. (2015) conclude in their studies, there is still scope to understand a practical definition of an outbreak event; one that is unconventional, holistic, and clear.

The case of pandemic becomes more momentous as the spread becomes a near-global or global situation, meaning that it includes not only multiple regions but also multiple countries across the globe. The actual occurrence of a pandemic event mainly depends on how fast and how efficient an epidemic event is managed. In some cases, a pandemic can last for a much longer period (such as HIV AIDS pandemic, recognised from 1966 onwards). In reality, it can last until it is completely cured. Finally, endemic is defined as an infection spread that is "*constantly maintained at a baseline level in a particular geographic area without external inputs*" (extracted from 'Centre of Disease Control and Prevention (CDC)' webpage, Division of Scientific Education

and Professional Development (DSEPD) 2020). This is not necessarily defined as an event but is recognised as a continuing situation of the disease spread.

Henceforth, we mainly use the terms 'outbreak' or 'outbreak event', as we focus mostly on the defined scale of the city. This book addresses this scale as it requires further attention from the perspective of resilience and management, two factors that will be assessed and discussed throughout. However, the suggestions are common for both epidemic and pandemic situations, but more closely to a more common case of 'epidemic'; an outbreak event that we can say is not completely disastrous but is exceedingly impactful on the societies.

1.3 City Vulnerability in Disease Outbreak Events

Before reaching the "*vaccine effectiveness period*" (Pezzoti et al. 2018), the city and its communities suffer from the invasive disease outbreak. In a situation like this, cities are more vulnerable. In a common scenario, the situation is always unexpected; hence, preparedness is not exactly adequate to respond to earlier stages of the outbreak and is not as prompt as it should be. In the first few days, or even in the first few weeks of the outbreak, the situation appears to be uncertain and difficult to handle. This is mainly because of the outbreak changes drastically, the broad-spectrum life patterns change in a sudden, and our daily routines and operations become completely disrupted. The multiplicity of impacts is sensed across multiple sectors, affecting the most: our society. While the long term vulnerabilities can be reduced in a more progressive way (Lim et al. 2013), the short term treatments may take longer than initially expected.

As suggested by Brady et al. (2015) with appropriate and timely control, the disease outbreak burden can be minimised. Yet, this requires preparedness as early as possible and it requires ready-made planning to reduce the city's vulnerability in crucial areas/factors, wherein need the most. As addressed by other studies, fluctuations in case numbers and regular surges can frequently disrupt and slow down the progress of treatment and containment (ibid), which can drive "*already-stretched healthcare resources to breaking point*" (also see Hay et al. 2003a; Hay et al. 2003b, Garg et al. 2008, Cotter et al. 2013; Brady et al. 2015). More importantly, the city's vulnerability increases as the spread continue to affect the primary services and systems of the city, such as healthcare, food systems, transportation services, etc. In general, disease outbreaks are usually fast-developing situations with indeterminate progress and constantly changing updates. These effects or factors put pressure on the society as much as they cause an excessively "*high burden due to the lack of response capabilities*" (Garg et al. 2008, Grais et al. 2007, Najera 1999, WHO Ebola Response Team 2014; Brady et al. 2015). Also, there is an urgent need to reduce vulnerabilities, by enhancing emergency risk management for health, which is believed to be multi-sectoral (Emergency Risk Management for Health Fact Sheets 2013, p. 1), including:

"*The systematic analysis and management of health risks, posed by emergencies and disasters, through a combination of (i) hazard and vulnerability reduction to prevent and mitigate risks, (ii) preparedness, (ii) response and (iv) recovery measures*".

This includes a range of factors for individuals, larger groups of people populations, infrastructure, services, and other community factors. In this regard, the need for primary health care at multiple levels is essential to reduce any "*underlying vulnerability, protect health facilities and services, and scale-up the response to meet the wide-ranging health needs*" (ibid). Hence, during an outbreak event, as the city becomes more vulnerable, we should ensure that supporting measures and the role of urban resilience is not reduced. To name a few, for instance, we have patients with other health issues who require attention, we have the elderly whom are more vulnerable than the others, we consistently need essential daily supplies and services, such as food, water, energy, etc., as well as other factors that should be taken into full consideration. Therefore, we cannot just avoid all those dynamism or else it cannot last long for a city to fall apart.

In the outbreak events, the vulnerability of the city goes beyond just vulnerable communities. The situation is dissimilar to those examples that only target a particular group. Hence, outbreak events are usually widespread. This is also one of the reasons why outbreaks are different from those examples of disasters and are instead more related to health emergency conditions (examples by WHO 2019). Generally, in the outbreak events, cities and communities with weak(er) or no institutional structure suffer the most. For the case of the COVID-19 pandemic, this was evident from inception. This was tracked from the earlier records and updates from WHO (2020b): "*The international community has asked for US$675 million to help protect states with weaker health systems as part of its Strategic Preparedness and Response Plan*". The numbers were later increased and included more countries and regions. Two months after, the United Nations requested for a total of US$2 billion cash contributions for nations that will struggle to contain the outbreak. Those countries/regions that are not well prepared are likely to experience a shock before they could cope with the unexpected situation. Municipal actions, from managerial and decision-making bodies, try to assess the situation as any response is sensitive and require careful processing and monitory. Society gets the biggest hit as they experience panic attacks, anxiety, and uncertain conditions. In such events, our voracious nature vivacities as we are alarmed to prepare for survival. In general, people often rush to store more necessary food and supplies, and create a self-imbalance in the equilibrium of regular production and production trends. We do not buy what we need; but instead, we buy what we need and what we think we may need. This is caused by the uncertain circumstances that can change in any direction at any time. The vulnerability does not end there, and becomes more severe if the society is not reassured (Schoch-Spana et al. 2020), and if immediate measures are not in place. Hence, there are major debates around society management challenges during outbreak events, such as community/public engagement processes (Biehler et al. 2018; Jamrozik et al. 2018), public information policies (Maxwell 2003), health and risk communication (Miller 2017), community values (Schoch-Spana et al. 2020),

public health ethics (Kenny et al. 2010; Lee 2012; Marckmann et al. 2015, Spike 2018), etc. In addition, an extended communication plan is required to effectively respond to those societal needs to ensure vulnerabilities are minimised at multiple stages and throughout the outbreak event.

Furthermore, the contagious disease could affect many people directly and indirectly, and this potentially increases the vulnerability of society from multiple dimensions (American Psychological Association 2018), more than just the disease itself:

> "*The threats to psychological well-being that outbreak pose often can be overcome with the skills of resilience, which can serve as a kind of emotional vaccine. We all can develop resilience. It involves behaviours, thoughts, and actions that can be learned over time*".

Therefore, as a response to vulnerability increase, there is a major need to increase and maintain the urban resilience measures; those interventions that boost the city's management, and those strategies that eventually save the city from a looming disaster.

1.4 Urban Resilience in Disease Outbreak Events

There is more to urban resilience in the disease outbreak events than just a typical example of a resilient city strategic plan. As discussed earlier, outbreak events are inimitable situations; and indeed, they require exclusive responses, too. This was evident from the time when we developed the first resilient city toolkit several years ago (Siemens, Arup, and RPA 2013). Through a variety of studies on resilient cities and urban resilience measures, we can verify a range of direct impacts on health, emergency medical services, communities, infrastructure, economy and businesses, profitability, production systems, social well-being, and quality of life. As many foundations of the city deteriorate at a rapid pace, we have to ensure the city is prepared enough to handle the situation before making progress.

More recent published books on urban resilience planning are mostly related to natural disasters (to name a few: Clarke and Dercon 2016; Sanderson et al. 2016; Lamond et al. 2017; Baldwin and King 2018; Miyata et al. 2019) or other disaster scenarios (to name a few: Pasteur 2010; Masterson et al. 2014; Matsuoka and Shaw 2014; Tierney 2014; Coaffee and Lee 2016; Shaw et al. 2016; Fekete and Fiedrich 2017; Lucini 2017; Borsekova and Nijkamp 2019; Lindell 2019; Pelz et al. 2019) that address factors of preparedness, resilience, responses, and action plans; those that then respond to immediate, gradual, and long-term transformations. There are fewer examples that include disease and contagion as part of those resilience planning (Rodin 2014; Jones 2016; Yang 2017; Singh et al. 2020; Yang Chan and Shaw 2020), which include a range of measures for risk management or bring together related reflections and initiatives (Burayidi et al. 2019). Hence, in order to be effective in practice, urban resilience needs pioneering state-of-the-art thinking. In addition to

this, the need for supporting guidelines (Ihekweazu, et al. 2010) and frameworks are certainly essential, too.

As our cities grow more in numbers and size, and as they face more adversities and challenges (from the webpage of 100 Resilient Cities 2020), we may not always be ready to mitigate particular events; sometimes, we have to adapt, and often we have to enhance what we may have or develop what we may not have (Cheshmehzangi 2016; Cheshmehzangi and Dawodu 2018). In this regard, we need to develop a set of strategies to combat those particular events that can cause significant disruptions or could progressively jeopardise our cities and societies. Urban resilience measures are ever needed to respond to those adversities and challenges, those we foresee and not foresee. An outbreak event is one of those examples of specific events, which can be damaging in multiple ways and can increase the burden on the overall city management. In such incidences, the vulnerabilities are extensive and affect the multiple operations of cities. The situation of an outbreak event of any kind suggests an insalubrious city status; it is unhealthy for the government, governance, institutions, economy, health, and on top of all, the society.

To date, there is little literature or specific research associated with urban resilience in outbreak events. On the other hand, there are generic examples of practical measures, frameworks, tools, and guidelines that enable us to support those cities in need. Yet, in real practice, the city authorities often require to make decisions fast and precisely. Those decisions need to be context-specific and should address cultural factors, social needs, and economic concerns of that specific place/city. The process is so fierce that it can cause significant disruptions in any direction. Any decision needs to be carefully crafted before it is released to the public, or else it can turn into playful games of multiple means of the media, from social media to a more monstrous international media. They can generate false news, increase anxiety and fear, and they can simply make a pandemonium. In the outbreak events, there are many issues associated with the overarching public health factors that require a new (or revised) perspective; hence, vulnerabilities are at a much higher rate when outbreak events hit the city and its communities. Undoubtedly, resilience is needed for any occasion for any community. More importantly, we also need to acquire those resilience skills, both individually and collectively as part of society. The probabilities of failures or failed occasions are high, and reversing them can take longer and interrupt the progress of containment and recovery at any time. Any minimal disruption is perceived as a major issue, and the impacts are felt event much greater. Many sectors come into an absolute halt, even if temporary, but they suffer significantly. They usually look forward to novel solutions, innovations, and findings in medical research—in other words, something that can save the situation sooner than later.

In general, urban resilience must be realised as the backbone of how cities can be managed, both effectively and efficiently, especially during the outbreak events. There are only a handful of preparedness (i.e. including but not limited to services, supplies, and facilities) that can be in place before the actual start of the outbreak; hence, the majority of the work is not necessarily related to preparedness but is indeed the immediate and strategic responses that should develop, shape and get implemented during the event itself. This is exactly why, similar to some of those

disaster events, vulnerabilities are high and cities and communities are at a high-risk level. In their report, WHO (2019, p. 15) suggest that while the "*leadership in managing infectious risks and responding to outbreaks is clear, the health sector also has a critical role in preventing and minimizing the health consequences of emergencies due to natural, technological and societal hazards*". In addition to this statement, it is important to note that from the city management perspective, multiple sectors must experience similar—if not the same—situation. Other sectors associated with such incidents aim to promptly deal with emergencies and meritoriously cope with the disruptions caused by the event. In other words, the city as a whole becomes a new entity that requires to deal with emergencies at multiple levels and in multiple sectors. By having a resilience plan (i.e. in any practice-based or practical form), the city can work more effectively in managing the event and its negative impacts on the society. Hence, it is suggested to enhance the city's resilience where we can and where it seems feasible to do so in the specific context (i.e. in terms of capacity, capabilities, economic background, social issues, etc.). With such a planning approach, we can speed up the containment and recovery processes of the outbreak—i.e. to better contain the spread of disease, and avoid the event to evolve from an emergency status into a disaster situation.

Finally, what has to be addressed is the way we prepare and respond in a process. This requires a framework that could reflect on the ever-changing situation(s) of outbreak events, which will be addressed in later chapters in more detail (see Chaps. 3 and 4). Therefore, there is an essential need to act reflectively and responsibly by multiple actors of the government (of multiple departments), emergency units and emergency medical and health services, and other associated stakeholders of the public sector, private organsiations, non-governmental organisations (NGOs), community organisation groups, and the general public. In reality, the situation creates a new ecosystem of management and operations, one that requires to have resilience measures and adaptive capabilities. In their report on 'Communicable diseases following natural disasters', WHO (2006) proposed a set of risk assessment and priority interventions, to ensure the needs of the society are addressed promptly throughout the events and adequate planning is operational for both therapeutic and preventive interventions. These factors, apart from having adequate planning measures, requires a tangible resilience capacity in order to reflect quickly, be ready, and respond to those situations in the best possible way. These would be the concluding remarks of this introduction chapter in the following section.

1.5 Reflections, Readiness, and Responses

As an introduction to the book, this chapter has summarised a general overview of outbreak events, and how they are progressively more important in the fields of 'urban resilience' and 'city management'. The aim of this book is then to see how we can save the city before it becomes too vulnerable, and how we can respond to those unexpected and unfortunate events that could cost us many human lives and many

other pressures. In a way, the analysis so far indicates that the extent to which we see outbreak events in a city boundary needs more scholarly attention. As mentioned earlier, there are many cases of outbreak events that we do not even hear about; as we only learn about the ones of the global importance or higher contagious nature. Some are only become more visible because of their political importance, or the economic impacts they may have at the much larger global scale (such as the recent COVID-19 outbreak). Yet, as it appears from the recorded data of global outbreak events (WHO 2019), it is indicated that we constantly deal with various outbreak events in communities all around the globe. How we may reflect on those events are something that we should take into full consideration for better future preparedness and a much-enhanced resilience (Fig. 1.1). It only makes a logical sense that we should plan this ahead and not wait for the unforeseen impacts. As we continue to neglect the importance of outbreak events, we may continue to neglect the importance of resilience measures we should develop for our cities and communities around the world. This is not a simple task, but without a doubt, it is one very important task that can save the lives of many people who could live if we take action either in advance or as early as possible.

So far, we highlighted the basic knowledge, the existing literature on outbreak events, and the perspectives that refer to the situation of a typical outbreak event. We learned outbreak events are not universal; as they differ from one disease to another, and from one context to another. We realised the same disease can also be different

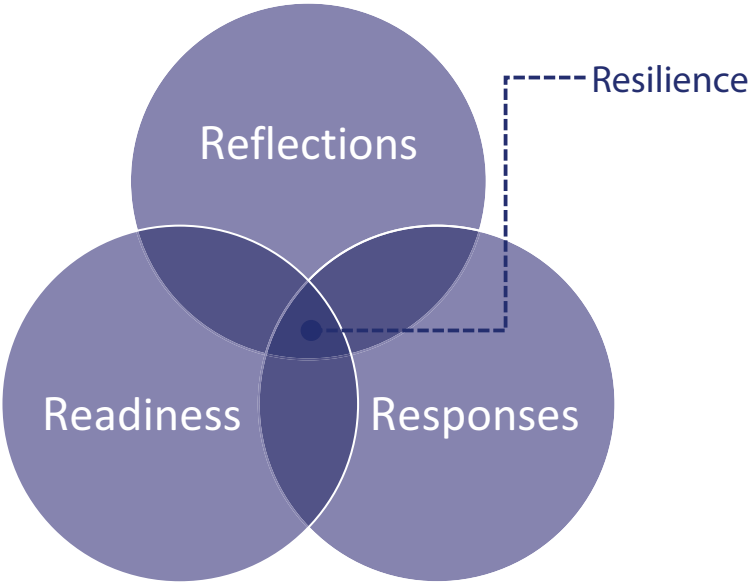

Fig. 1.1 The three primary R's in the practice of urban resilience. *Source* The Author's Own

from one location to another. Our cities are also very different, with primary differences in how they operate, their size, infrastructure, capabilities, economic conditions, social values, services, networks, etc. Therefore, our cities and communities would certainly reflect on outbreak events very differently, too. This means their readiness will be different, and how they may respond will ultimately be different. However, certain commonalities cannot be simply avoided in case of an outbreak event. For instance, the commonalities are mostly related to those institutional and societal needs, meaning how we plan to keep up the operations of our systems and services, how we may provide access to clean water, daily food supplies, energy, hygiene, amenities, and how our emergency units are supported and enhanced, as well as many other factors. In sum, cities, although different in many ways, will face similar difficulties/challenges in the case of outbreak events. Careful and comprehensive planning cannot be anything less than an assurance to overcome those difficulties that can simply threaten any community that exists in our world. In reality, we have to understand there is no immune community; at least, there is none that we know about.

The next few chapters of the book focus purely on key factors of urban resilience and city management to address their practicalities in a probable case of an outbreak event. Henceforth, the book addresses methods and strategies to enhance urban resilience during outbreak events. These ideas are generated through existing literature, practices, available tools and frameworks, dialogues with multiple experts of different disciplines, continuous discussions with local governmental authorities and global organisations, and the invaluable experience gained from standing with the community in a particular pandemic outbreak event.

References

100 Resilient Cities webpage.(2020). Retrieved February 2, 2020, from http://www.100resilientcities.org/.

Alwidyan, M. T., Traunor, J. E., & Bissell, R., A. (2020). Responding to natural disasters vs. disease outbreaks: Do emergency medical service providers have different views?, *International Journal of Disaster Risk Reduction*, *44*, 101440.

American Psychological Association (2018). *Resilience and Disease*, Psych Central, Retrieved February 18, 2020, from https://psychcentral.com/lib/resilience-and-disease/.

Baldwin, C., & King, R. (2018). *Social Sustainability, Climate Resilience and Community-Based Urban Development: What About the People? (Routledge Focus on Environment and Sustainability)*. Oxon: Routledge.

Biehler, D., Baker, J., Pitas, J. H., Bode-George, Y., Jordan, R., Sorensen, …, & Ladeau, S. (2018). Beyond "the Mosquito people": The challenges of engaging community for environmental justice in infested urban spaces. In R. Lave, C. Biermann, & S. Lane (Eds.), *The Palgrave Handbook of Critical Physical Geography* (pp. 295–318). Palgrave Macmillan: Cham.

Borsekova, K., & Nijkamp, P. (Eds.). (2019). *Resilience and Urban Disasters: Surviving Cities (New Horizons In Regional Science Series)*. Cheltenham: Edward Edgar Publishing Ltd.

Brady, O. J., Smith, D. L., Scott, T. W., & Hay, S. I. (2015). Dengue disease outbreak definitions are implicitly variable. *Epidemics, 11*, 92–102. https://doi.org/10.1016/j.epidem.2015.03.002.

Burayidi, M. A., Allen, A., Twigg, J., & Wamsler, C. (Eds.). (2019). *The Routledge Handbook of Urban Resilience* (Routledge International Handbooks). Oxon: Routledge.

Centre of Disease Control and Prevention (CDC) webpage, Division of Scientific Education and Professional Development (DSEPD). (2020). Retrieved February 5, 2020, from https://www.cdc.gov/csels/dsepd.

Cheshmehzangi, A. (2016). City Enhancement beyond the notion of "Sustainable City": Introduction to integrated assessment for city enhancement (iACE) Toolkit. *Energy Procedia, 104,* 153–158.

Cheshmehzangi, A., & Dawodu, A. (2018). *Sustainable Urban Development In The Age of Climate Change–People: The Cure or Curse.* Singapore: Palgrave Macmillan.

Cheshmehzangi, A. (2020). *Blame game will not help contain outbreak*. Article on China Daily. Retrieved May 12, 2020, from http://global.chinadaily.com.cn/a/202005/12/WS5eb9e1d9a310a8b241154e3e.html.

Clarke, D. J., & Dercon, S. (2016). *Dull Disasters?: How Planning Ahead Will Make A Difference.* Oxford: OUP Oxford.

Coaffee, J., & Lee, P. (2016). *Urban resilience (planning, environment, cities).* Red Globe Press, part of Macmillan International Higher Education.

Cotter, G., Sturrock, H. J., Hsiang, M. S., Liu, J., Phillips, A. A., Hwang, J., …, & Feachem, R. G. (2013). The changing epidemiology of malaria elimination: new strategies for new challenges. *Lancet*, *382*, 900–911.

Emergency Risk Management for Health Fact Sheets. (2013). *Emergency risk management for health: Overview*, global platform, May 2013, pp. 1–6.

Fekete, A., & Fiedrich, F. (Eds.). (2017). *Urban Disaster Resilience and Security: Addressing Risks in Societies (The Urban Book Series).* Singapore: Springer.

Garg, P., Nagpal, J., Khairnar, P., & Seneviratne, S. L. (2008). Economic burden of dengue infections in India. *Transactions of the Royal Society of Tropical Medicine and Hygiene, 102,* 570–577.

Grais, R. F., Dubray, C., Gerstl, S., Guthmann, J.-P., Djibo, A., Nargaye, K., …, & Ihekweazu, C. (2007). Unacceptably high mortality related to measles epidemics in Niger, Nigeria, and Chad, *PLoS Med.*, 4, p. e16.

Green, M. S., Swartz, T., Mayshar, E., Lev, B., Leventhal, A., Slater, P. E., et al. (2002). When is an epidemic an epidemic? *Israel Medical Association Journal, 4*(1), 3–6.

Hay, S.I., Renshaw, M., Ochola, S.A., Noor, A.M., & Snow, R.W. (2003a). Performance of forecasting, warning and detection of malaria epidemics in the highlands of western Kenya. *Trends Parasitol*, *19*, 394–399.

Hay, S. I., Were, E. C., Renshaw, M., Noor, A. M., Ochola, S. A., Olusanmi, I., …, & Snow, R. W. (2003b). Forecasting, warning, and detection of malaria epidemics: a case study, *Lancet*, *361*, 1705–1706.

Ihekweazu, C., Basarab, M., Wilson, D., Oliver, I., Dance, D., George, R., et al. (2010). Outbreaks of serious pneumococcal disease in closed settings in the post-antibiotic era: A systematic review. *Journal of Infection, 61*(1), 21–27.

Jamrozik, E., & Selgelid, M. J. (2018). Ethics, health policy, and Zika: from emergency to global epidemic? *Journal of Medical Ethics, 44,* 343–348.

Jones, G. (2016). *HIV and Young People: Risk and Resilience in The Urban Slum (Springerbriefs In Public Health).* Singapore: Springer.

Kenny, N. P., Sherwin, S. B., & Baylis, F. E. (2010). Re-visioning public health ethics: A relational perspective. *Canadian Journal of Public Health, 101*(1), 9–11.

Lamond, J., Booth, C., Hammond, F., & Proverbs, D. (Eds.). (2017). *Floor Hazards: Impacts and Responses for the Built Environment*. Taylor and Francis Group: CRC Press.

Lee, J. D., Healy, S., & Lee, M. (2012). *Prepare for Disaster: The One Book You Need To Plan For Emergencies*. Florence, Alabama: Whitman Publishing.

Lee, L. M. (2012). Public health ethics theory: review and path to convergence. *Journal of Law Med Ethics, 40,* 85–98.

Lim, S. S., et al. (2013). A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet, 380,* 2224–2260.

Lindell, M. K. (Ed.). (2019). *The Routledge Handbook of Urban Disaster Resilience: Integrating Mitigation, Preparedness, and Recovery Planning*. Oxon: Routledge.

Lucini, B. (2017). *The Other Side of Resilience to Terrorism: A Portrait of a Resilient-Healthy City.* Singapore: Springer.

Marckmann, G., Schmidt, H., Sofaer, N., & Strech, D. (2015). Putting public health ethics into practice: a systematic framework Front. *Public Health, 3,* 23.

Masterson, J. H., Peacock, W. G., van Zandt, S. S., Grover, H., Schwarz, L. F., & Cooper, J., T. (2014). *Planning for Community Resilience: A Handbook for Reducing Vulnerability to Disasters.* Washington D.C.: Island Press.

Matsuoka, Y., & Shaw, R. (2014). *Hyogo Framework for Action and Urban Disaster Resilience (Community, Environment and Disaster Risk Management).* 16, Bingley, UK: Emerald Group Publishing Limited.

Maxwell, T. A. (2003). The public need to know: emergencies, government organizations, and public information policies. *Gov. Inf. Q., 20*(3), 233–258.

Miller, A. N. (2017). Appeals to morality in health and risk messaging. In J. F. Nussbaum (Ed.), *The Oxford Research Encyclopedias of Communication: Health and Risk, Communication.* Oxford University.

Miyata, Y., Shibusawa, H., Permana, I., & Wahyuni, A. (2019). *Environmental and Natural Disaster Resilience of Indonesia (New Frontiers in Regional Science: Asian Perspectives).* Singapore: Springer.

Najera, J. (1999). Prevention and control of malaria epidemics. *Parassitologia, 41,* 339–347.

Pasteur, K. (2010). *From Vulnerability to Resilience: A framework for analysis and action to build community resilience.* Rugby, Warwickshire: Practical Action Publishing.

Pelz, M. (Ed.). (2019). *Protecting Historic Coastal Cities: Case Studies in Resilience (Gulf Coast Books).* Texas: Texas A & M University Press.

Pezzotti, P., Miglietta, A., Neri, A., Fazio, C., Vacca, P., Voller, F., …, & Stefanelli, P. (2018). Meningococcal C conjugate vaccine effectiveness before and during an outbreak of invasive meningococcal disease due to *Neisseria meningitidis* serogroup C/cc11, Tuscany, Italy. *Vaccine. 36*(29), 4222–4227.

Porta, M. (2014). *A Dictionary of Epidemiology* (6th ed.). New York: Oxford University Press.

Rodin, J. (2014). *The Resilience Dividend: Managing disruption, Avoiding Disaster, and Growing Stronger in an Unpredictable World*. London: Profile Books.

Sanderson, D., Kayden, J. S., & Leis, J. (Eds.). (2016). *Design for Urban Disaster: Response.* Resiience and Transformation, Oxon: Routledge.

Sandi, A. A., & Kangbai, J. B. (2019). *Disaster Management and the West African Ebola Outbreak*. Independently published, 89 pages.

Shaw, R., Ur-Rahman, A., Surjan, A., & Parvin, G., R. (2016). *Urban Disasters and Resilience in Asia.* Oxford: Butterworth-Heinemann.

Schoch-Spana, M., Watson, C., Ravi, S., Meyer, D., Pechta, L. E., Rose, D., A., …, & Sell, T. K. (2020). Vector Control in Zika-Affected Communities: Local Views on Community Engagement and Public Health Ethics during Outbreaks. *Preventive Medicine Reports*, 101059 (in Press).

Siemens, Arup, & RPA. (2013). *Toolkit for Resilient Cities: Infrastructure, Technology and Urban Planning*, 60 pages document. Retrieved January 24, 2020, from https://assets.new.siemens.com/siemens/assets/public.1543066657.641ee2256c5a0d5919d1aa3094a701f6ec9c3f90.toolkit-for-resilient-cities.pdf.

Singh, R. B., Srinagesh, B., & Anand, S. (Eds.). (2020). *Urban Health Risk and Resilience in Asian Cities (Advances in Geographical and Environmental Sciences).* Singapore: Springer.

Spike, J. P. (2018). Principles for public health ethics. *Ethics Med Public Health, 4,* 13–20.

Tireney, K. (2014). *The Social Roots of Risk: Producing Disasters, Promoting Resilience (High Reliability and Crisis Management).* Stanford: Stanford Business Books.

World Health Organisation (WHO) Ebola Response Team. (2014). Ebola virus disease in West Africa—the first 9 months of the epidemic and forward projections. *New England Journal of Medicine, 371,* 1481–1495.

World Health Organisation (WHO). (2006). *Communicable diseases following natural disasters: Risk assessment and priority interventions.* Report number WHO/CDS/NTD/DCE/2006.4. Geneva, Switzerland (also see: http://www.who.int/diseasecontrol_emergencies/en/).

World Health Organisation (WHO). (2019). *Health Emergency and Disaster Risk Management Framework*. Geneva: Switzerland.

World Health Organisation (WHO). (2020a). Webpage source on the category of 'Environmental Health in Emergencies', sub-section 'Disease Outbreaks". Retrieved February 8, 2020, from https://www.who.int/environmental_health_emergencies/disease_outbreaks/en/.

World Health Organisation (WHO). (2020b). *Rolling updates on coronavirus disease (COVID-19)*, as part of updates on 11 March 2020: WHO characterizes COVID-19 as a pandemic. Retrieved March 12, 2020, from https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen.

Yang Chan, E. Y., & Shaw, R. (Eds.). (2020). *Public Health and Disasters: Health Emergency and Disaster Risk Management in Asia (Disaster Risk Reduction).* Singapore: Springer.

Yang, W. (Ed.). (2017). *Early Warning for Infectious Disease Outbreak: Theory and Practice.* Elsevier: Academic Press.