



## Walkable communities and pedestrian safety

Yasmin Moanis

<sup>1</sup>Author affiliations: Delta University for Science & Technology, Faculty of Engineering, Department of Architectural Engineering, Gamasa City, Mansoura, Dakhliya, Egypt

Correspondence: [Yasmin Moanis Latif Hatem]; Tel +201556700028; Email: [yasmin.hatim@deltauniv.edu.eg](mailto:yasmin.hatim@deltauniv.edu.eg)

### ABSTRACT

Communities all around the world have a growing concern and need to make it possible for people to walk more frequently, to more places, and to feel safe while doing so, whether for leisure or practical reasons.

Increasing the number of individuals who walk will improve physical health, reduce air pollution and traffic congestion, and give support for more walkable communities and neighborhoods, among other benefits.

a neighborhood that is walkable, prioritizes people over cars, and is constructed on a human scale. It promotes a diverse, dynamic, enjoyable, healthy, and cozy setting for living and strolling. It reinstates rights for those who are most in need, with a special emphasis on kids and those with disabilities. Where stores and services in a community that is walkable are accessible by foot.

By creating walkable towns and neighborhoods the number of car trips and the number of people who use them will be reduced, which will reduce air pollution, noise pollution, and CO2 emissions. The wellbeing of the residents will undoubtedly change, and their social lives will be improved, if there are fewer cars on the street and more green spaces, pedestrian walkways, and bicycle lanes are constructed on a portion of the street.

Walking communities are less likely to be classified as "unsafe communities." Walking people inside the street and reducing the number of cars on the road will boost natural surveillance and reduce the frequency of walking and driving accidents.

This study will address how walkable communities can improve welfare and pedestrian safety by promoting walking behavior that perceive walkability and its relation to safety, as well as the importance of public awareness policies that promote walkability.

**Keywords:** walkable communities-pedestrian safety-street design-built environment

### 1. Introduction

Getting people to walk will help generate support for the establishment of more walk-able spaces, reduce air pollution and traffic congestion, enhance physical health, increase natural surveillance, enhance pedestrian safety, and provide other benefits. (Shay, 2004)

Planners and engineers have fallen into the trap of prioritizing cars over people on foot over the last few decades. Social Community bonding has deteriorated, and foot visits to distant locations have been supplanted by motorized trips. (deutsche, 2003) . To disrupt this loop, first understand and respond to the needs of pedestrians by interacting with the local community. To accomplish this, designers and decision maker should follow the safe community design criteria. And second, increase awareness of the importance of walking for health and the community, and also design a guideline for effective neighborhoods and safer spaces between buildings.

According to research, developing locations for walking (such as walking trails) and other forms of physical activity may be connected with greater physical activity. A walkable community is created for humans according to their scale, with a focus on people rather than cars. It encourages a diverse, lively, healthy, enjoyable, safe and comfortable environment in which to live and walk. It restores rights to the most vulnerable individuals, with a special focus on children and people with disabilities. (Talen, 2013)

*Table 1 benefits of walking according to walk friendly communities <https://www.walkfriendly.org/>*

Safety	designing streets for people instead of cars improves safety for all users.
Health	regular physical activity reduces the risk of chronic disease and improves quality of life for people of all ages.
Equity	prioritize and invest in travel modes that serve all members of the community.
Environment	more walking, biking and transit use means less air pollution from motor vehicles and a reduced dependence on fossil fuels.
Economic	walkable communities draw investment from residents, businesses and tourists alike.

Practicing physical activity on a daily basis has proven that it has a very significant influence on health, including decreasing the risk of heart disease, stroke, diabetes, and other chronic diseases. It also improves the quality of social and physical life for people of all ages. Daily physical walking activity will also improve the social life of the same community and increase pedestrian safety. (organization, 2020). Physical activity has also proven to help with weight loss, stress reduction, better sleep, and overall health. Which enhances the wellbeing and strengthens the relationship between the inhabitant and his surrounding environment. (Matthew A Stults-Kolehmainen 1, 2014)

The purpose of this paper is to provide decision-makers with hard facts on the relevance of walking in pedestrian safety, as well as advice for creating a safe environment conducive to walking. This is a critical contribution to the creation of livable cities.

## 2. Pedestrian Safety

Walking is the most natural mode of transportation; nonetheless, cities have not always evolved to meet the requirements of pedestrians, and walking has often been overlooked in the creation of transportation systems. (Fan, 2021) Improving the pedestrian environment can make a significant contribution to addressing climate change, air pollution, and health issues. (Alejandro Ruiz-Padillo, 2022)

Everyone is a walker. People walk for fun, fitness, and transportation. Gas prices, environmental concerns, and improved health may all be reasons to walk. Pedestrians are at risk of injury if a community does not take their needs into consideration. To maintain everyone's safety, all vehicles, bicyclists, and pedestrians must act appropriately. A city with a road infrastructure that allows for numerous means of transportation reduces the chance of harm that may be caused to pedestrians. (Paul, Pet.al (2015)

Walking is a choice that is crucial to walkability and social justice. Communities and neighborhoods are the main players in how users select their most convenient mode of transportation by providing pedestrian and street infrastructure such as main roads, sidewalks, crosswalks, bicycle lanes, and promenades. Without providing safe infrastructure for the street and the pedestrian walkway, people are obliged to go by personal vehicle or engage in unsafe pedestrian activities as a result of the failure to create these facilities. (Philip Stoker\*, 2015). This lack of mobility options presents an uncomfortable and socially inequitable barrier to travel for people who are unable to drive, such as adolescents, those who cannot afford a car, and people with certain disabilities.

### 2.1 non-traffic accident pedestrian fall and stumbling:

Falls are the leading cause of injury for people of old age, but children under 14 and older adults over 65 are overrepresented. (WHO global report on falls prevention in older age, 2007) The predominance of older people in hospital admissions from falls is a result of an increased likelihood of falling compared to the two younger age groups and also due to their greater fragility, resulting in a greater likelihood of broken bones. Falls often occur on stairs and inside buildings or homes; however, they also occur while walking or jogging on footpaths, stepping over curbs, and crossing roadways. However, few data exist on the magnitude and consequences of pedestrian falls because there are fewer studies show that up to 1/3 of pedestrian facilities and three-quarters of injuries are due to falls in public space. (Oxley, 2017)

The first factor that contribute to pedestrian falls are pavement and footpath conditions. Changes in the pavement surface, even minor height variances, can easily cause a person to lose their balance, stumble and fall. This is

especially true for the elderly. The second factor is connected to the pedestrian: persons carrying weights, feeling tired, indulging in other activities while walking, or being in a rush to get to their destination. Reduced or limited eyesight, distraction from the walking job, vision problems, and pedestrian awareness are all factors that may increase the probability of a fall. (Oxley J. &, (2010). )

2.2 safe street design:

It is the joint obligation of designers, engineers, regulators, and civic leaders to provide safe roadways. The fear of traffic violence makes moving about the city a potentially deadly everyday activity, even in the places with the highest safety records.( Global Designing Cities Initiative, & National Association of City Transportation Officials. (2016) Highway-like Street layouts that put cars before vulnerable pedestrians and individuals and promote fast speeds don't create secure spaces.

Global studies have revealed that only a small number of arterial roadways are responsible for the majority of traffic fatalities, particularly the readily avoidable pedestrian fatalities. By design, these roadways are hazardous (World Health Organization, 2015) The following traits are present in them:

- 1- wide streets with unsafe crossings that encourage speeding.
- 2- streets that serve as front yards and encourage hostile behavior from passersby.
- 3- highway-like surface streets without enough sidewalks that put riders on motorcycles and people on public transportation in danger due to massive speed differentials.

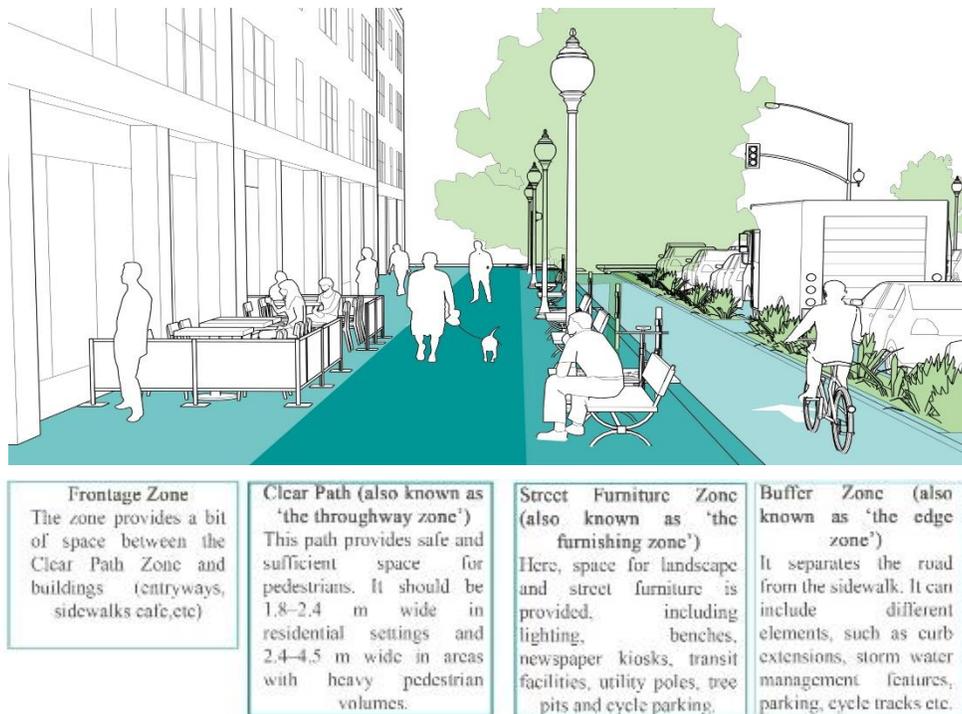


Figure 1 safe street design illustration, adapted from National Association of City Transportation Officials

Pedestrians, cyclists, and motorized two-wheelers are disproportionately involved in road traffic injuries. For example, according to the first Global Status Report on Road Safety, nearly half (46%) of those killed in road traffic accidents were walkers, cyclists, or users of motorized two-wheel vehicles (Zegeer, 2006) .More recently, the second Global Status Report on Road Safety 2013: Supporting a Decade of Action looked at pedestrians separately from other vulnerable road users and discovered that 22% of those murdered on the world's roads are pedestrians (Khayesi M, 2005) As evidenced by the Global Status Report on Road Safety (Global status report on road safety

2013, Howe J. The,2001) and the World Report on Road Traffic Injury Prevention (both of which are available online), the distribution of road-user mortality varies by region and by country.

Countries must address the issue of pedestrian safety by putting in place appropriate safeguards. Several proposals urge governments to consider all road users' requirements, including walkers and bicycles, when making decisions concerning road design and infrastructure, land-use planning, and transportation services (Howe, 2001). This research could assist countries in accomplishing this goal, with a particular emphasis on pedestrians respecting their daily needs.

### 3. Importance of addressing pedestrian safety

Every year, pedestrians, whether they are driving, riding a motorcycle, or riding a bicycle, face street injuries. Pedestrian deaths and injuries are frequently preventable, and proven solutions exist; nonetheless, in many places, pedestrian safety does not receive the attention it deserves. Successful interventions to protect pedestrians and promote safe walking necessitate an understanding of the nature of pedestrian crash risk factors. (Leden L.2002)

The reduction or elimination of pedestrian dangers is an important and attainable policy aim. Pedestrian collisions, like other types of road traffic accidents, should not be regarded as unavoidable because they are both predictable and avoidable (Zegeer CV, 2012). The walking environment and pedestrian safety are inextricably linked. Walking in an environment that lacks pedestrian infrastructure and allows high-speed automobiles to be driven increases the risk of pedestrian harm. The probability of a motor vehicle colliding with a pedestrian rises as the number of motor vehicles interacting with pedestrians increases (AuréliDommes, 2015)

Measures taken into consideration to increase pedestrian safety improve walking environments and contribute to urban revitalization, local economic growth, social cohesion, and improved air quality by reducing the detrimental impacts of traffic noise (LaPlante, 2008) .They also provide additional advantages for other road users, such as motorists and cyclists. Implementing safety measures necessitates dedication and informed decision-making on the part of government, industry, nongovernmental organizations, and international organizations. (Dumbaugh, 2009).



Figure 2 importance of including the community problem in designing safer streets for pedestrians

### 4. Ideologies of creating safe walk-able system

According to the "General Theory of Walkability," walking must be advantageous, safe, comfortable, and fascinating in order to be preferred. The areas designed to accommodate automobiles appear to be the most efficient in colliding them.

Creating an environment that enhances road safety recognizes the importance of mobility in society and supports the notion that all road users should be safe as they interact with roads and cars to allow movement. The Safe System technique seeks to prevent fatal wrecks and major injuries by developing a safe transportation system that is tolerant of human errors and considers people's sensitivity to catastrophic injury. This could be done by government emphasis on road infrastructure, automobiles, and travel speeds, reinforced by a range of measures in education, behavior change, regulation, enforcement, and punishments.

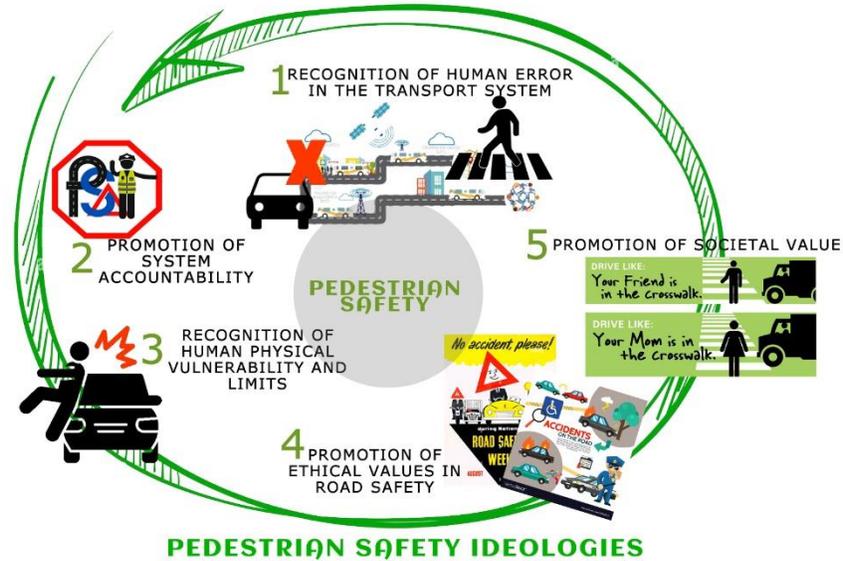


Figure 3 pedestrian safety ideologies adapted from the safe system technique  
<http://roadsafety.gov.au/nrssi/safe-system.aspx>

People will make mistakes in traffic that can easily lead to harm or death. The Safe System approach does not dismiss road user behavior initiatives, but instead emphasizes that behavior is simply one of many essential factors in improving road safety. As human pedestrians are vulnerable to how much violent force they can tolerate before suffering major damage or death, many considerations should be taken when designing streets that enhance pedestrian safety. (World Cities Report 2022)

Road users and system designers must share responsibility for traffic safety. Vehicle drivers are required to follow traffic laws, and system designers and operators are responsible for creating a transportation system that is as safe as feasible for users, which is part of promoting system accountability. (McAndrews, 2013)

The Safe System concept depends on the ethical notion that any major trauma caused by the road transportation system is unacceptable. Humans can learn to be more cautious, yet mistakes will undoubtedly occur on occasion. Although mistakes may cause collisions, death and serious injury are not unavoidable outcomes. (UNECE, 2020) The road transportation system is anticipated to contribute to overall societal values, notably in main four areas: economic development, human , environmental health, and individual choice.

### 5. Making communities more walkable

Communities and decision makers must decide whether or not to help their communities to walk. However, improvements to community walkability, as well as programs and policies that give opportunity and support for walking can help make the decision easier. These modifications, in addition to increasing walking, can benefit communities by boosting safety, social cohesion, and the local economy, as well as lowering air pollution. (Forsyth, 2015)

Local governments can utilize the following planning techniques on the community to include existing and future plans for public land and amenities, infrastructure, multi-use paths, parks, and open space into municipal planning, policy, and law. That include making sidewalks and cycling networks more extensive, interconnected, and

accessible, as well as reducing the width of traffic lanes and turn radii, installing curb extensions, safety islands, and high-visibility crosswalks. Adopt policies and plans for community planning, land use, development, and zoning that encourage walking among individuals of all ages and abilities. Identify locations that are accessible by foot for schools, workplaces, companies, parks, recreational areas, and other locations that people frequently visit.

5.1 Make the environment more inviting place to walk

People want to walk in a neighborhood that is aesthetically pleasing: trees, flowers, and bushes are prevalent; buildings are located close to the street; and garages or parking lots are hidden out of sight and away from where people are walking. If a neighborhood has no or very little vegetation, buildings are located far from the street, and large driveways, garages, and parking lots are prevalent, the neighborhood will look barren and inhospitable, and people will not want to walk. (Blackwell, 2014)



Figure 4,5 JORDAN GOLSONGEAR OCT 7, 2014 6:30 AM *One Thing Every City Can Do to Be More Pedestrian-Friendly*

Figure 6, May 21, 2013, 4:00 PM PDT, By [Xiongbing Jin, Fanis Grammenos](#)



Figure 7, <https://afd.city/How-can-streets-foster-pedestrian-friendly-environments>

Figure 8,9, <https://thecityfix.com/blog/6-ways-make-city-streets-safer-pedestrians-nikita-luke/>

5.2 Work with your neighborhood to create sense of community

Discover the surrounding neighbors and enlist their help in making your neighborhood a safer place to live and walk. If the pedestrians observe a suffering family in the neighborhood, reach out for friendship and support. Sometimes people simply need to know they can talk to someone who cares. Offer to help with mundane duties, babysit, provide transportation, or simply listen. Determine or notify religious or community organizations that may be able to support the family. (Ebrahim, 2015) . That will help in creating ponds and strengthen the sense of community within individuals.



Figure 10: two girls walking safely. [www.360east.com](http://www.360east.com)

Figure 11: A welcome sign in the neighborhood. [www.360east.com](http://www.360east.com)

Figure 12: Street side cafes where people can meet, [www.360east.com](http://www.360east.com)

### 5.3 Design safe root for schools

For most youngsters, walking to school used to be extremely usual. The idea of walking to school must gain popularity once more. Walking to school is a very smart investment because of the benefits it provides to students in terms of fitness and mental attentiveness. (Morris JN, 1997) .Walking is beneficial to one's mental health. It generates feel-good hormones, which serve to elevate our mood and can help your little explorers start the day on a positive note. Physical activity helps your children learn and improves their academic performance. They will arrive at school feeling refreshed, joyful, and eager to begin their day after a nice stroll. And walking helps children feel more independent and in control. It teaches them road safety, basic navigation skills (letting them lead the way), and helps them feel more confident. Before allowing your children to walk to school on their own, make sure they are ready and have all the required road safety skills and road safety design measurement. (Martin, 2016)



Figure 13: safe root for school by bike, <https://capta.org/focus-areas/community-concerns/safe-routes-to-school/>

Figure 14: safer roots for school walking A welcome, <https://altago.com/services/planning-safe-routes-to-school/>

### 5.4 organized neighborhood walks

Developing a greater sense of community can assist in overcoming many communal barriers to walking. Organizing a neighborhood walk is one approach to bring neighbors together and introduce them to the experience of walking in their neighborhood. **Here are a few examples:**

- A walk to visit a new park or pathway.
- A walk to an event (neighborhood fair, local coffee shop).
- A nighttime's holiday walk to view landscapes and open public spaces.
- A fitness walks or walking just for the sake of walking.
- A walk for a cause or charity.

### 5.5 Develop treatment and enhancing program

To build a community, mentoring, tutoring, or pedestrian initiatives, or other prevention or treatment programs for neighborhood members, community groups can depend on private and public resources as well as their own "people power." Create and distribute believes of the local groups that may offer help, decision making, training, advice,

and other services that your neighbors may require. Community policing personnel, no matter how dedicated they are, cannot be everywhere at all times. Collaborate with local people to create a safe walkable environment in your neighborhood—a physical environment that does not encourage crime or provide opportunities for violence to brew and give more space to pedestrian to move more likely. (Ebrahim N. , 2015)

### 5.6 Access to park and open spaces

Localities should design their communities with ample space for parks with connectivity to the neighborhood, schools, and other pedestrian destinations. Where possible, the parks should be incorporated into a walking route to various destinations throughout the community.

A major concern may be the need to maintain the park and prevent vandalism, which would encourage the agency responsible for maintaining the park to close it down during the night. Local agencies may want to employ community block watches to monitor conditions in parks adjacent to their neighborhoods to prevent this from happening and organize periodic clean-up activities to show that they will protect and help maintain the park. Parks remain a highly desirable walking destination for exercise and leisure activities, and access should be retained for this use. (Ebrahim, N. (2015)



Figure 15: open park and pedestrians, <https://www.fieldsintrust.org/News/frequently-asked-questions-on-our-guidance-for-outdoor-sport-and-play>

Figure 16: increasing access to open parks, <https://www.urbanismnext.org/potential-impacts/parks-and-open-space>

## 6. Strategy for promoting walkability plan for pedestrians

In order to increase pedestrian walkability, this plan lays out a proposal for a strategic vision, goals, and objectives for open space. Its fundamental objective is to guarantee that there is adequate, high-quality open space in the city. The plan is based on research showing how important it is to encourage walkability in order to improve pedestrian safety and safety perception. As many people and organizations with an interest in open space as possible have been involved in the formulation of this policy at every level.

Pedestrian safety and walkability were adapted inside the Strategy to benefit people, health, the economy and the environment. It aims to: Access to a network of top-notch open streets for pedestrians that support communities that are stronger, more responsible, and proud. Encourage and support healthier lives Make sure walkability is a desirable habit to practice, adapt, and respect the environment for present and future generations to promotes pedestrian safety.

Table 2 strategy for promoting walkability plan for pedestrians

Promoting walkability strategy plan				
<b>What is needed:</b> Adopt policies and plans for community planning, land use, development, and zoning that encourage walking among individuals of all ages and abilities. and to alter the established method of doing things. Specifically, transportation agencies, designers, and planners must change the way they work to incorporate safety and walkability into their plans from the start.				
Key objectives				
Community	Pedestrian infrastructure	Adequate neighborhood design	Recreation	Commuting
Having enough people to support the walkability idea by public awareness	Offering easily accessible transit services, complete streets and safe paths for biking or walking	Providing attainable housing at varying income levels	Centered around shopping districts, parks, and other public spaces	Proximity to schools and workplaces so commutes are accessible by foot
Bring people and activities close enough to walk in safe and livable environment Recognize the economic, environmental and social value of walkability	Ensure physical space and design that promote walking. Increase the value and use of idea of walkability for health, education, play and lifelong learning.	Give preference to walking cycling and transit over private car. follow the design criteria for safer communities and neighborhoods, public parks and open spaces over street design. Introduce new laws that support walkability and pedestrian safety.		
Application				
1- A mix of activities and services activate the street from morning to night. 2- Adapt walks and marches by students and individuals to promote walkability. 3- Creating a civilized transportation and pedestrian culture together that enhance using public transportation means for everyone.	1- Sidewalks are sheltered, suitably wide, and in decent condition. 2- Crosswalks are wide enough, safe to cross, and accessible to all pedestrians. 3- Signals prioritize pedestrians who cross first and reduce wait times while allowing ample time for everyone to cross. 4- producing a prioritized project plan for improving open spaces, particularly play spaces and encouraging good design, such as making the most of the natural landscape and using natural play materials.	1- Well-managed and reasonably priced on-street parking can reduce traffic while acting as a barrier between moving automobiles and pedestrian areas. 2- Street vendors and sidewalk amenities such as seating, shade, lighting, and garbage bins attract more users and animate the sidewalk. 3- Buses, trains, and bike share are all accessible by foot. 4- Smaller roadway widths can make crossing more fun, safe, and easy. 5- Designing for slower traffic speeds and enforcing speed restrictions results in a more pleasant and safe environment for pedestrians. 6- Priority must be for pedestrians and cyclists 7- Ensure universal mobility for those with limited access to transport. 8- Connecting our urban open spaces and surrounding, more rural greenspaces, to each other, and to the communities around them, offers a wide range of social, health, economic and environmental benefits.		

### 7. Conclusion and Recommendation

The security of pedestrians while walking is crucial. The fundamentals of pedestrian safety should be doubted and enhanced to communities, neighborhoods and pedestrians to help prevent accidents that might result in severe injury or even death. However, accidents do occur. Every time there is an accident, the pedestrian should be entitled to compensation.

Creating or changing settings to encourage people to walk or bike is a method that can not only boost physical activity but also make communities safer and nicer places to live. when more people ride and walk in places where improvements, such as safer sidewalks, pedestrian crossings and protected bike lanes, have been made. Furthermore, when people relocate to neighborhoods that encourage physical exercise and active transportation, they spend less time driving and more time walking for transportation. Making it easy to walk may also benefit communities by enhancing safety, promoting engagement among inhabitants, strengthening local economies, and lowering air pollution.

Communities should enhance walkability by enlisting the support of experts in the promotion of physical activity behavior to guarantee that organizational resources are properly devoted to assisting inactive people in becoming physically active. Furthermore, communities should be committed to improving accessible walking-related infrastructure (e.g., sidewalks, crosswalks, traffic signals, and crossing guards) in low-income regions.

The communities that suffer from a lack of safe pedestrian walkways, prioritize resources to insurable that these communities (rural, urban, and suburban) can access funds and technical assistance to improve pedestrian infrastructure and transit, which are disproportionately affected by higher rates of pedestrian deaths and injuries and generally lack safe walking infrastructure.

It is critical to raise public awareness in order to increase passion and support, inspire self-mobilization and action, and mobilize local expertise and resources. Raising political knowledge is especially crucial since policymakers and politicians are major players in the policy adaptation process.

A strategy for community advancement Public and private, non-profit organizations should enhance financing for walking and pedestrian safety research, policy formulation, programs, and assessment of the impacts of current policies. And instead of focusing just on traffic numbers and speeds, local transportation authorities should reform transportation expenditures at all levels to relate them to bigger goals for health, safety, equity, and the environment.

The topic of walkability is crucial and vital to create a better and safe communities, more research on walkability should be conducted, and local governments should prioritize investments in creating and maintaining huge networks of high-quality sidewalks, crosswalks, greenways, trails, and transit that are compliant with the Disabilities Act in order to provide individuals of all ages and abilities with safe means of walking (for transportation and recreation).

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