IMPROVING ROAD SAFETY FOR URBAN CHILDREN

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• Evidence to action briefs: These are short research summaries about different topics that are important to address when thinking about child rights and the well-being of children and young people in urban contexts.
• Case studies of success from different urban contexts to inspire change and action.
• Country/city reports about the situation of children in urban areas.
• Practical tools to work with children and young people to encourage their participation, better understand their needs and support their contributions in the urban context.
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SUMMARY

Road traffic injuries are the leading cause of death globally for children and young adults between the ages of 5 and 29.[1] Every year around 220,000 children and young people die due to crashes on the world's roads, the majority in low- and middle-income countries.[2] Around ten million more are injured,[3] including many left with permanent disabilities.[4] Child pedestrians in deprived and excluded communities are particularly at risk.

Road traffic injuries are preventable. The Safe Systems Approach (described in Box 1) is a best practice framework for all stakeholders to follow, based on the premise that no one should die on roads, and if crashes do occur, they should not result in serious injury or death. It identifies ways to reduce risk through safe speeds, safe vehicles, safe road design, and by supporting road users to be safe.

Programmes and interventions which reduce road traffic injuries also improve health and wellbeing, the environment, and the economy. Putting children first instead of motorised vehicles requires prioritising walking, cycling, and public transport, and focusing on personal security, particularly for women and girls.

Improving road safety requires coordinated action between national and local governments, in order to set and enforce laws and invest in safe road infrastructure. City authorities have a responsibility to collect and use data to understand mobility patterns and road safety challenges, and then take steps to address these to ensure cities are safe for children to move around.

There are a number of tools that can help with this, and extensive evidence about what works and should be prioritised, including:

- Ensuring every urban street has a viable footpath and protected crossings
- Roads in areas where children are commonly present have a default speed of no more than 30km/h – and even lower in areas where children mix with traffic
- Convenient and affordable transport options, including a network of separated cycle lanes, and public transport
- Education and enforcement around road safety, including training road users in practical ways, and ensuring use of child restraint systems and motorcycle helmets, and
- Investing in high quality post-crash care, including equipment and trauma facilities designed for children, is crucial for saving the lives of those seriously injured.

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ACRONYMS

EASST	Eastern Alliance for Safe and Sustainable Transport
GDCI	Global Designing Cities Initiative
GDP	Gross Domestic Product
GRSP	Global Road Safety Partnership
iRAP	International Road Assessment Programme
ITDP	Institute for Transportation and Development Policy
NGOs	Non-Governmental Organisations
SARSAI	School Area Road Safety Assessment and Improvements
SDGs	United Nations Sustainable Development Goals
SR4S	Star Ratings for Schools
UNICEF	United Nations International Children's Fund
WHO	World Health Organization
WRI	World Resources Institute

1. INTRODUCTION

Every day approximately 600 children die due to road traffic injuries – equivalent to one death every two minutes, and 97% of these deaths occur in low- and middle-income countries.[2] In cities around the world many streets currently lack basic infrastructure to keep children and young people safe, such as continuous pavements/sidewalks, convenient pedestrian crossings and separate cycle lanes. Many countries still lack comprehensive laws, or fail to adequately enforce those that do exist, to protect road users and ensure vehicle safety.

Roads are often designed to meet the needs of adults using motorised transport, rather than those of children and young people. As a result, streets are filled with traffic, air pollution, and noise pollution. Busy and dangerous roads physically separate communities and do not allow for safe walking and cycling. Lower rates of physical activity contribute to non-communicable diseases and negatively affect mental health. Making streets safe for children can support a range of agendas, including improved air quality, climate action, and greater equality of access to opportunities and services. Streets that are safe, attractive and healthy for children and young people also benefit people of all ages.[5]

This brief provides a summary of key evidence on preventing road traffic injuries among children, and effective evidence-based interventions. While evidence is most extensive for high-income settings, there is an increasing body of evidence on the cost-effectiveness of interventions in low- and middle-income settings.[6] The brief includes global policy commitments, and resources for more information and practical support.

2. THE RESEARCH

2.1 Global evidence on road traffic injuries harming children and young people

2.1.1 Children are particularly vulnerable to road traffic injuries

Compared to adults, it is harder for children to assess the risk posed by traffic because they are less able to assess distance, speed and sound.[7] Young child pedestrians are smaller and less likely to be seen by vehicles. Being nearer to the ground means they may also find it harder to see past objects to assess risks when crossing roads, and are more likely to suffer head injuries if hit by the front of a car. As passengers, children require specifically designed safety equipment, for example child restraint systems or appropriate sized helmets when using motorbikes.

Every day approximately 600 children die due to road traffic injuries – equivalent to one death every two minutes, and 97% of these deaths occur in low- and middle-income countries.

Non-governmental organisations (NGOs), donors, local governments, and other stakeholders have a special responsibility to protect children and youth. This includes improving the design of roads, implementing interventions, enacting road traffic laws, and advocating to save lives. This shared responsibility is central to the Safe Systems Approach (see Box 1).

Box 1. The Safe Systems Approach

The Safe Systems Approach is based on the premise that road traffic deaths are unacceptable and avoidable if effective injury prevention strategies are implemented. It is a comprehensive framework for improving road safety.[8] The approach shifts the burden of responsibility from vulnerable road users, such as children and their caregivers, to include all those who design and interact with roads through shared responsibility to reduce risk.[9]

The Safe Systems Approach works. Countries that have adopted it have had both the largest reductions and lowest rates of fatalities in road traffic crashes.[10] While these are mainly high-income countries, the approach can and should be applied in low- and middle-income countries.

The principles of this approach are:

- Individuals make mistakes.
- The human body by nature has a limited capability to sustain collision forces.
- It is a shared responsibility between all persons who interact in the road environment to take appropriate actions to ensure that road collisions do not lead to serious or fatal injuries.
- All components of the system must be interconnected to strengthen and multiply their impacts.

Principles, core elements and action areas of the safe systems approach

Source: UNICEF (2022)[11]

2.1.2 A significant proprortion of child traffic injuries are pedestrians, particularly in low- and middle- income countries

Globally, over half of all child deaths are among 'vulnerable road users' – as pedestrians, cyclists and on motorcycles. These deaths are particularly high in low- and middle-income countries where more than 80% of roads with speeds above 40mph and with pedestrians present have no formal sidewalk.[12]

Because children and young people have different travel patterns than adults, they suffer different types of injuries (see Figure 1). Globally, babies are most likely to be injured in vehicles, but between the ages of one and 15, children are most likely to die on roads as pedestrians. Between the ages of 15 and 19, the proportion of deaths on motorcycles rises to over 25%, and motor vehicle deaths also increase, reflecting young people's increased independence and ability to legally ride or drive.[13]

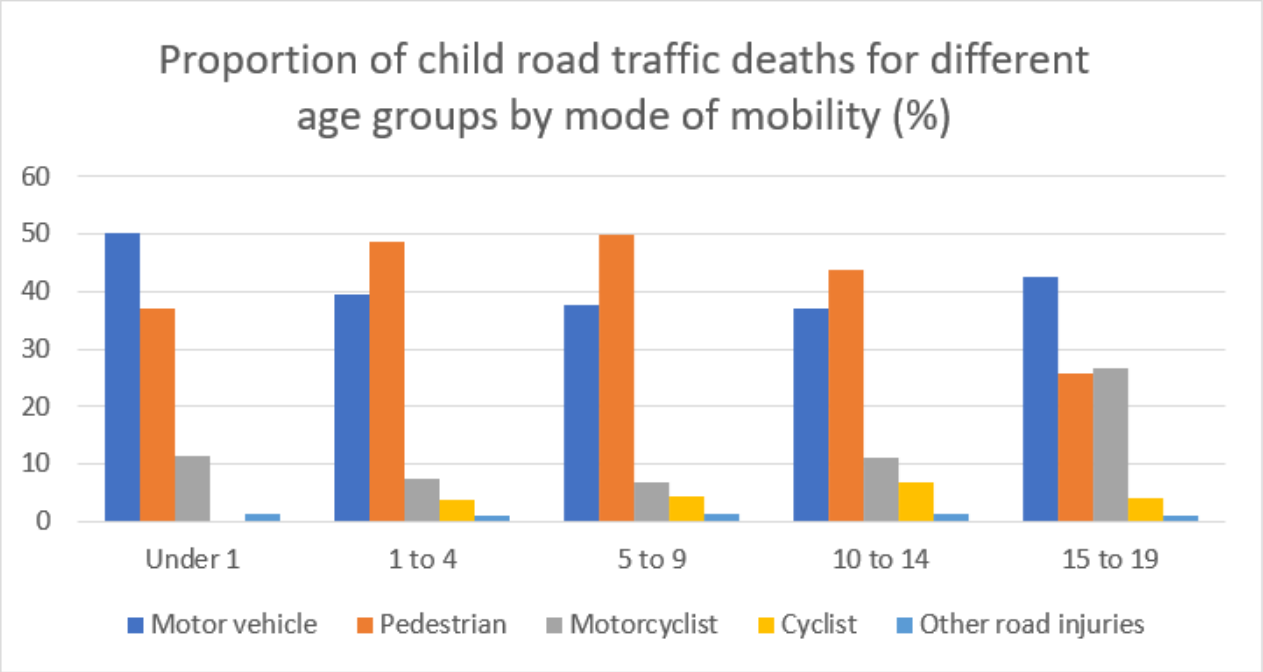

Figure 1. *Source: Adapted from UNICEF (2022) based on WHO Global Health Estimates 2019*

2.1.3 Boys are far more likely to be injured in road traffic crashes, but girls often face higher personal security risks

The rate of road traffic deaths is almost twice as high for boys compared to girls.[14] In general, boys are given greater freedom to explore their environment and use motorised vehicles. Boys also mature later than girls, take more risks, are influenced by their peers and overestimate their driving abilities.[15] However, girls face greater sexual harassment on streets and in public transport. Therefore, strategies for improving road safety should also be integrated with efforts to improve personal security, such as through better street lighting and visibility.[16]

2.1.4 Rates of child road traffic injury are highest in low-income countries, which also have a lower rate of improvement

Over the past twenty years, high income countries, which already had the lowest rate of injuries, achieved the greatest decreases in the rate of fatal road traffic injuries. Europe and North America both achieved reductions in child road traffic injuries of more than 50%, whereas in sub-Saharan Africa the reduction was 16%, and the rate remains considerably higher than other regions.

In sub-Saharan Africa, 70% of the population is below the age of 30,[17] which coupled with increasing urbanisation, means significantly more and growing numbers of children and young people in cities are at risk of road traffic injuries compared to those in Europe and North America. Therefore, there is an urgent need to improve road safety for children and young people in the region. Differences across regions not only reflect population change, but also rapid increases in motorisation, combined with a lack of adequate legislation, funding and safety measures.

Road traffic injury death rates for children and adolescents, aged 0–19 years, by UNICEF region, 2000–2019

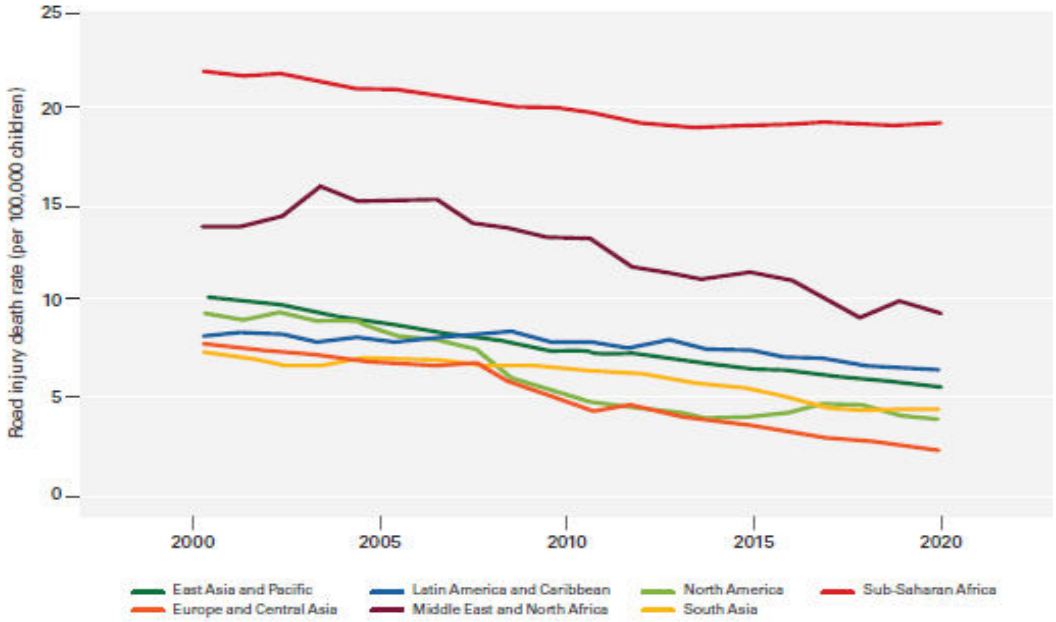

Figure 2. *Source: UNICEF (2022) based on WHO Global Health Estimates 2019*

2.1.5 Road traffic injuries lead to significant costs

Road traffic injuries have wide-ranging physical, social, psychological and economic impacts – and may include additional burdens for carers, financial loss for healthcare and missed income, and the unquantifiable relational impacts of personal loss.[18] While some injuries cause significant long-term disability, others are a temporary impairment.[19] Road traffic crashes are estimated to cost countries around 3% of their Gross Domestic Product (GDP).[20] They also result in missed school days and lost learning opportunities, negatively affecting academic performance. In the long term, this may negatively impact careers, making it harder to break out of the cycle of poverty.[21]

2.2 Urban-specific evidence

2.2.1 Road safety is key to healthy, low-carbon, welcoming streets

Road safety is a wider enabler of child-friendly cities, that support children's healthy development. Streets are the largest continuous public space in cities and, if designed appropriately, have the potential to positively influence people's wellbeing, fostering physical health and social connections.[4] Well-designed streets, with reliable and active mobility choices, adequate space and places to pause, play and learn can reduce sources of stress, and provide opportunities for positive interactions and strengthen core life skills.[4]

Cities that have established comprehensive networks of safe cycling routes, such as Bogota, have seen cycling rates rise significantly.[22] Networks of protected bicycle lanes in middle-income cities are a cost-effective way of reducing emissions, providing quantifiable economic benefits, and paying for themselves in less than a year.[23] For children, these are particularly important – both preventing the harms that come from air pollution and sedentary lifestyles, and also enabling healthy developmental building blocks.[24]

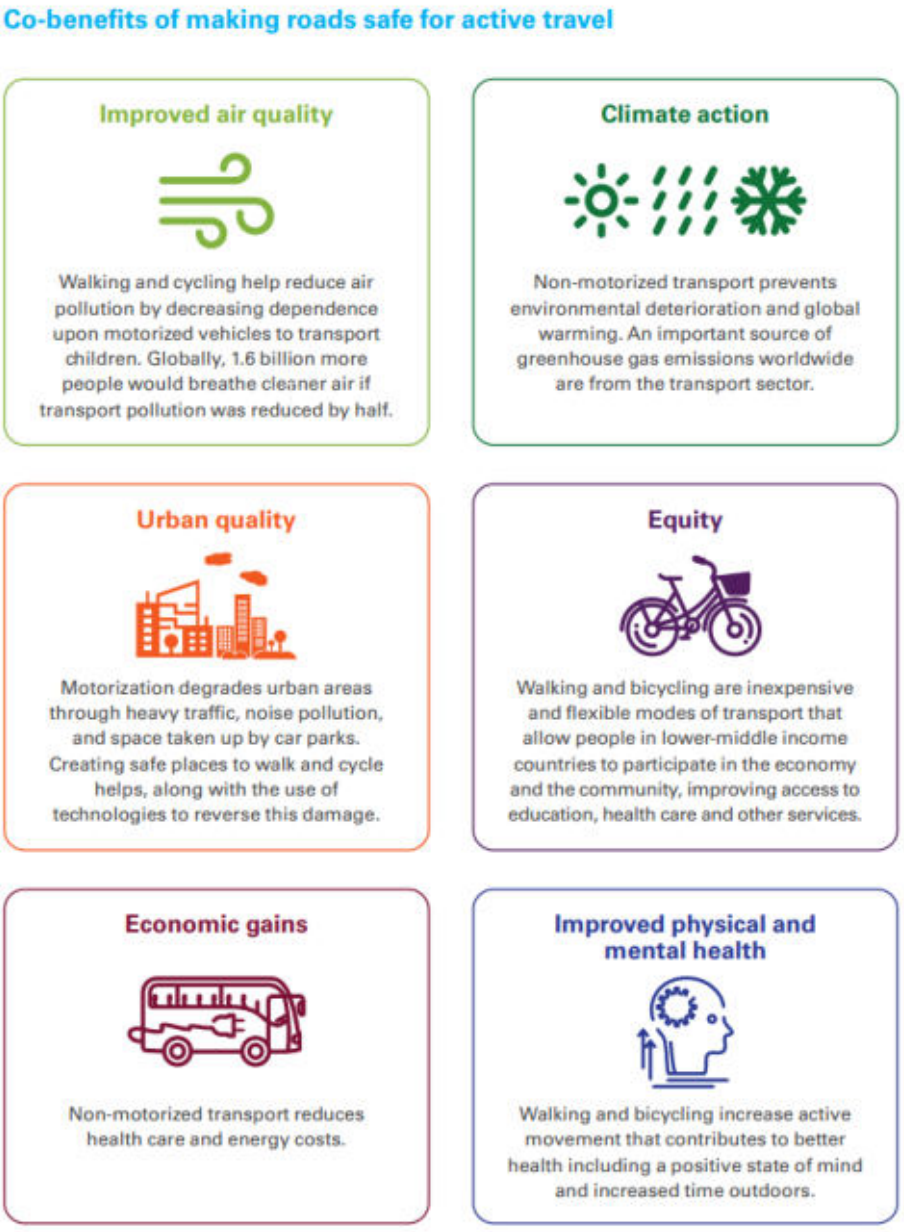

Figure 3. *Source: UNICEF (2022) based on Sustainable Mobility for All*

2.2.2 Road injuries are an issue of equity and justice

Across a range of countries road injuries tend to be greater in communities that experience higher levels of poverty and deprivation.[25] [26] Inadequate road design can also exacerbate other inequalities, such as by disproportionately impacting certain ethnic groups.[27]

There are various reasons for this:

These groups are more likely to live in areas that have higher volumes of vehicles and which lack adequate safety features.

Areas with unsafe roads are less desirable, and may sometimes be the only places that poor people or migrants are able to afford to live. Many informal settlements are situated along the edges of major roads, and while their unplanned tightly packed structure often means that few vehicles (except sometimes motorcycles) are able to access the narrow paths around dwellings, a lack of safe routes across surrounding roads, and little provision of public transport or other services increase the risk of injury.

People with lower incomes are more likely to use modes of transport which make them more vulnerable.

Households that earn less money are less likely to own a private vehicle, meaning more journeys may be made on foot, or by riding bicycles or motorbikes. Also in many cities in developing countries, there is often a range of informal transport operators – such as minibuses, *tuk-tuks* or motorbike taxis – which may be unregulated with poor safety standards, but may be the only option poorer households can afford.[28]

Some areas have less political influence.

Residents in more deprived areas may have less knowledge or time to use political processes and social connections to campaign for local improvements.[29] There may also be wider structural issues of inequality and exclusion which mean their views are not heard, sometimes linked to language or cultural or racial identity. In Lebanon, for example, children who are refugees have a higher risk of dying on the road as pedestrians and double the risk of dying from road traffic injuries compared to local children. They are more likely to have dangerous jobs exposing them to higher levels of risk on roads – for example selling products on the street or working in agricultural fields alongside highways. Children living in informal, overcrowded settlements are also at higher risk of injury on roads, as well as long-term disability or death, because of limited access to health services.[30]

Streets are the largest continuous public space in cities. If designed appropriately, have the potential to positively influence people's wellbeing, fostering physical health and social connections.

Unlicensed vehicles and drivers in informal settlements.

In some informal settlements there is limited police enforcement to ensure that vehicles and drivers are licensed. In Cairo's larger informal settlements, for example, old and unlicensed mini-trucks, often driven by unlicensed youth are a means of mobility within neighbourhoods. These trucks have a set route, and people, especially children, sometimes jump on the vehicle while it is moving.[31]

2.2.3 Schools are a key priority area for intervention

Going to school and back is perhaps the most regular journey that children and young people take. In African cities 70–90% of children walk to school – but high proportions of roads lack adequate sidewalks.[32] In Canada, the average distance between a crash and a school is less than 500m.[33] In Chile, 90% of child pedestrian fatalities occur within 500m of an educational establishment, with 70% within 250m.[34] Similar trends have also been found in France.[35] Improving safe and active travel infrastructure around schools, such as reducing vehicle speeds and restricting vehicle use, are all ways of addressing these issues (see section on specific actions for more details).

2.2.4 The quality of data differs significantly between cities

There are significant differences in the quality of data collected on road traffic injuries across different countries and cities. While some cities have sophisticated systems for tracking road traffic crashes and understanding their causes, in most developing countries there is a lack of data available to transport planners about road traffic injuries and where these occur. Often it is the police or hospital system that keep these records.[36] In order to correct for under-reporting, the World Health Organization (WHO) has developed a process for adjusting country data to create comparable global estimates.[37]

Box 2. Access to quality data can improve road safety

There are a number of initiatives that aim to improve the quality of data available to decision makers. The International Transport Forum Safer City Streets network aims to improve urban road safety performance by sharing data experiences and knowledge.[38] There are also regional road safety observatories in Latin America, Africa and the Asia-Pacific region, which aim to support governments in sharing and exchanging data and experiences on road safety to reduce injuries.[39] Even where data is collected there need to be systems in place to use it to inform decisions. For example, in Bengaluru, India, World Resources Institute(WRI) has collated data on road safety risks to inform strategies for reducing child deaths.[40] Bogota, Colombia also has a relatively robust data bank on road safety incidents – whereby every incident is registered and coded using a geolocation tool, and the data made available through a public portal.[41]

3. RESEARCH-INTO-ACTION

3.1 Road safety for children is embedded in international commitments

There are a series of international commitments on road safety, which highlight road injury reduction as a significant priority worldwide. These include:

UN Sustainable Development Goals (SDGs)
Reducing road traffic injuries is so important it is included twice in the **SDGs**.[42]

- Goal 3: Good Health and Well-being
  Target 3.6: By 2030, halve the number of global deaths and injuries from road traffic accidents
- Goal 11: Make cities inclusive, safe, resilient and sustainable
  Target 11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

Habitat III New Urban Agenda
Includes detailed commitments to:

> *take measures to improve road safety and integrate it into sustainable mobility … with special attention to the needs of all women and girls, as well as children and youth … We will promote the safe and healthy journey to school for every child as a priority.*[43]

2020 Stockholm Ministerial on Road Safety
Helped to establish an international consensus around the Safe Systems approach and lower speeds. The Stockholm Declaration on Road Safety included a specific focus on children, and called for action to:

> *address the unacceptable burden of road traffic injury on children and young people as a priority, increasing political commitment, by ensuring that the Global Strategy for Women's, Children's and Adolescents' Health delivers necessary action on road safety.*[44]

Specific approaches for road safety have been set out by the WHO, as part of commitments for a second UN Decade of Action for Road Safety from 2021-2030, built on the first decade (2010-2020).[45] It set a target to reduce road traffic injuries and deaths by at least 50% over that period.[46]

3.1.1 The Global Plan

The Global Plan for the second Decade of Action for Road Safety (2021-2030) sets out the international consensus on the priorities for addressing road traffic injuries.[47] It builds on the five 'pillars' of road safety – road safety management, safe road use, safe vehicles, safe roads and roadsides, and post-crash care.[48] The Global Plan includes a focus on multimodal transport and land-use planning. It builds on two other key initiatives:

A **technical package**, known as **Save LIVES**, developed by the WHO in 2017, which identified seven priority interventions (spelling out the acronym): Speed management; Leadership on road safety; Infrastructure design and improvement; Vehicle safety standards; Enforcement of traffic laws, and; Survival after a crash.[49]

Twelve global **voluntary performance targets** which cover the five pillars – the majority of which have goals for 2030, in line with the SDGs.[50] Guidance is available to assist countries seeking to achieve these.[51]

Twelve global voluntary performance targets

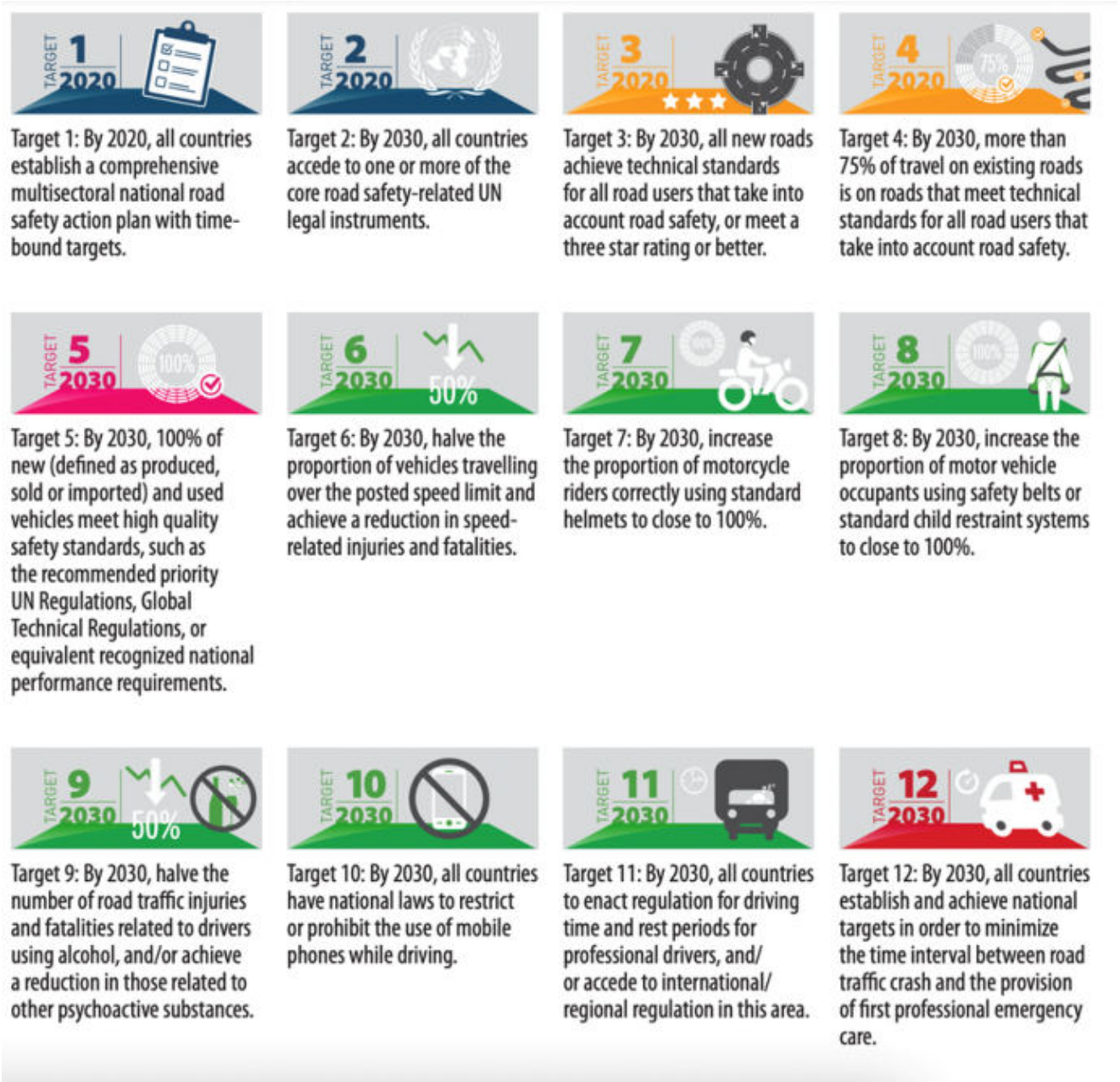

Figure 4. *Source: WHO (2018)* [52]

3.2 Specific actions to reduce child and adolescent road traffic injuries

Improving road safety in line with the Safe Systems Approach and the Global Plan requires actions across a range of areas to reduce injury risk. Underlying these actions is the need to rethink and rebuild cities from the perspective of children and young people, which benefits the entire population.

In Mexico City for example, children's voices were central to safety improvements in a low-income, high-risk area. Many grandparents walk children to school – two vulnerable populations engaging in a necessary, but risky, activity. Through Vision Zero for Youth, the Institute for Transportation and Development Policy (ITDP) supported basic road safety and traffic conflict technique workshops for students (see page 15). Stakeholders joined students in temporary tactical urbanism that resulted in long-term, government-funded change.[53]

Similarly, in Fortaleza, Brazil, the National Association of City Transportation Officials' Streets for Kids programme transformed a formerly unsafe, 5,000m2 site into a leisure destination using paint and moveable street furniture. They increased safety by removing and narrowing travel lanes, built refuge islands and kerb extensions, and focused on play spaces for children. A post-intervention survey showed 90% of people approved of the intervention, and 86% felt 'very safe' from motorists. Though the project was initially supposed to be temporary, it had so much support thanks to increased safety that it became permanent. This shows that strategic and low-cost interventions can inform and secure long-term change.[54]

The population-level benefits of focusing on children are clear. Yet the needs of children are often ignored, particularly in slums, informal settlements, and redevelopment areas, where they face increased risk of injury and other negative health outcomes. These areas are often rife with efforts to widen roads with little attention to safety and regulation and result in an increase in road traffic injuries among children and decrease in access to play spaces.

For every injury-related fatality, it is estimated that 10–50 times more people are permanently disabled. The effects of these disabilities and injuries are more severe for low- income individuals in informal settlements, where they suffer from inadequate trauma care, and insufficient welfare and rehabilitative services. Nonetheless, these inequities remain ignored by urban policymakers who view accidents as 'unavoidable', blinded as they are by underreporting and focusing instead on competing priorities. The lack of programmes, policies and interventions to improve road safety and play spaces for children in informal settlements, slums, and redevelopment areas can be lethal.[55]

There are proven methods to decrease the risk of road traffic injuries and fatalities which are not 'accidents' but which are preventable. WHO's Save LIVES technical package includes a total of 22 interventions across six components. Similarly, UNICEF's technical guidance on road safety interventions summarises the effectiveness of 23 potential policies, across engineering, legislation and education.

Save LIVES: 6 components and 22 interventions

Acronym	Component	Interventions
	**Speed management**	Establish and enforce speed limit laws nationwide, locally and in cities
		Build or modify roads which calm traffic, e.g. roundabouts, road narrowing, speed bumps, chicanes and rumble strips
		Require car makers to install new technologies, such as intelligent speed adaptation, to help drivers keep to speed limits
	**Leadership on road safety**	Create an agency to spearhead road safety
		Develop and fund a road safety strategy
		Evaluate the impact of road safety strategies
		Monitor road safety by strengthening data systems
		Raise awareness and public support through education and campaigns
	**Infrastructure design and improvement**	Provide safe infrastructure for all road users including sidewalks, safe crossings, refuges, overpasses and underpasses
		Put in place bicycle and motorcycle lanes
		Make the sides of roads safer by using clear zones, collapsible structures or barriers
		Design safer intersections
		Separate access roads from through-roads
		Prioritize people by putting in place vehicle-free zones
		Restrict traffic and speed in residential, commercial and school zones
		Provide better, safer routes for public transport
	**Vehicle safety standards**	Establish and enforce motor vehicle safety standard regulations related to: • seat-belts; • seat-belt anchorages; • frontal impact; • side impact; • electronic stability control; • pedestrian protection; and • ISOFIX child restraint points
		Establish and enforce regulations on motorcycle anti-lock braking and daytime running lights
	**Enforcement of traffic laws**	Establish and enforce laws at national, local and city levels on: • drinking and driving; • motorcycle helmets; • seat-belts; and • child restraints
	**Survival after a crash**	Develop organized and integrated prehospital and facility-based emergency care systems
		Train those who respond to crashes in basic emergency care
		Promote community first responder training

Figure 5. *Source (WHO, 2017)*

Not all of these are specific to children. While there is more evidence for high-income settings, there is also increasing evidence for low- and middle-income countries.[56] The following actions are based on the WHO's publication 'Ten strategies for keeping children safe on the road': [57]

1. Managing speed

One of the most important ways of reducing the risk of injuries is to reduce road traffic speeds. Children cannot accurately see or judge the speeds of vehicles traveling above 20mph.[58] Every 1% increase in mean speed produces a 4% increase in the fatal crash risk and a 3% increase in the serious crash risk.[59] A review of 20mph zones in London found a 50% reduction in serious injuries for children within the zones.[60]

In low- and middle-income countries, particular care needs to be taken when upgrading roads, as improving the road surface might enable higher speeds. Physical traffic calming measures that influence vehicles to reduce speeds (such as road narrowing, traffic calming, speed bumps) alongside infrastructure to enable safe crossings have the greatest proven safety benefits.[60] Reducing speed not only reduces road traffic injury risk, but also makes people more likely to feel safe to walk and cycle. Lower speeds also reduce noise levels, and make streets quieter and more pleasant.[62]

Many cities have also made 20mph/30kmh the default speed limit across the whole city for non-arterial roads, as recommended by the WHO.[63] If the low-speed zone includes a shared space where pedestrians and motor vehicles mix, then target speed for the shared space should be even lower – such as 10mph or even 5mph.

- Paris is one of a number of cities that have rolled out 30km/h limits across the majority of its roads in a bid to reduce road traffic risk and make roads safer for pedestrians, particularly children and the elderly.[64]
- Spain has made 30km/h the default limit on all single-lane urban roads, and 20km/h for those without a separate pavement.[65] Barcelona has also established a number of 'superblocks' which significantly reduce the amount of traffic on minor residential streets.[66] The Netherlands has a similar, smaller-scale version of this concept called a woonerf, which is a car-free street.[67]
- In April 2022, Uganda announced that it was planning to introduce a new traffic regulation lowering the speed limit for driving in urban areas from 50km/h to 30km/h.[68]

2. Reducing drink driving and other impairments

A large proportion of road traffic deaths are attributed to alcohol.[69] Novice drivers are particularly likely to be affected by alcohol, which can affect judgment and increase the risk of a crash. Policies that increase the minimum drinking age to 21 are effective in reducing crashes,[70] as well as breath testing, zero tolerance of alcohol for novice drivers, night-time curfews for young drivers, and reducing the blood alcohol limit to 0.05 BAC (Blood Alcohol Concentration) or less.

3. Child restraints

Seat belts and appropriate child restraints save lives. The safest place for a child aged 12 years and under is in the back seat, properly restrained in an approved child safety seat. Babies using (rear-facing) child restraints are around 90% less likely to be killed or injured in a crash, compared with those who are unrestrained.[34] Children aged 4–7 using booster seats are around half as likely to be injured in a crash than those just wearing seat belts. The likelihood of serious injury also depends on the nature of the crash – those in seatbelts and booster seats are eight times less likely to be moderately or severely injured in front and side impacts than unrestrained children. This increases to 13 times for side impacts, and 24 times for rollover crashes.[34]
Large numbers of children globally do not use appropriate seat belts or correctly fitted child restraints, in part due to a lack of information, cultural perceptions, affordability and lack of adoption or enforcement of laws.[71]

Strategies to reduce fatalities include ensuring:

- Countries have child restraint laws that meet best practice, requiring use of a child restraint until at least the age of ten (or 135cm in height), and which forbid children under a certain height from sitting in the front seat
- Countries have internationally-recognised manufacturing standards in place (UN Regulation 44 or the more recent i-Size 129)
- Child restraints are affordable and available to those who need them, such as through loan schemes
- Vehicles have plug-in attachments, such as ISOFIX (International Standard Organization Fix) anchorage systems, although this may be less feasible in low- and middle-income countries, and
- Families know how to use child restraints correctly.

The recently updated WHO/FIA Foundation guide on Occupant Restraints offers further detailed evidence and case studies, including a focus on children.[72] The Global Road Safety Partnership has also produced a technical guide for implementing child restraint systems in low- and middle-income countries.[73]

Box 3. Child restraint system legislation in Chile

Chile almost halved the number of children killed in road crashes over five years, from 77 in 2014 to 44 in 2019, following the introduction of child restraint system legislation. This new legislation requires all children up to the age of 12 to use appropriate restraint systems.[74] The NGO Fundacion Gonzalo Rodriguez (FGR) was a key advocate for these changes, and also ran regular 'check up events' to support parents in ensuring that their child seats were fitted correctly.

Fundacion Gonzalo Rodriguez has advocated for child restraints in South America.
Credit: Fundacion Gonzalo Rodriguez

4. Motorcycle helmets, including for children

Children are often passengers on motorcycles, particularly in Asia – where around half of child road traffic injuries and deaths are related to motorbikes.[75] Wearing a quality helmet can reduce the risk of death by 42% and the risk of serious brain injury by 69%.[76] In countries where motorcycles are the dominant form of mobility, it is not unusual to see whole families riding them. While adults often have helmets, it is less common for children to have protection. Use of helmets is influenced by parental knowledge, helmet availability, accessibility, cost and ease of use, including the availability of the correct size for children.[77]

Box 4. Helmets for Kids programme in Vietnam

In Vietnam, the national helmet law was enacted in 2007 – and the country saw 1,500 fewer traffic fatalities the following year.[78] Over ten years it is estimated that the law prevented 500,000 head injuries and saved US$3.5 billion (in medical costs, lost output, and pain and suffering). However, while over 90% of adults wear helmets, by 2017 only 53% of children wore one – up from 5% in 2007.[79] There are over 50 million motorcycles in the country, and 90% of children are transported by motorcycles each day.

The AIP Foundation, whose advocacy since 2000 had helped introduce the helmet law, has supported the rollout of the Helmets for Kids programme.[80] For example, by working with 12 schools in Gia Lai Province, helmet-wearing rates increased from 38% in 2015 to 95% in 2018.[59]

AIP Foundation has helped increase helmet wearing to prevent injuries, especially among children. *Credit: AIP Foundation*

5. Improving children's ability to see and be seen
Improving visibility can be done through design modifications. These include additional parking restrictions to improve sightlines and 'build-outs' to narrow the road at crossings to ensure that children can be seen – often using low cost-materials such as paint and bollards as has been done in Mexico City.[81]

Road crossings made safer through paint markings and 'build outs' in Mexico City.
Credit: Institute for Transportation and Development Policy

Street lighting is estimated to reduce injuries by 10–25%.[82] It also plays an important role in making people, particularly women, feel safe and can increase the number of people who choose to walk. Perceptions of personal security are not just influenced by brightness, but by the diffusion of light, which should also be taken into account. In the absence of adequate lighting, reflective clothing or lights make it easier for pedestrians and other vulnerable road users to be seen by drivers.[85]

6. Enhancing road infrastructure for children
Many streets around the world lack basic infrastructure for active travel. Safe pavements can reduce casualties by 40–60%.[86] Even where pavements do exist, it is important to address other hazards, such as parked cars, informal street vendors or open drains blocking the route.[87]

School zones, with lower speed limits and additional traffic calming features and infrastructure such as formal crossings, are a common intervention around schools in many countries. South Korea reduced child road fatalities by 95% between 1988 and 2013, including through introducing over 9,000 school zones, with a 30km/h speed limit and parking prohibitions.[88]

Box 5. Safe School Zones in Tanzania

In Tanzania, the NGO Amend has implemented School Area Road Safety Assessment and Improvements (SARSAI) across a number of schools. This includes a range of infrastructure improvements including speed bumps, bollards, new pavements, signage and crossing points. These simple solutions, which cost only about US$25,000 per school, save lives and prevent injuries. In a peer-reviewed study, schools with SARSAI experienced 26% fewer injuries, and vehicle speeds in school zones dropped by as much as 60%.[89] This cost-effective impact led Amend to win the inaugural WRI Ross Prize for Cities in 2019.[90] Amend is replicating this approach across many other countries in Africa.

Amend's infrastructure improvements in Tanzania are a cost effective way to save lives and prevent injuries. *Credit: Amend*

Star Ratings for Schools (SR4S) is a simple system for assessing the safety of road infrastructure. SR4S allows measurements to be made before and after the intervention, to objectively measure the safety change through the difference in score (from one to five stars). SR4S assessments have been undertaken in many countries – including Justin Kabwe Primary School in Lusaka, Zambia – where the changes raised the score from a dangerous one and two star to an excellent five-star rating.[91] The simple methodology means that the assessments can be rolled out to many schools, with over 1,000 schools assessed so far, in more than 63 countries.[92]

In Vietnam, AIP Foundation reduces speeds around schools to improve safety.
Credit: AIP Foundation

Box 6. Safe School Zones in Pleiku City, Vietnam

In Pleiku City, Vietnam, AIP Foundation has led a Slow Zones, Safe Zones programme which aims to reduce speeds and improve safety around schools. By implementing the Star Rating for Schools approach, and implementing infrastructure improvements, the two pilot schools in the project in 2018 were able to increase their safety rating to 5 stars, and average speeds were reduced by around 20km/h. Across the project's two phases between 2018 and 2022, there was a 47% and 29% decrease in student-reported crashes at target schools, respectively. Subsequently, Vietnam enacted a new law in 2019 that allowed local authorities to set speeds "based on the actual situation of the road sections and on traffic infrastructure, on the flow, types of vehicles and the time of day", allowing local government agencies to designate reduced speed for their schools during peak hours. In 2020 the provincial government mandated that City authorities install speed limit signs and enforce limits during peak school arrival and departure hours, with speeds not exceeding 30 km/h or 40km/h. School zone modifications were completed at a total of 31 programme schools in December 2021.

The aim is to reach all schools in Vietnam. A new Safe School Zones Guide (SSZ Guide) is being developed to reduce injuries and fatalities in and around all school zones by improving road conditions and setting legal speed limits across the whole country. This will initially inform infrastructure modifications at 13 schools in Northern, Central, and Southern Vietnam. The aim is to apply mandatory engineering parameters for all school zones in Vietnam including 30km/h speed limits. All newly-built schools will be designed with these parameters in mind and all existing schools will be gradually upgraded as well.[93]

Another useful tool for assessing the impact of changes around schools is Traffic Conflict Analysis, which uses observations of driver and pedestrian behaviour to assess road safety risk. The aim of the free toolkit is to prevent crashes before they occur by collecting data on near misses. Near misses occur more frequently than crashes, and crash data is often difficult to gather, and/or is underestimated. The toolkit recognises although infrastructure may be safe, users may not interact with it in a safe way. Measuring conflicts helps decision makers modify the environment to ensure safety.[94] Evidence from an evaluation of this technique in school zones in Ghana, Vietnam and Mexico found that this effective, low-cost technique can help decision makers evaluate strategies for improving road safety using real world-data, preventing injuries and saving lives.[95]

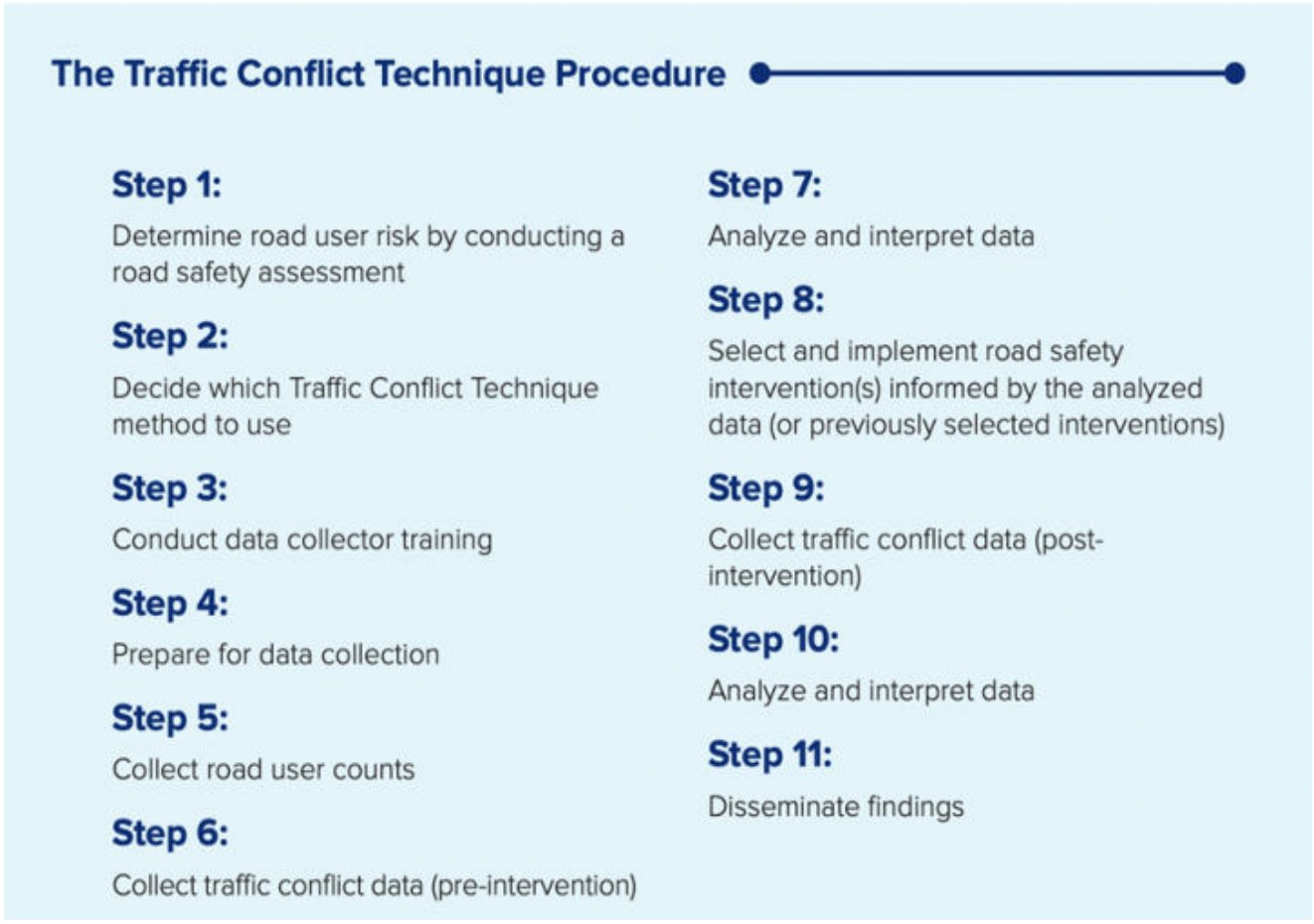

Figure 6. The Traffic Conflict Technique offers a menu of options to utilise the technique, based on time, resources, and expertise, and a low-cost, relatively simple process to identify opportunities for safety improvements.[96]

As well as reducing speed limits and improving infrastructure for pedestrians, many schools are now restricting vehicles from travelling along roads outside schools at the start and the end of the school day. Banning vehicles reduces harmful emissions, and can improve air quality by around a quarter.[97] There are now over 1,250 school streets (or similar schemes) globally in at least a dozen countries.[98]

The way that streets are designed can shape children's independent mobility and 'everyday freedoms'.[4] A child-friendly city combines the freedom to explore in safety with interesting and engaging things to do.[99] Other key areas where children are more likely to be injured are near where they live or play. Many cities lack formal play areas, meaning that children may be more likely to play in the street, exposing them to road traffic risk. Even when formal play areas exist, caregivers may prefer that children play near homes for convenience, allowing caregivers to simultaneously do chores or care for others at home. A 5–10 minute walk to a formal playground may not be feasible for a caregiver who has many other competing tasks. Play streets, and safe streets, are therefore crucial. Nonetheless, it is important that cities provide places where children can play safely, which can include improving road safety around existing playgrounds, developing new places and facilities, or temporarily closing streets to vehicles to provide temporary play areas for children to come together.[100]

7. Vehicle design

Minimum safety standards for vehicles can play a role in reducing road traffic deaths. A 'crumple zone' reduces compression in the passenger area during impact, protecting children. This design feature has been shown to increase safety by over a quarter compared with older cars.[101] In Europe, legislation on Frontal Protection Systems ensures that the fronts of vehicles are designed to protect pedestrians and cyclists in the event of a collision.[102]

It is important that the specification of vehicles sold in low- and middle-income countries includes the safety specifications of equivalent vehicles sold elsewhere. Countries should apply UN minimum safety regulations to new vehicles. New Car Assessment Programmes, which include independent crash testing, can also promote consumer awareness and demand for higher standards of safety.[103]

8. Graduated licensing schemes

Young drivers account for a large number of road traffic crashes globally because of a lack of experience, and emotional and developmental maturity. In some countries, children as young as 15 years old are allowed to drive. Graduated driving licenses, which place additional restrictions on novice drivers, are effective in reducing crash rates in young adults.[104] Increasing the age at which children are allowed to apply for a license can also increase safety.[105] Other elements can include restrictions on night driving, not carrying passengers for set time period after passing the test, and ensuring that the novice driver is accompanied by a fully licensed driver while they gain road experience – again, for a defined period of time.[10]

Many cities lack formal play areas, meaning that children may be more likely to play in the street, exposing them to road traffic risk.

In many countries, the first vehicle a young person will drive is a motorbike, with many employed to ride motorbike taxis. Many of these riders are young people without a license or even any basic training, who are exposed to high levels of risk on the roads. In Kenya, efforts have been made to work with the National Youth Service to enforce rules on licenses and provide free motorcycle training classes.[106]

9. Improving post-crash care

Timely post-crash medical assistance can be the difference between life and death for injured children. Ways to improve care include training in first aid for those who may be first on the scene – such as teachers, police, or other community groups – as well as a dedicated medical emergency response service, with ambulances that have equipment designed for children, and child-focused trauma care services in hospitals.

10. Supervising children

Even with excellent road infrastructure there will always be a role for supervision to ensure that children wear helmets, use appropriate child restraints, and know how to cross roads safely. Education campaigns can be effective in encouraging this, particularly when these include physical practice and interactive training, such as roadside experience for child pedestrians.[107]

The EASST Road Safety Education Pack is a free educational resource designed to be used in low- and middle-income countries, that has been successfully used in a number of Eastern European countries and beyond.[108] The Global Road Safety Partnership (GRSP) has also developed some guidelines for how to design road safety education.[109]

Beyond education, adequate childcare can also help ensure children are appropriately supervised. This is especially important in informal settlements. Even in high-income nations, informal settlements may not receive the benefits of measures to reduce speeds and require seatbelts.[110]

4. STAKEHOLDERS AND PARTNERSHIPS

Implementing improvements in road safety brings together a number of different agendas and stakeholders, from education to transport to climate change. Achieving positive change requires collaboration and ambition. Relevant groups working on this child-focused agenda include:

- The Child Health Initiative, a collaborative partnership with a focus on global and national advocacy, research, and programme implementation. Hosted by the FIA Foundation it includes around twenty expert partners and shares practical advice and resources. Partners with a particular focus on road safety for children in cities include:
  - Bernard van Leer Foundation, whose Urban95 initiative aims to create healthy, safe and vibrant cities where babies, toddlers and their families thrive [112]
  - Fondation Botnar, which has a healthy cities for adolescents programme[113]
  - Global Designing Cities Initiative (GDCI), which runs practical support for cities to be more child-friendly,[114] and
  - International Road Assessment Programme (iRAP), which has developed a star-rating system to improve safety around schools.

- The Child Friendly Cities Initiative, run by UNICEF, supports municipal governments in bringing about the rights of children at the local level, including in how streets are planned and managed.[115]

- YOURS (Youth for Road Safety) is a youth-led organisation that advocates for road safety around the world, encouraging youth participation in decision-making and peer-to-peer communication.[116]

- The Global Alliance of NGOs for Road Safety represents more than 200 member NGOs from more than 90 countries.[117]

More generally, there are a range of key global partners including the World Health Organization,[118] the UN Road Safety Fund,[119] the World Bank's Global Road Safety Facility,[120] and the Safer City Streets programme of the International Transport Forum.[121]
Because of the multiple benefits of road safety interventions, funding for road safety improvements can come from a range of sources, including climate, health, transport, education, and children's rights programmes.

Road safety needs to be mainstreamed through all programmes, and not seen as something that is funded separately. For example, making streets safer for active travel is a pre-condition for maximinsing climate benefits by achieving a significant modal shift from cars to cycling and walking.

Because of the multiple benefits of road safety interventions, funding for road safety improvements can come from a range of sources, including climate, health, transport, education and children's rights programmes.

5. CONCLUSION

Road traffic injuries are the biggest killers of children and young people aged between 5 and 29 years. Urgent action is needed. The good news is that we know the solutions and there are simple steps that cities can take, including reducing speed, improving infrastructure for walking and cycling, and ensuring streets are safe for children and young people.

Improving road safety requires coordinated action between national and local government, in order to set and enforce laws and invest in safe road infrastructure. Municipal authorities have a responsibility to collect and use data to understand mobility patterns and road safety challenges, and then take steps to address these to ensure their cities are safe for children to move around.

There are a number of tools that can help stakeholders with this, and extensive evidence about what works should be prioritised including:

- Ensuring every urban street has a viable footpath and protected crossings, with adequate lighting at night and consideration of personal security alongside safety
- Speed limits in areas where children are commonly present have a default speed of no more than 30km/h – and even lower in areas where children mix with traffic
- Convenient and affordable transport options, including a network of separated cycle lanes, and public transport
- Education and enforcement around road safety, including training road users in practical ways, and ensuring use of child restraint systems and motorcycle helmets, and
- Investing in high quality post-crash care.

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