



PIARC Global Road Safety Knowledge Exchange Vulnerable Road Users

Summary

- **About PIARC**
- **VRUs Safety Fundamentals**
- **VRUs Safety Issues**
- **VRUs Safety Measures**
- **Recommendations**

About PIARC



PIARC

World Road Association

- Founded in **1909** as a non-profit, non-political Association
- Foster and facilitate global discussion and **knowledge sharing on roads and road transport**
- **124 government members** worldwide
- Retains **consultative status** to the Economic and Social Council of the **United Nations**
- **4 Strategic themes**: ST1 road administration, ST2 mobility, ST3 safety and sustainability, ST4 resilient infrastructure
- **16 Technical Committees (TCs)**, 4 per strategic theme, unite experts from numerous areas including road safety and design, network operations and maintenance, finance and governance.



PIARC Road Safety Technical Committee

Technical Committee T.C. 3.1: Road Safety part of ST3:

- Observes specific **road safety issues for LMICs**
- Explores the implementation of **proven countermeasures**
- Updates the “**Road Safety Audit Guidelines**” and the “**Road Safety Manual**”
- Disseminates and encourages the **application of the manuals**
- Provides **access to well-chosen safety measures** and their dissemination among **LMICs**
- Studies the implications of **connected and automated vehicles**

PIARC Road Safety Activities

- **Technical reports** prepared by the Technical Committees
 - Well-Prepared Projects
 - Automated Vehicles – Challenges and Opportunities for Road Operators and Road Authorities
- **Road Safety Manual:** an electronic manual for all technicians and managers concerned about road safety issues **acknowledged by the United Nations**
- **Seminars** organised by the Association available online
 - Connected and Autonomous Vehicles, a Pathway towards a Safer Future, 27-28 October 2021
 - Road Safety in Low to Middle Income Countries, 18-20 May 2021
- Declaration of **Support** to the **UN Decade of Action**

PIARC Global Road Safety Knowledge Exchange Project

- Aiming to **promote knowledge sharing** through appropriate implementation aids that will reflect previous work of but not limited to PIARC
- Focus on spreading road safety knowledge to **Low- and Middle-Income Countries**, where **death rates** due to road traffic injuries in LMICs are **three times higher** than in high-income countries (HIC).
- With the support of National Technical University of Athens (**NTUA**) and Austrian Institute of Technology (**AIT**)
- Deliverables for this project include **fact sheets, presentations**. Based on the road safety manual and other relevant **material produced by PIARC** technical committees (reports, case studies etc.).

VRUs Safety Fundamentals



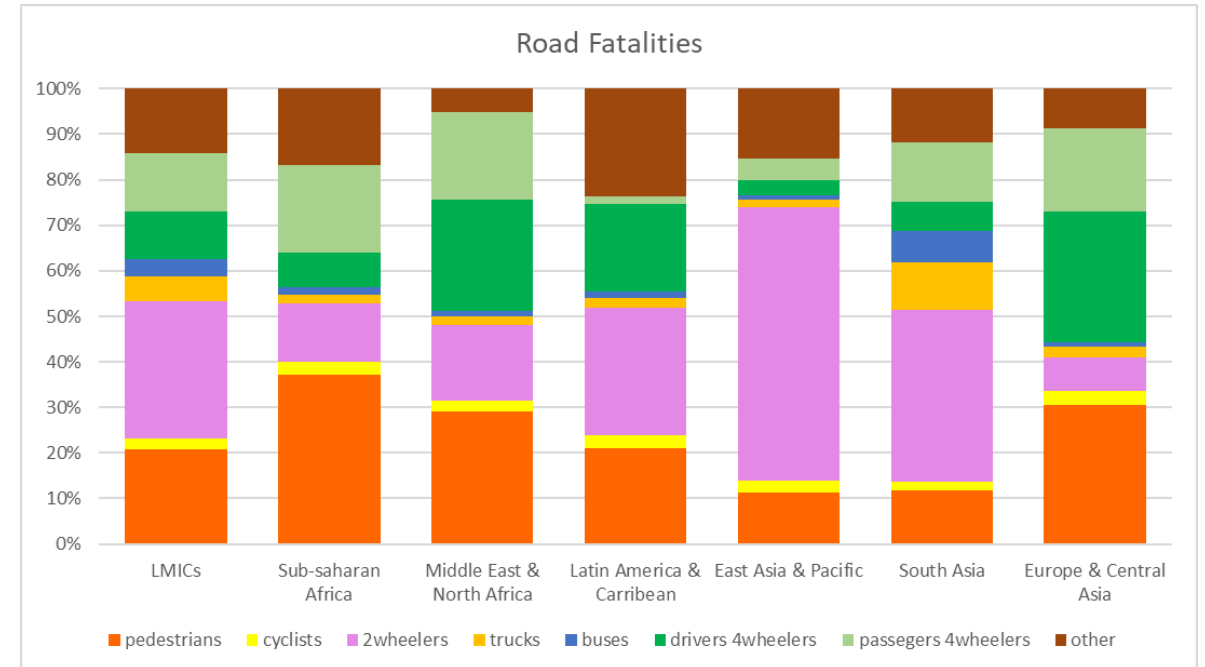
LMICs Road Safety Fundamentals

- Each year, 1.35 million people are killed on the worlds' roads, and a further 50 million are injured, with the vast majority of these (**over 90 percent**) **occurring in LMICs.**
- **Death rates** due to road traffic injuries **in LMICs are three times higher** than in high-income countries (HIC) (27.5 vs. 8.3 per 100,000 population)
- Despite the increased global attention and progress in policy-making at national level, the number of **road casualties increased in 87 LMICs since 2013**

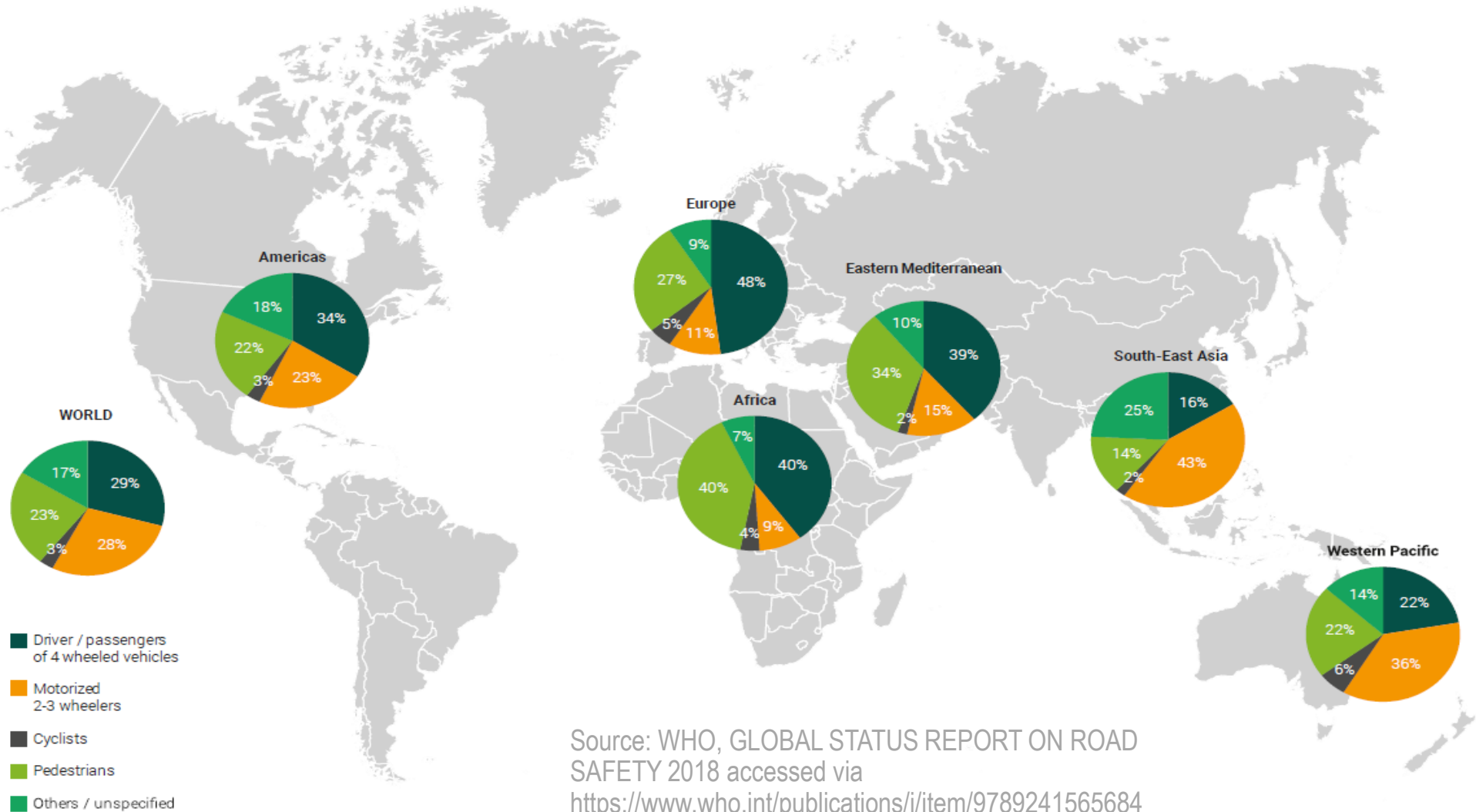


LMICs VRUs Safety Fundamentals

- In most LMICs, the majority of road users are vulnerable road users – pedestrians, cyclists and those using motorized two or three-wheelers.
- Low-income countries have the highest proportion of fatally injured casualties among vulnerable road users at 57%, as opposed to 51% in middle-income countries, and 39% in high-income countries



Distribution of deaths by road user type by WHO Region



Source: WHO, GLOBAL STATUS REPORT ON ROAD SAFETY 2018 accessed via <https://www.who.int/publications/i/item/9789241565684>



VRUs Safety Issues



VRUs Types

VRU often means **pedestrians and cyclists** in the mind of people. Other types of road users should be considered as well:

- **Powered two-wheelers (PTWs):** less stable, less visible, less protected. In LMICs the ownership and use of motorcycles and other two-wheelers are generally high.
- **Slow and small agriculture vehicles:** speed difference, less protected
- **Novice or elderly** car drivers: based on their task capability or resilience to accidents
- **Road workers**

Pedestrians Characteristics

- Persons walking along a road or a developed area
- **Unprotected** (no shell or cover)
- **Various reasons for walking:** journeys to work/school, exercise, leisure
- **Subgroups:** children, elderly, persons with impaired mobility, others



Cyclists Characteristics

- Persons riding a **two-wheeled** (or three-wheeled) **cycle**
- Principal means of transportation in **LMICs**
- Popular form of **recreation** usually in **HIC**
- Used by a **person of any age**
- **Subgroups:** pedal operated, electric (assisted)



PTWs Characteristics

- Two-wheeled motor vehicles or similar comparatively low cost and very affordable
- Favored mode of transport due to lack of public transport, increasing fuel prices, urban congestion, effortless parking
- **High ownership in LMICs**
- **Not fully protected**; helmet wearing not enforced in many LMICs



Other VRUs Characteristics

- Light duty **farm vehicles**
- Animal drawn vehicles
- **Speed and mass difference** with regular traffic
- Relatively **unprotected riders** /passengers



Factors related to VRUs Safety

- VRUs may themselves be a **threat to others**
- **Fatalities** amongst VRUs are **higher in LMICs** due to:
 - **Lack of resources** to provide or maintain adequate and safe infrastructure
 - **Land use planning problems**
 - **Unsafe users behavior**
- **LMICs have greater variety and intensity of traffic mixing** the slow-moving and vulnerable non-motorized road users, as well as the motorcycles with fast-moving motorized vehicles.



VRUs Crashes

- Casual factors for **pedestrian crashes** are:
 - Driver
 - Vehicle
 - Roadway/environment
 - Demographic/social/policy
 - Being a pedestrian
- Reasons why **crashes occur** include:
 - Careless crossing
 - Disobeying traffic lights
 - Jaywalking
 - Misjudgment of speed gap
 - Lack of proper facilities



VRUs Safety Measures



UN Decade of Action for Road Safety



Safe System Approach

- **UN Second Decade of Action for Road Safety**, with a goal of reducing road traffic deaths and injuries by at least 50% from 2021 to 2030
- Adoption of Safe System Approach is necessary to prevent fatal and serious crashes.



Safe System Principles



**Death/Serious Injury
is Unacceptable**



**Humans
Make Mistakes**



**Humans Are
Vulnerable**



**Responsibility
is Shared**



**Safety is
Proactive**



**Redundancy
is Crucial**

Measures for VRUs along road sections

- **Visual segregation by edge markings:** may be associated with a reduction of the lane width contributing to traffic calming
- **Wider and paved shoulder:** may contribute to speeding or unsafe overtaking
- **Appropriate traffic lane width:** too wide lanes may create erratic movement of vehicles. May be considered along with separated facilities for VRUs
- **Segregated footpath:** must be wide enough
- **Segregated lane for cyclists or mopeds:** consider carefully the intersection issues
- **Proper crossing facilities:** combined with cyclists crossing
- **Relocated bus stop:** important to connect the stop with footpaths, crossings
- **Kerbs and barriers:** adapted to the traffic and road environment situation
- **Traffic calming:** impact depends on the facilities for VRUs

Measures for Pedestrians (1/2)

■ Pedestrians at intersections:

- **Zebra crossing with or without a central refuge:** better if combined with traffic calming measures
- **Installation of pedestrian fences and central refuges:** pedestrians would likely try to find a shorter way leading to unsafe situations
- **A minor road central refuge at an unmarked crossing place**
- **Traffic signals to control the movements at the intersection:** mostly in urban areas and suburban areas
- **Pavement markings to restrict parking:** combined with use of flexible bollards
- **Install kerb extensions**
- **Signs and equipment**

■ Pedestrian crosswalks-signing:

- **Dedicated signs and markings**
- **Traffic calming measures**

Measures for Pedestrians (2/2)

■ Pedestrians crosswalks-signals and lighting:

- **Use a pedestrian phase at the signals with symbols:** appropriate signal phase to mitigate risk of jaywalking
- **Use a pedestrian phase at signals with a numerical countdown display**
- **Acoustic signals/tactile knobs at crossings:** confusing if acoustic signals close to each other
- **Appropriate lighting**

■ Sidewalk accessibility

- **Obstruction free:** give a clear path to pedestrians. Obstructions along cycle paths are even more dangerous
- **Work zones:** adequate protective barriers, longitudinal barricades, provide safe pavement surface conditions
- **Kerb ramps:**
 - Use kerb ramp at intersection: ramps also useful on cycle paths
 - Add tactile strips across the width of the sidewalk leading to the crosswalk: may be difficult to implement in historic city areas

Various Measures for VRUs

- **Pedestrians and cyclists crossing multiple lane road section:**
 - **50km/h speed limit dedicated marking/signs or rumble strips:** better if combined with traffic calming measures
 - **Middle island by reducing the lane width and protecting by a barrier**
 - **Traffic signals for pedestrians and/or cyclists:** depends on traffic volume
- **VRUs at high traffic volume intersections:**
 - **A sign-posted alternative cycle route away from junction:** cyclists always tempted to shortcut even if not safe
 - **Modify the layout of the intersection to cater for the cyclists**
 - **Marking, signing and signals at the intersection**
 - **Pre-start in time/space for cyclists:** access to pre-start area should be eased
 - **Pre-start in time/space for motorcyclists:** may cause dangerous manoeuvres
- **Medians and refuge islands:** medians painted on the road surface, raised medians and refuge islands, multifunctional medians

Road Safety Audits and Inspections

- Target elements for RSA and RSI are **risk factors for accident occurrence** or injury severity
- Should take into consideration **the point of view of every kind of road user**
- Each route has to be **logical and continuous**
- Take into account **how interactions happen** between different types of road users or transport modes
- **Checklists** can be used to ensure safety aspects have not been overlooked.

Recommendations



VRUs Safety Recommendations

- Road design should include a **self-explaining and failure-forgiving road** according to the needs of the road users.
- Key message for road engineers and designers is to **include vulnerable road users in the design process** and include self-questions such as “what if a child /blind /elderly /disabled person is crossing.
- **Key requirements:**
 1. Give road users enough time.
 2. The road must provide a safe field of view.
 3. The road environment must correspond with the road user’s perception logic.
- To ensure compliance, measures of **communication, education and enforcement**, including special warning signs and campaigns should be employed.

PIARC IS BOOSTING ROAD SAFETY IN LMICs

- **VRUs safety is key priority** for increasing road safety.
- PIARC Road Safety Technical Committee has provided a detailed presentation of the relevant safety issues along with an overview of possible **design and remedial measures** for each type of VRUs sub-groups respecting the Safe System Approach.
- PIARC is engaged in **promoting road safety** all over the world and committed to **actively support safety in LMICs**.
- The new knowledge-sharing campaign for road safety will provide **monthly updates**, on social media and on PIARC website, for **all essential road safety areas**.
- **Stay tuned for more actions and events!!**



Relevant PIARC reports

- [Proceedings of the PIARC International Seminar on: “Road Safety in Low- and Middle-Income Countries: Issues and Countermeasures”](#)
- [Proceedings of the “International Seminar and Workshop on Safer Roads by Infrastructure Design and Operation”](#)
- [Road Safety Catalogue of Case Studies](#)
- [Proceedings of the Internal Workshop “Policies and Programs for Road Safety Management”](#)
- [1st Webinar on COVID-19 and Road Safety](#)
- [2nd Webinar on COVID-19 and Road Safety](#)
- [COVID-19: Initial Impacts and Responses to the Pandemic from Road and Transport Agencies](#)
- [Proceedings of the World Road Congress 2019](#)
- [Addressing Road Safety Worldwide: Vulnerable Road Users, Human Factors & RS in LMIC](#)
- [Vulnerable Road Users: Diagnosis of Design and Operational Safety Problems and Potential Countermeasures](#)

Thank you for your attention!



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