SOUTH AFRICAN ROAD FEDERATION

Non-Motorised Transport Practitioner's Course

24 JULY 2023

Session 1: Introduction to Non-Motorised Transport

Dr. Hubrecht Ribbens
ribbens.hubrecht@gmail.com

SARF
founded in 1950

1

Learning objectives of NMT Practitioner's Course (1)

Role of NMT in ***sustainable and accessible transport, greening of transport/Eco-mobility, transport planning processes*** (roads, land use, public transport), ***ITS applications; poverty alleviation*** and ***job creation***.

Need for NMT road user facilities in the road environment in relation to facilities for motorised road users – ***equity of space and modes***.

Overview of ***current legislation, policies and initiatives*** to promote the use of NMT modes.

Planning and design for NMT modes including pedestrians (and children), cyclists and animal drawn transport.

NMT conceptual thinking – *Complete Streets, First-mile/Last-mile Concept, Modal Hierarchy, Universal Design, Transit Orientated Development,15 and 20 minute Cities, Smart Cities, Greenways and others.*

2

Learning objectives of NMT Practitioner's Course (2)

Development of ***pedestrian and bicycle master plans***

Integration of ***NMT and land-use planning*** & Integration *of* ***NMT and public transport planning***

Promotion of ***Bike share and Community cycling programmes***

Identify NMT ***Data collection needs, technologies and procedures*** – different methodologies available to collect data

Introduction to NMT ***Pavement design and maintenance***

Vision of NMT and ***Technological innovation***

3

Definitions of Non-motorised Transport (NMT)

1.NMT includes walking, cycling, rickshaws, animal-drawn carts (in rural areas), rollerblading, skate-boarding; all of which do not rely on an engine or a motor for impetus.

Source: Jo'Burg Dev. Agency (JDA)

2.NMT comprises trips on foot, by bicycle or tricycle including the use of handcarts & wheelchairs.

Source: gTKP

3.NMT includes human and/or animal powered transport.

Examples:

- ***Personal mobility*** include walking, cycling, perambulating, roller-blading, skateboarding, bicycle taxiing, rickshaw riding and horse riding.
- NMT modes for ***transport of goods***, including wheel barrows and carts drawn by donkeys, horses or humans.
- NMT modes include wheelchairs, and hence must be a consideration when planning and designing transport related facilities for ***special needs persons*** (children, aged, impaired).

Source: Western Cape Provincial Strategy on Non-Motorised Transport

4

Active Transport

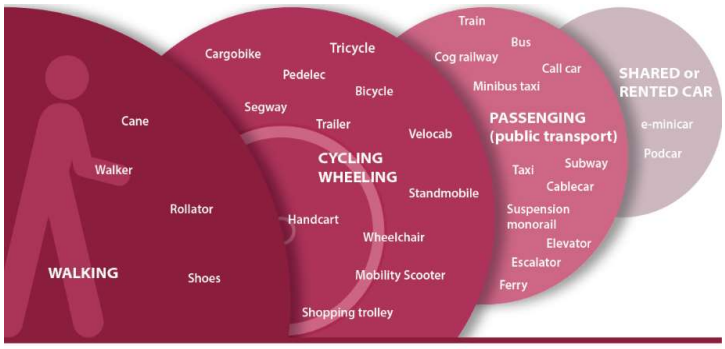
Gold Coast Active Transport Plan 2017 – 2027 *Boosting walking and cycling*

- NMT referred to by many transport planners as *Active transport*.
- *Active transport* is a unique way to travel. The *most cost-effective* form of transport that everyone in the community can be involved in.
- *Active transport* includes non-motorised forms of transport involving *physical activity*, most commonly walking and cycling.
- *Active transport* a vital part of the transport system; enabling people to access local destinations or public transport stops and stations.
- *Active transport* not only serves as a travel option for commuting to work or other destinations, but also serves as a recreational or fitness activity.

5

Eco-Mobility

- "Ecomobility" is the term for the green alternative to the automobile-dominated transport systems and mobility patterns in cities. According to Konrad Otto-Zimmermann of The Urban Idea, "Ecomobility, a term coined in 2007, denotes the entirety of walking, cycling and wheeling, and 'passenging', i.e., using public transport. Car sharing may fall under ecomobility, provided cars are small, light city vehicles powered by renewable energy." *The word "ecomobility" implies mobility that is ecologically sound and economically favorable, and thus eco-efficient* - it is "travel through integrated, socially inclusive, and environmentally friendly options".



Subsidiarity in urban transport:
the priority order for individual modal choice, transport policy and infrastructure planning

6

Micro Modes (aka Micro Mobility) - Emerging Technology

- Active modes (walking, bicycling and their variants) and micro modes (e-bikes & e-scooters) can provide large climate emission reductions and other important benefits.
- Important but often undercounted & underestimated. Their co-benefits:
  - Reduces household costs
  - Road and parking infrastructure costs
  - Traffic congestion and crashes
  - Urban sprawl-related costs
  - Reducing pollution emissions
  - Improves public fitness and health.
- Most transportation emission reduction plans are incorporating the same biases against micro modes.
- Lack of infrastructure major challenge.

https://www.planetizen.com/blogs/120946-small-modes-are-beautiful Todd Litman January 13, 2023

7

The two focus areas of NMT

NMT as independent transport mode

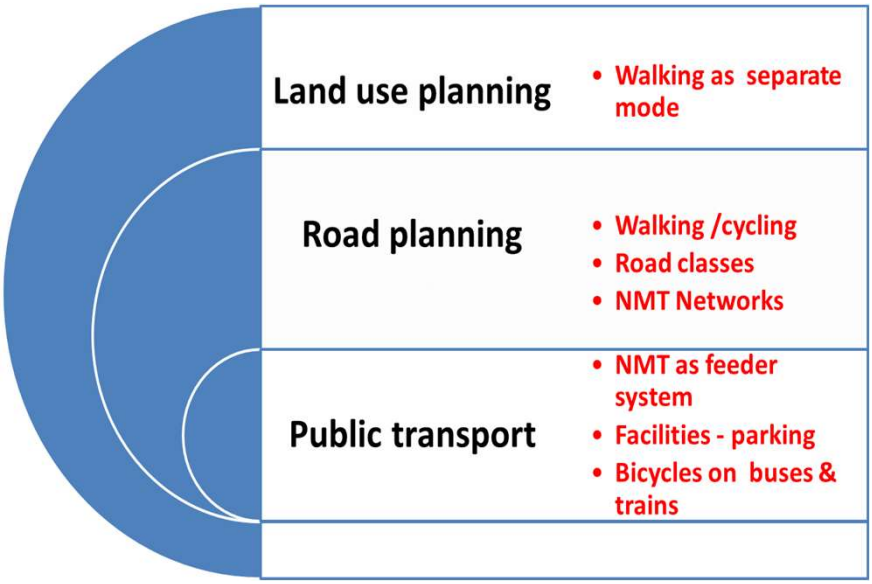
- **Pedestrians**: Children, Adults, Elderly & Disabled
- **Cyclists**: Learners, Commuters, Pedicabs, Racing & Leisure
- **Animal drawn transport** (ADT): Freight & People
- **Human powered transport**: Wheelbarrows, trolleys for recycling, prams

NMT as feeder system to public transport

- **MetroRail**
- **Gautrain**
- **BRT & other bus services**
- **Minibus taxis**

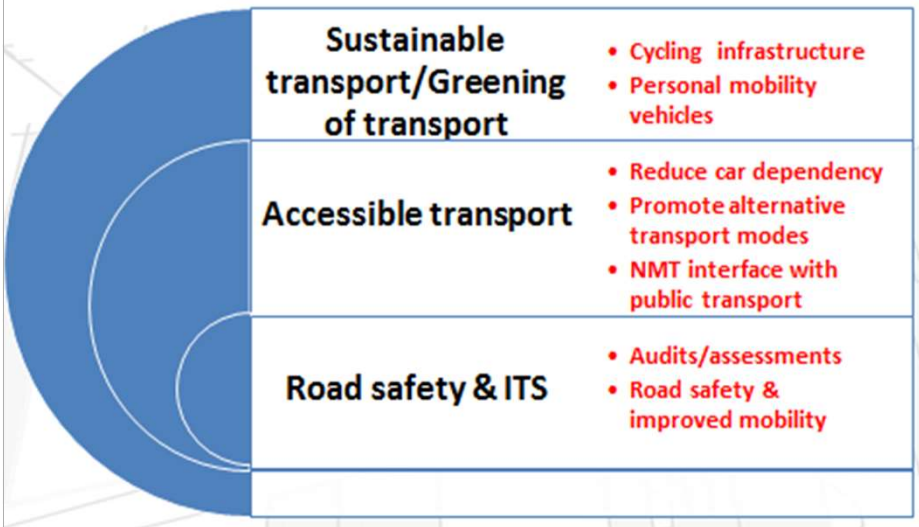
8

NMT as cross cutting issue (1)



9

NMT as cross cutting issue (2)



ITMP25

2037 consortium

10

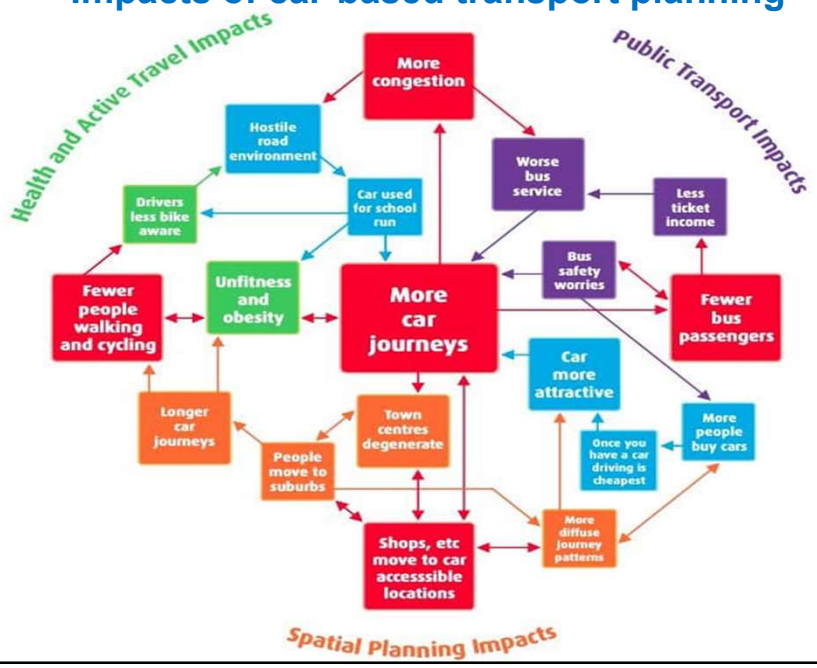
Cost Benefit Analysis of NMT Infrastructure

- Non-Motorized Transport (NMT) has immense benefits for individual users, as well as society at large, through:
  - improvements to physical health
  - air quality
  - the environment and climate change
  - personal finance
  - accessibility and mobility; and
  - the empowerment of vulnerable groups.
- Therefore, NMT infrastructure - particularly well-planned, high quality facilities in a comprehensive network - is essential to achieving economic and social equity, especially for the urban poor in developing countries.
- The Non-Motorised Transport Project Assessment Tool (NMT-PAT) is a joint venture between UNEP and the Center for Transport Studies (CfTS) at the University of Cape Town (UCT). The PAT Tool was designed to take into consideration the wide range of NMT benefits (health, social, economic and environmental).

https://www.unep.org/resources/report/cost-benefit-analysis-nmt-infrastructure-projects

11

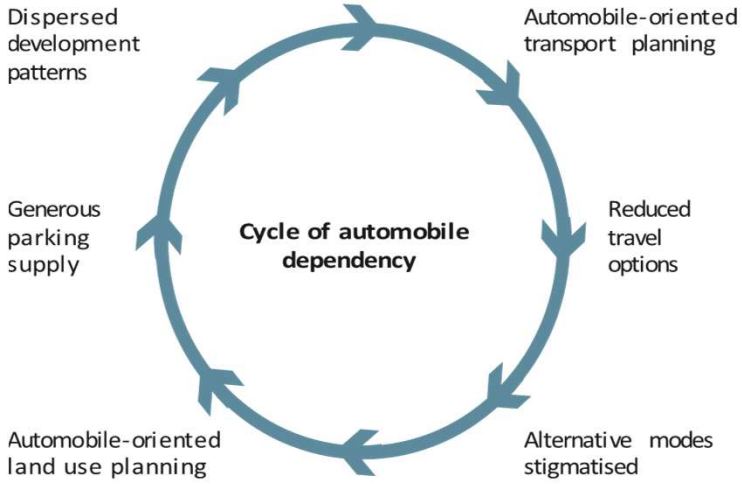
Impacts of car-based transport planning



12

Cycle of automobile dependency –

Tod Littman (2019)



13

NMT users – Who are we planning for?

Why do we need to plan for NMT users?

14

NMT users – Who are we planning for?

15

Non-Motorised Transport Users

Pedestrians: Adults, children, elderly, urban, rural

Disabled persons: Walking impaired, wheelchair (manual & electrical), visual and hearing impaired

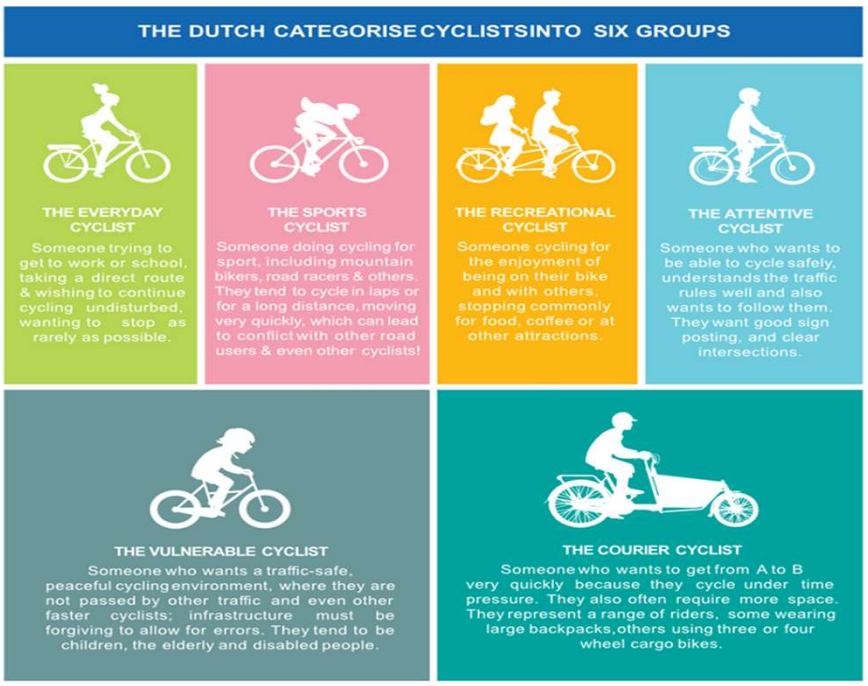
Cyclists: Commuter, scholar, recreational, Pedi cabs, e-bikes, rental bikes, e-scooters, custom built for recycling, rural areas, bicycle ambulances, etc.

Push carts: Trolleys, prams, recycling, wheelbarrows

Animal drawn vehicles: Passengers, goods

NMT as feeder system to Public Transport Corridors (Modal integration): Gautrain, BRT, rail, bus, taxi.

16



17

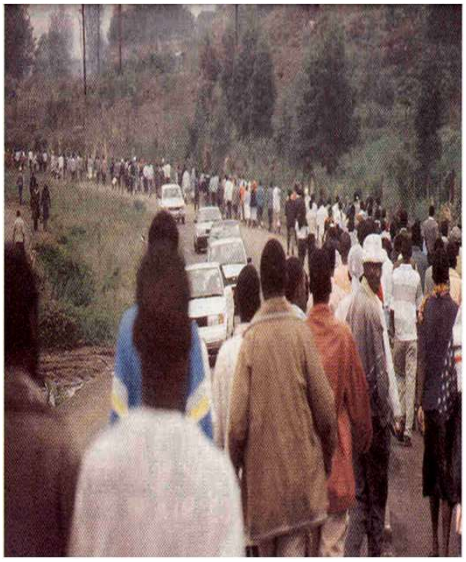
Pedestrians in Inner Cities

18

Pedestrians in Inner Cities

19

Pedestrians on Town Fringes



20

Pedestrians on Freeways

21

Child Safety in Urban Areas

22

Rural Learners

23

Wheelchair riders

24

Electric wheelchairs: NMT or not?

25

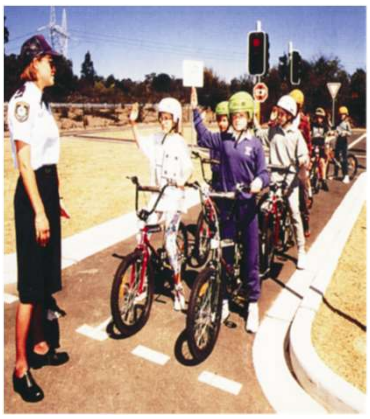
Impaired users: Visual & hearing impaired

26

Elderly pedestrians

27

Rural cyclists / Child cyclists



28

Child cyclists in residential areas

X

√

ks4053 www.fotosearch.com

29

Cyclists: Racing & Recreational

30

Commuting by bicycle

31

Bicycle renting systems

32

e-Bikes

- The e-bike can be effectively used for errands and trips where not much storage space is required, and is ideal for daily trips to work.
- The range of the bike is about 20km before the battery runs low and needs to be recharged – charging stations.
- Pedalling is not required on the flat, downhill or gentle uphill (unless you wish to go faster), but is required to go up steeper hills comfortably.

33

Innovative bikes

34

Bicycles used to carry loads

35

Pedicabs and custom built tricycles

36

E Scooters

- A motorized scooter is a stand-up scooter powered by a small electric hub motor in its front and/or rear wheel.
- Classified as a form of micro-mobility, they are generally designed with a large center deck on which the rider stands.
- E scooters are light, compact, and have the perfect blend of speed, range, and ride quality for commuting.
- E-scooter-sharing systems that use apps to allow users to rent them by the minute; commonly found in the U.S. and in Queensland, Australia.

37

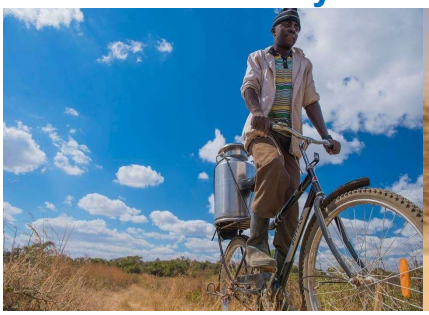
Lady Norman on Her Electric Scooter in 1917

38

Custom built tricycles: Recycling and Cargo

39

The bicycle in rural communities



40

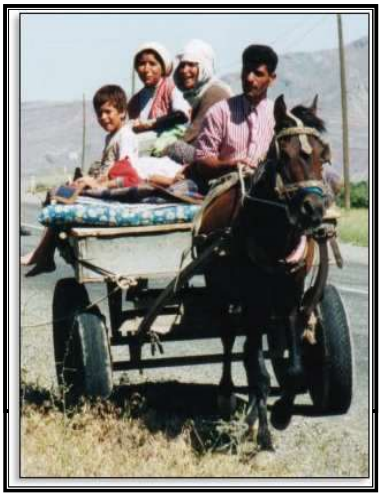
Cape Town Pedicabs – Early prototypes

41

Wheelbarrows, push carts, trolleys, prams

42

Animal drawn vehicles - passengers



43

Animal drawn vehicles - goods

44

Animal drawn vehicles - goods

45

Integration of NMT with public transport

46

Integration of NMT with public transport

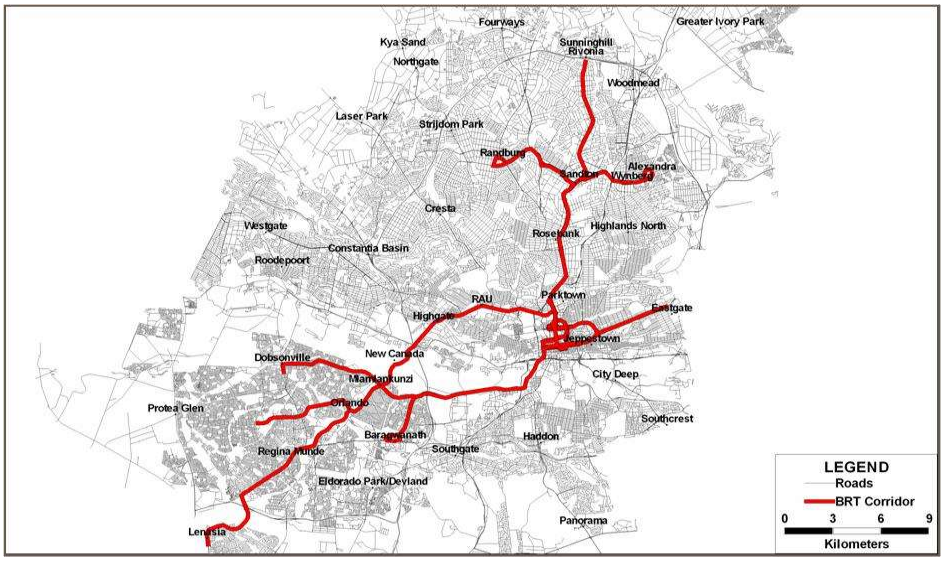
BRT/IRPTN systems in process in RSA – opportunities to promote NMT modes?

- Buffalo City
- Cape Town
- Ekurhuleni
- eThekwini
- Johannesburg
- Mangaung
- Nelson Mandela Bay
- Tshwane
- George
- Mbombela
- Msunduzi
- Polokwane
- Rustenburg

47

Integration of NMT with public transport

ReaVaya BRT Jo'Burg



48

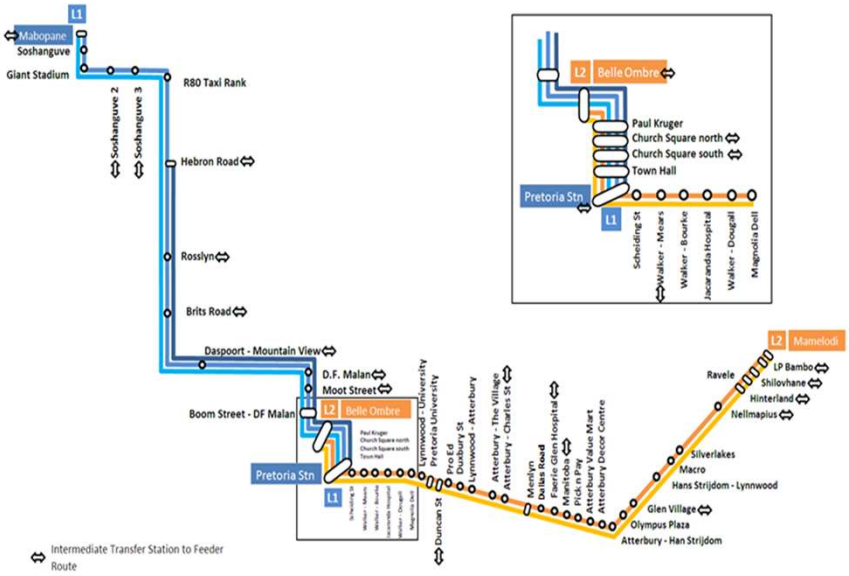
International examples of BRT & NMT systems integration

Bogota, South America

Ahmedabad, India

49

AreYeng Phase 1- Tshwane Integrated Rapid

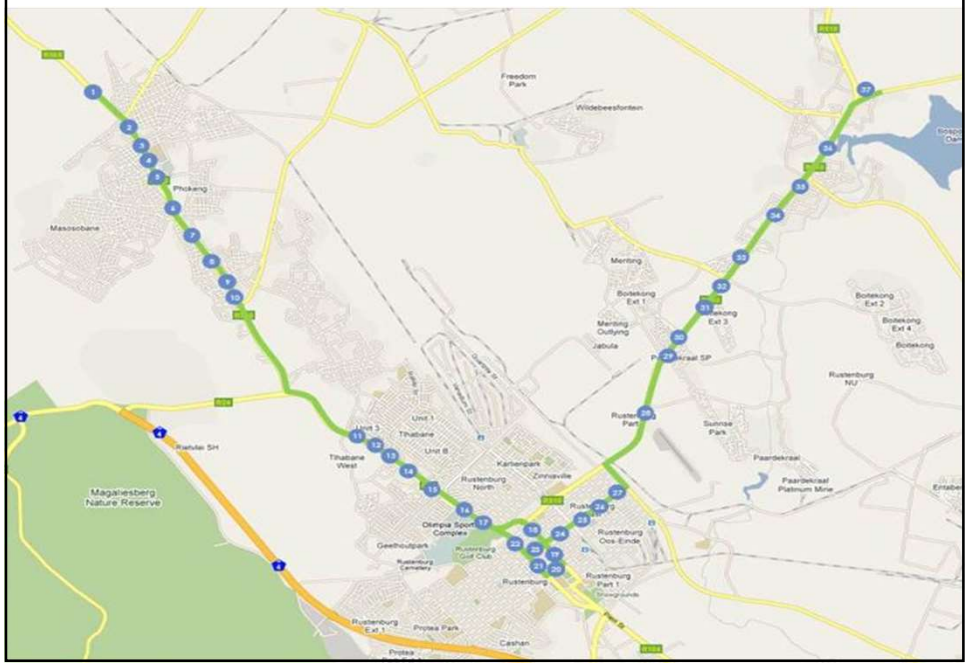


50

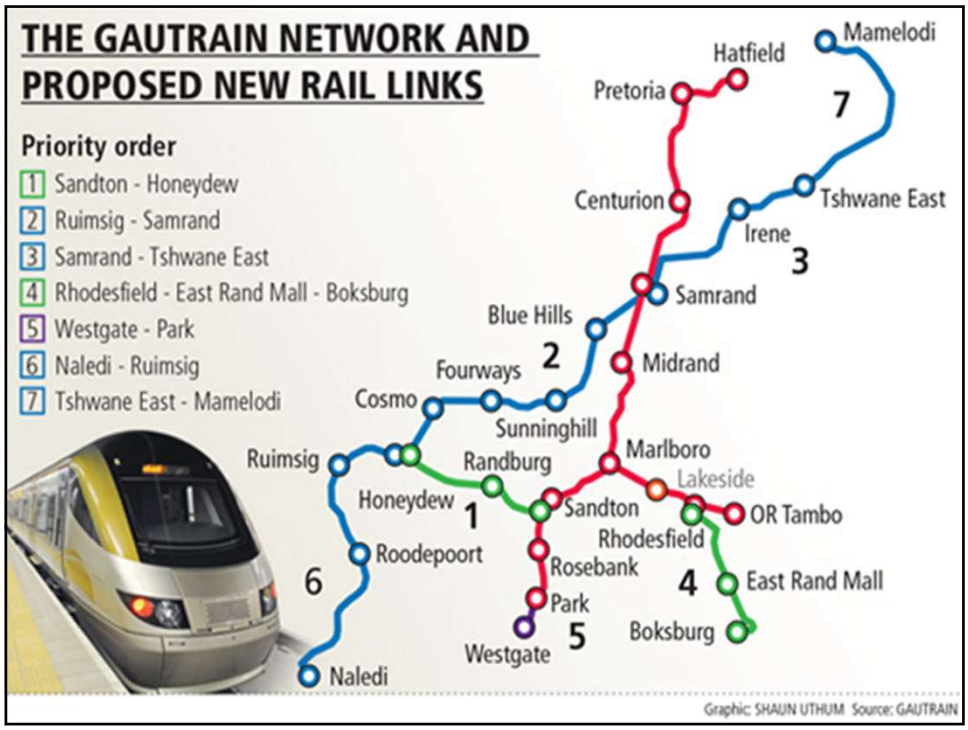
Cape Town MyCity Network

51

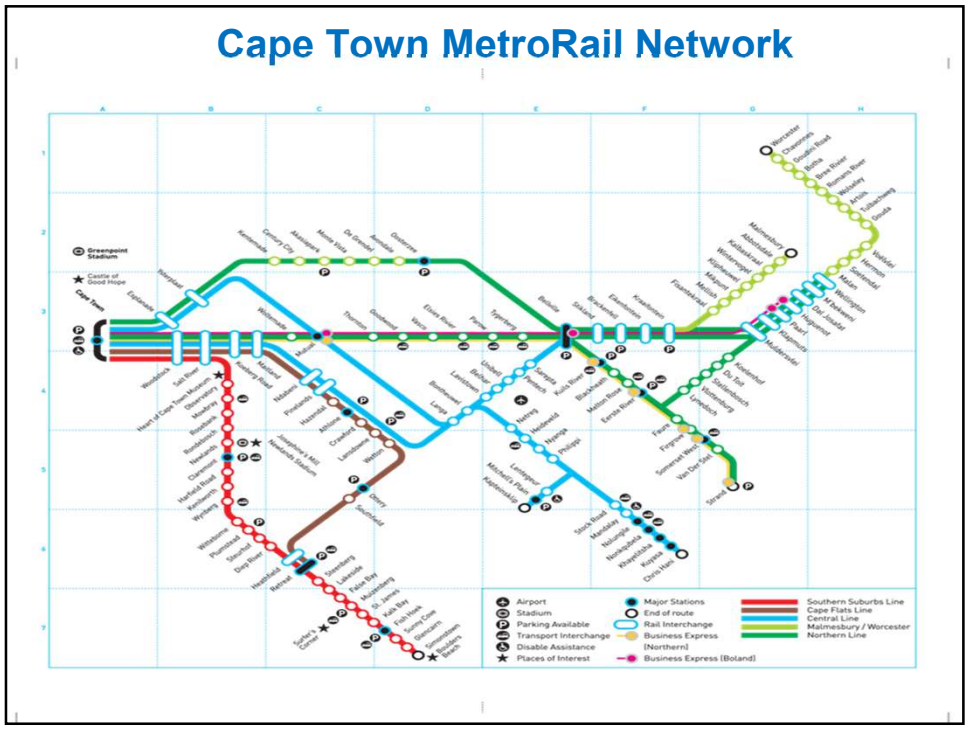
Rustenburg Rapid Transport



52


THE GAUTRAIN NETWORK AND PROPOSED NEW RAIL LINKS
Priority order
1 Sandton - Honeydew
2 Ruimsig - Samrand
3 Samrand - Tshwane East
4 Rhodesfield - East Rand Mall - Boksburg
5 Westgate - Park
6 Naledi - Ruimsig
7 Tshwane East - Mamelodi
Mamelodi
Hatfield
Pretoria
7
Centurion
Tshwane East
Irene
3
Samrand
Blue Hills
2
Midrand
Fourways
Cosmo
Sunninghill
Marlboro
Ruimsig
Randburg
Lakeside
Honeydew
1
Sandton
OR Tambo
Rhodesfield
Roodepoort
Rosebank
6
4
East Rand Mall
Park
5
Boksburg
Westgate
Naledi
Graphic: SHAUN UTHUM Source: GAUTRAIN

53


Cape Town MetroRail Network
Airport
Stadium
Parking Available
Transport Interchange
Disable Assistance
Places of Interest
Major Stations
End of route
Rail Interchange
Business Express (Northern)
Business Express (Boland)
Southern Suburbs Line
Cape Flats Line
Central Line
Malmesbury / Worcester
Northern Line

54

Bicycle parking facilities at stations

55

Bicycle facilities on trains

56

Bicycle facilities on trains

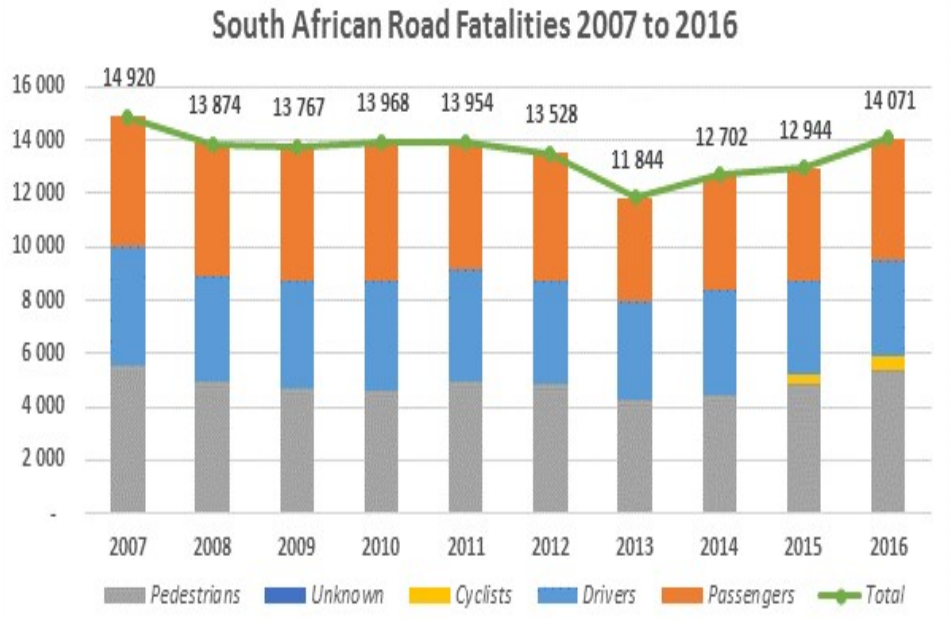
57

Bicycle racks on buses

58

Why do we need to plan for NMT users?

59



Graph prepared by the Automobile Asociation of South Africa
Data sourced from the RTMC Calendar report 2016

60

Pedestrian fatal crashes per province 2019 – 2021

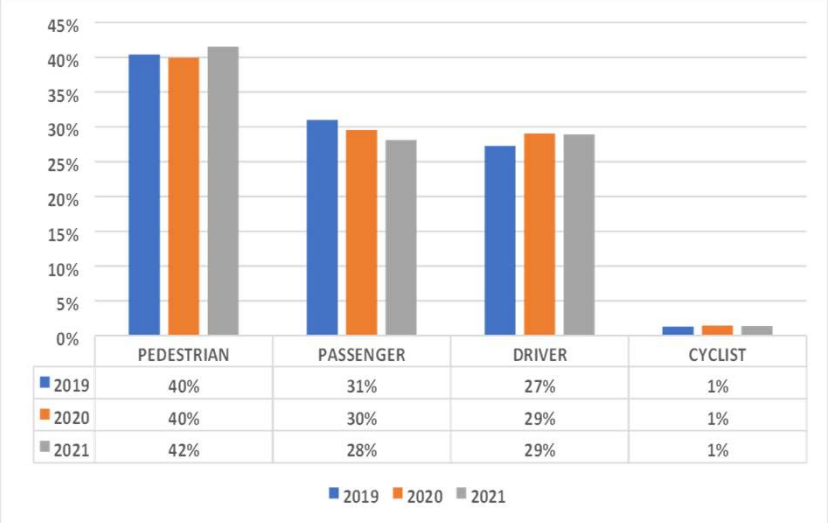
RTMC State of Road Safety Report: January 2019 – December 2021

Year	EC	FS	GP	KZN	LP	MP	NC	NW	WC	RSA
2019	603 12%	203 4%	1178 24%	1108 23%	430 9%	396 9%	119 2%	313 6%	574 11%	4924 100%
2020	479 12%	163 4%	847 22%	989 26%	336 9%	301 8%	87 2%	231 6%	442 11%	3875 100%
2021	631 12%	208 4%	1231 24%	1285 25%	395 8%	339 7%	126 2%	264 5%	640 13%	5119 100%

61

Percentage distribution of fatalities per road user type

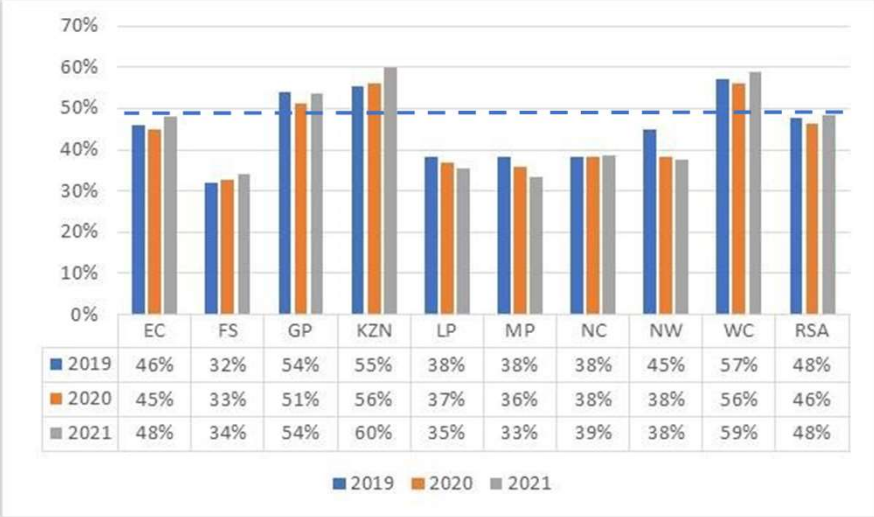
RTMC State of Road Safety Report: January 2019 – December 2021



62

% Pedestrian fatalities of all fatalities per province

RTMC State of Road Safety Report: January 2019 – December 2021



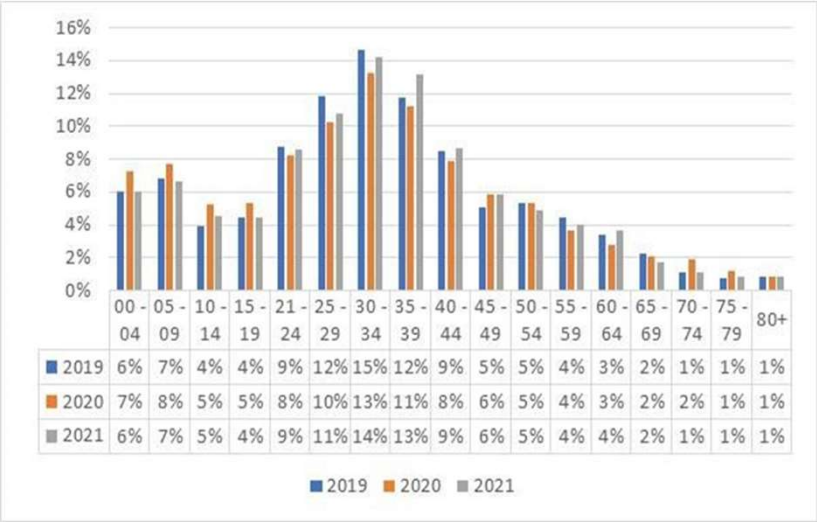
	EC	FS	GP	KZN	LP	MP	NC	NW	WC	RSA
2019	46%	32%	54%	55%	38%	38%	38%	45%	57%	48%
2020	45%	33%	51%	56%	37%	36%	38%	38%	56%	46%
2021	48%	34%	54%	60%	35%	33%	39%	38%	59%	48%

2019 2020 2021

63

Pedestrian fatalities per age group

RTMC State of Road Safety Report: January 2019 – December 2021



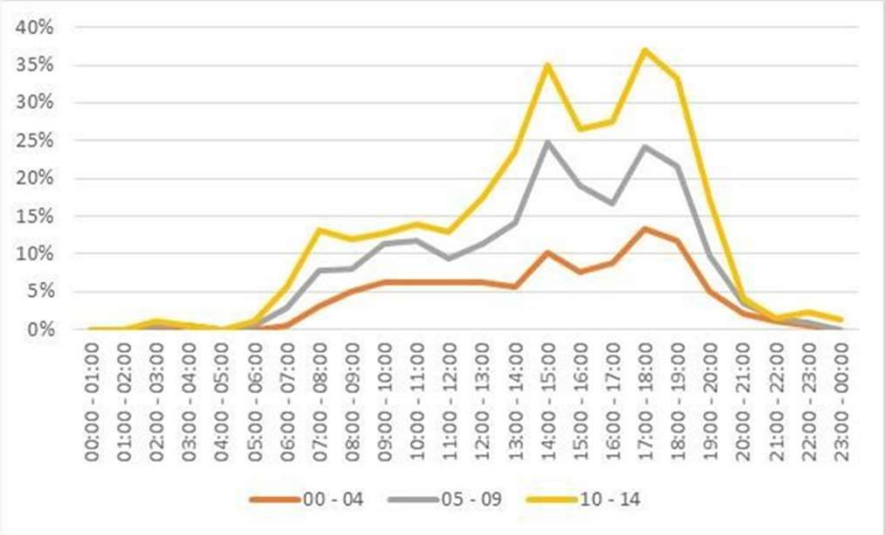
	00 - 04	05 - 09	10 - 14	15 - 19	21 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75 - 79	80+
2019	6%	7%	4%	4%	9%	12%	15%	12%	9%	5%	5%	4%	3%	2%	1%	1%	1%
2020	7%	8%	5%	5%	8%	10%	13%	11%	8%	6%	5%	4%	3%	2%	2%	1%	1%
2021	6%	7%	5%	4%	9%	11%	14%	13%	9%	6%	5%	4%	4%	2%	1%	1%	1%

2019 2020 2021

64

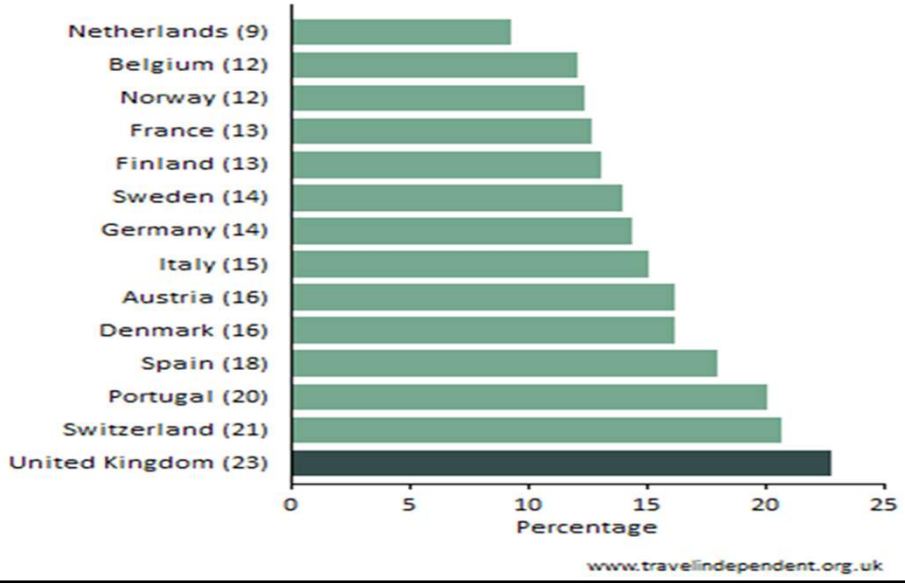
Fatalities by time of day Pedestrians (Age 0 – 14 years)

RTMC State of Road Safety Report: January 2019 – December 2021



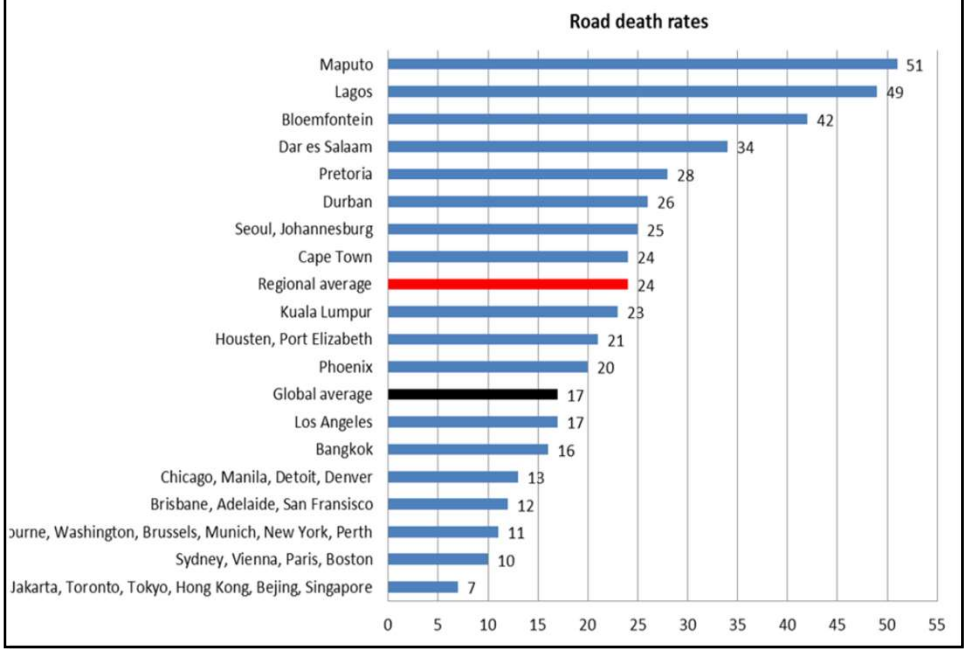
65

Pedestrian Deaths as a Percentage of All Road Deaths Western European Countries 2008-12



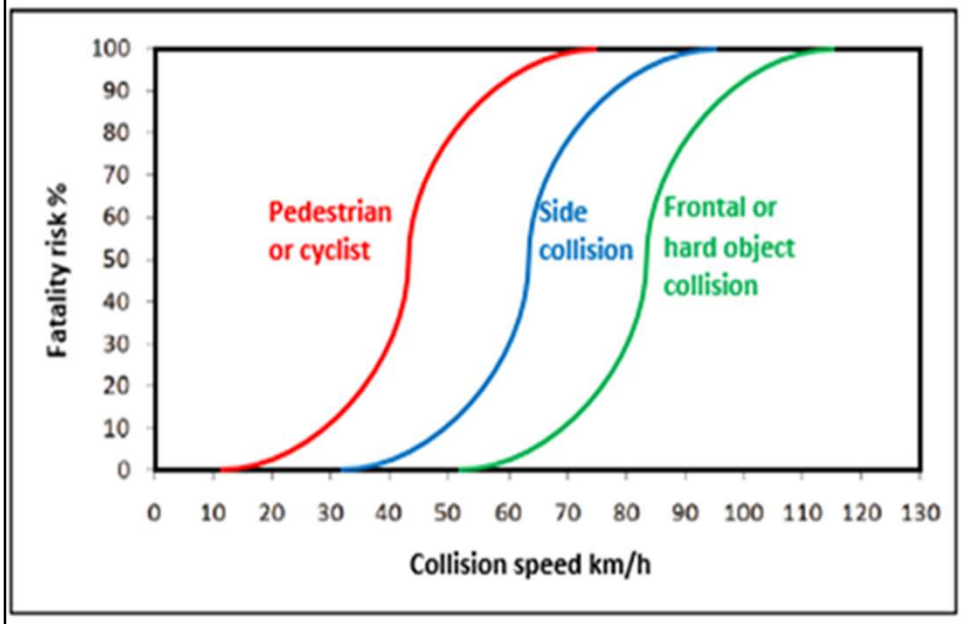
66

Global comparison of NMT death rates in cities



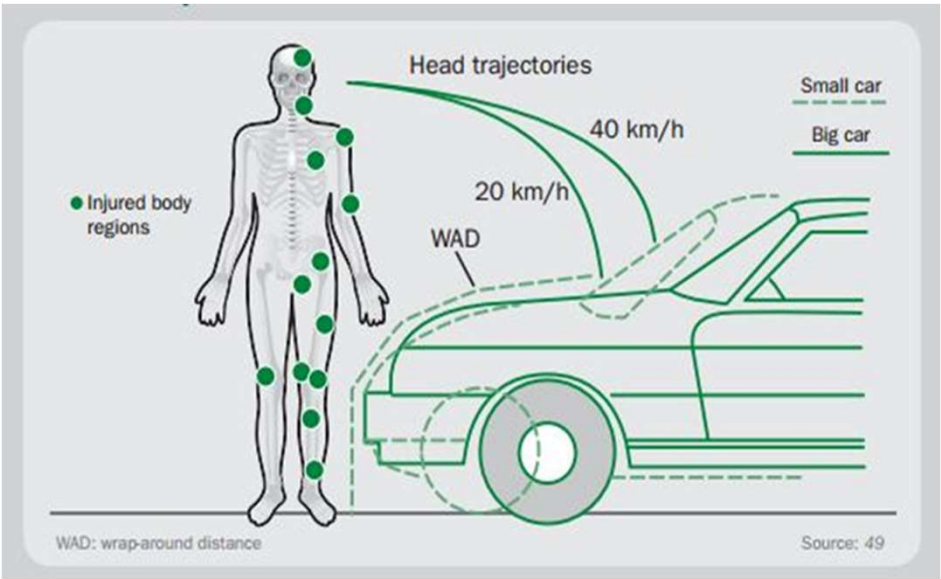
67

Fatality risk of NMT users



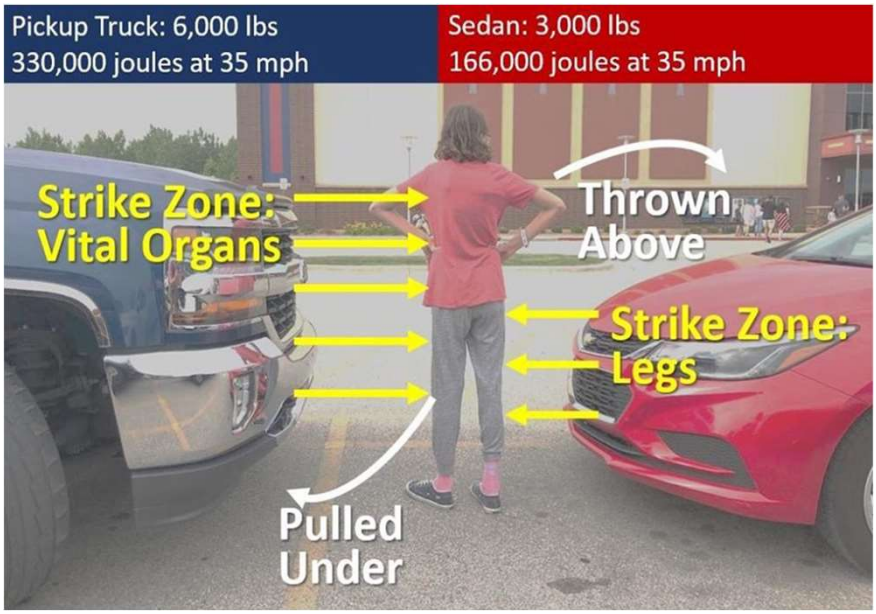
68

Typical injuries sustained by adult pedestrians (1)



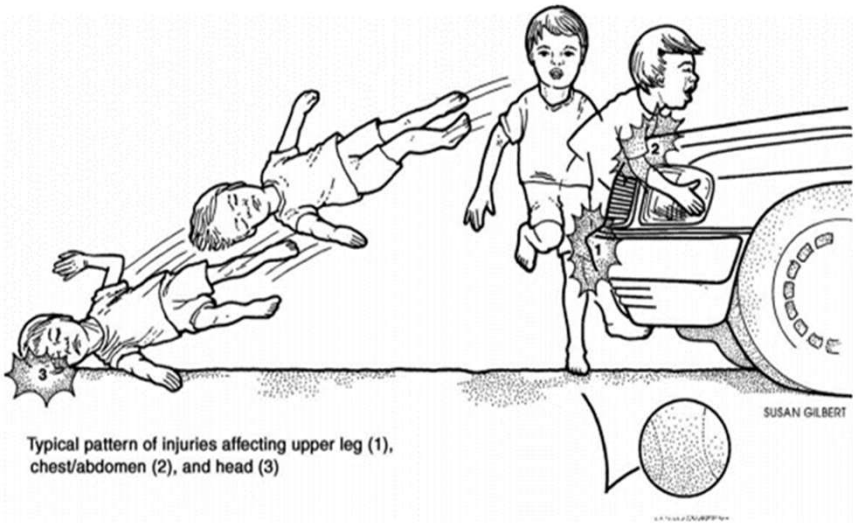
69

Typical injuries sustained by adult pedestrians (2)



70

Typical injuries sustained by children in traffic crashes



Typical pattern of injuries affecting upper leg (1), chest/abdomen (2), and head (3)

71