# CHILDREN NEED OUR PROTECTION

## POLY TRAUMA IN CHILDREN – WHAT MAKES THE DIFFERENCE

LOB, Guenter | RUCHHOLTZ, Steffen | DEBUS, Florian

Section Injury Prevention GERMANY SOCIETY FOR ORTHOPAEDICS AND TRAUMA

CHILDREN ARE NOT LITTLE ADULTS
CHILDREN HAVE A LIMITED RESPONSIBILITY
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2011-2020
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DESTATIS
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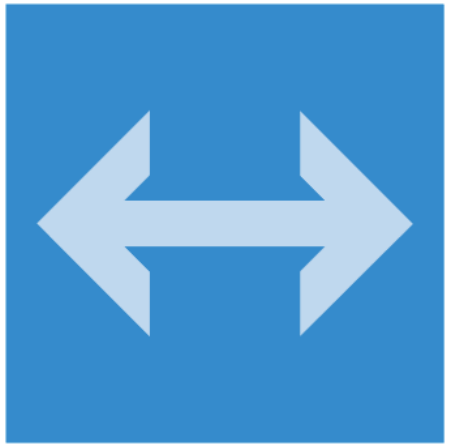
# VERKEHRSUNFÄLLE

## Kinderunfälle im Straßenverkehr



2014

Statistisches Bundesamt

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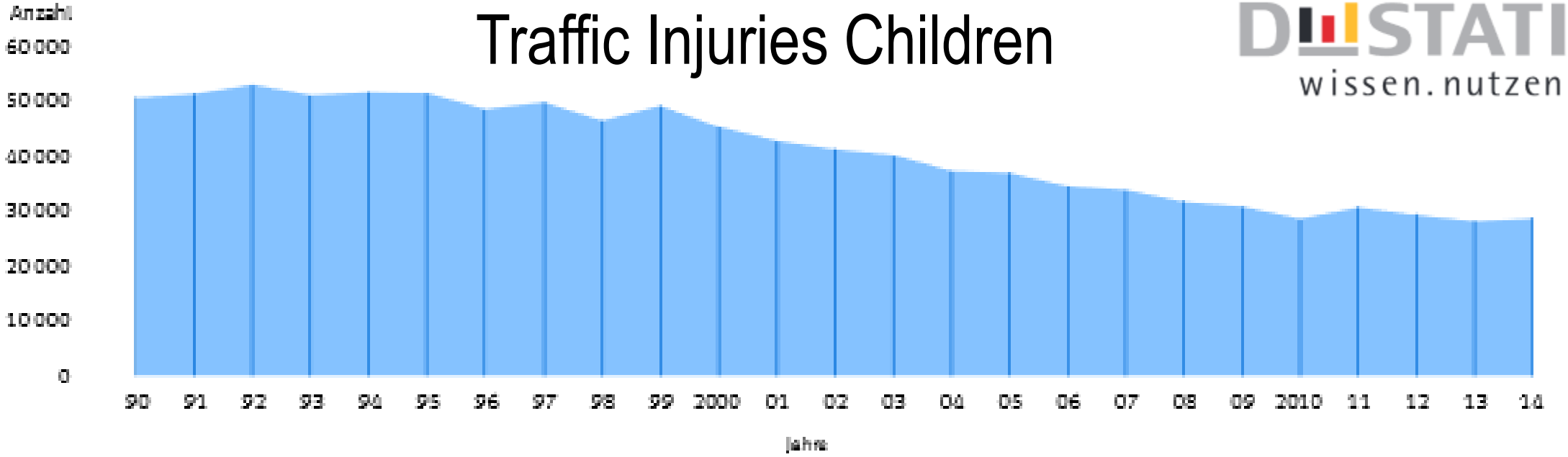
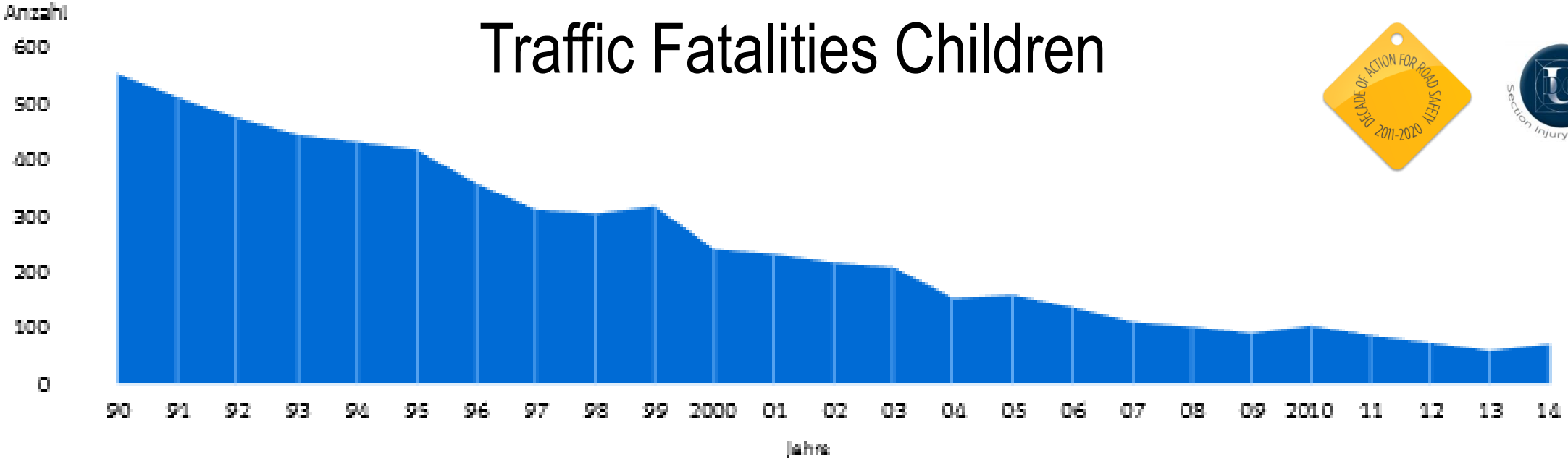
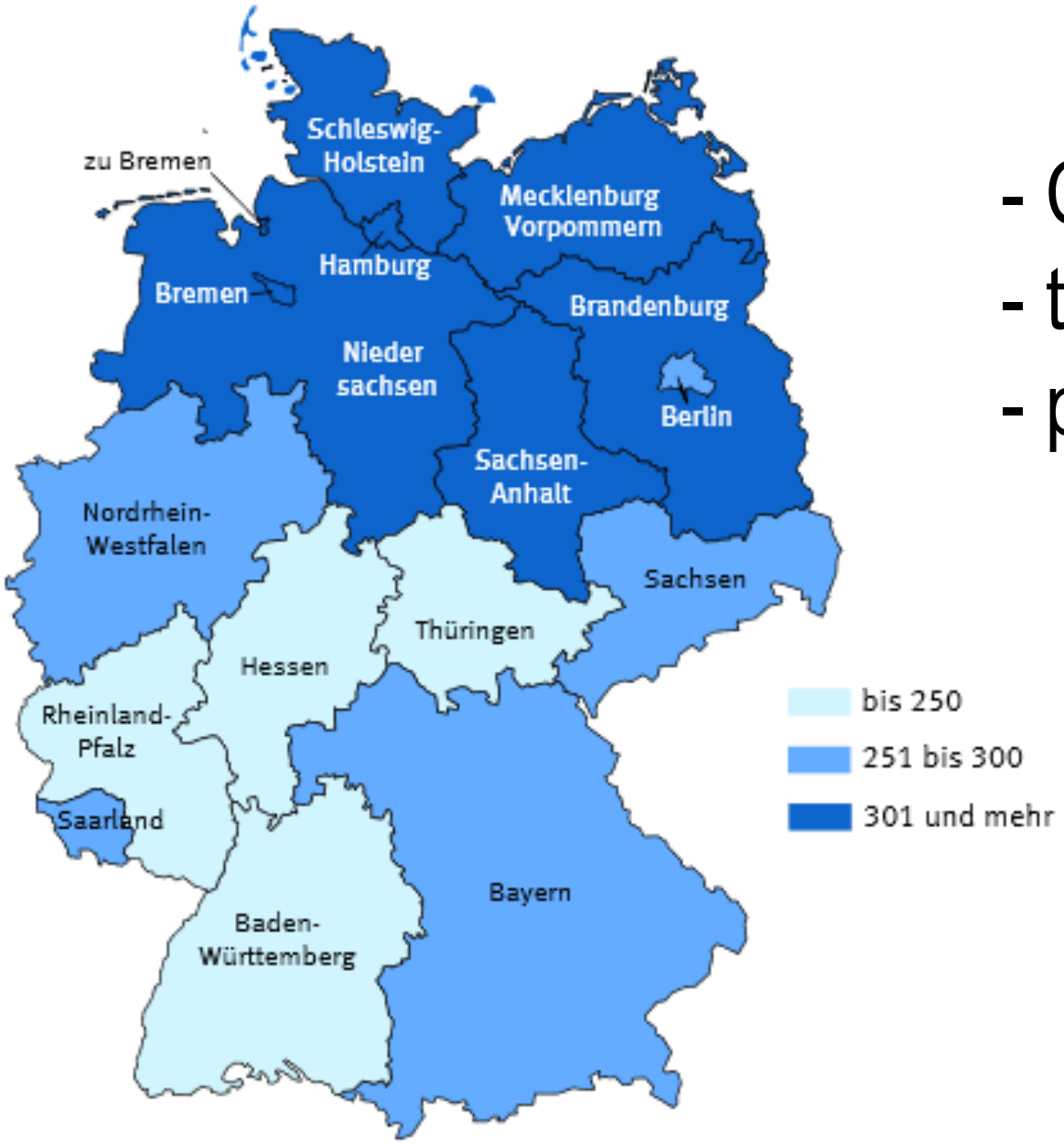
# Traffic Injuries Children




# Traffic Fatalities Children






- Children under 15 years
- traffic accidents in 2014
- per 100,000 inhabitants

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European Commission
European Road Safety Observatory
www.erso.eu
Traffic Safety
Basic Facts 2015
Children
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WHO DARS 2014 Tehran

In Iran each day an average of 60 persons are killed in road accidents. Each year some 20,000 persons are killed by road accidents and 200,000 to 300,000 persons are injured or disabled. Some 25% of all road fatalities in Iran involve motorcycles with over 60 % of those that occur because the rider did not use a helmet. Traffic fatalities are estimated to cost the Iranian economy some 6 to 20 billion USD every year.*

Philipps Universität Marburg

# Polytrauma in children – what makes the difference

Steffen Ruchholtz, Florian Debus

Department of Trauma, Hand and
Reconstructive Surgery

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# Severe Injury in Children

## TraumaRegister DGU

Data from 1997 - 2010

- Injury Severity Score ≥ 9
- Mechanism
- Pattern of Injury
- Prognosis

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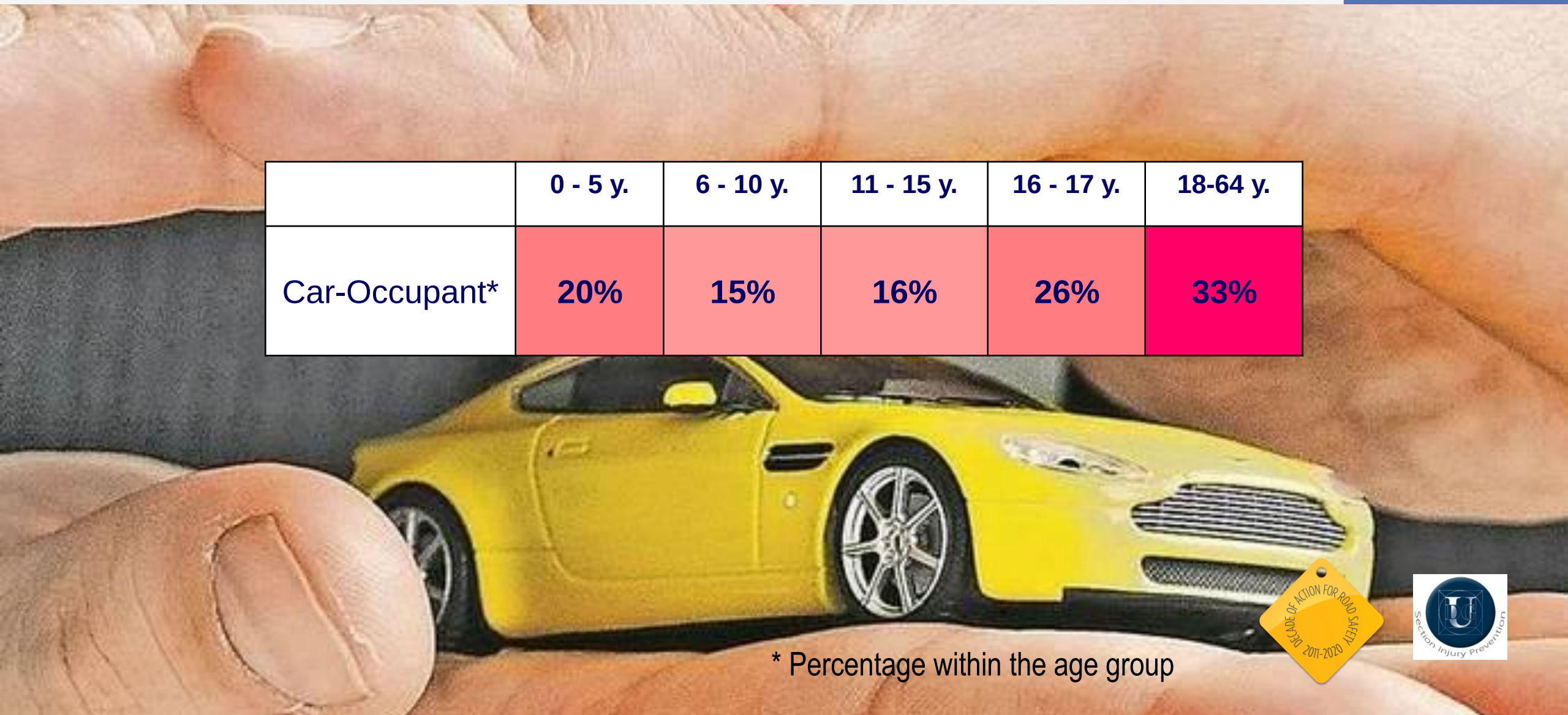
# Severe Injury in Children

| | Age Groups / n=47.915 / 1997-2010 | | | | | |
|---|---|---|---|---|---|---|
| | 0 to 5 y. | 6 to 10 y. | 11 to 15 y. | 16 to 17 y. | 18 to 64 y. | 65 and more |
| n= | 1,2% (560) | 1,2% (576) | 2,2% (1039) | 2,8% (1347) | 70,4% (33724) | 22,3% (10669) |

7,4% (3.522) Children and Adolescents

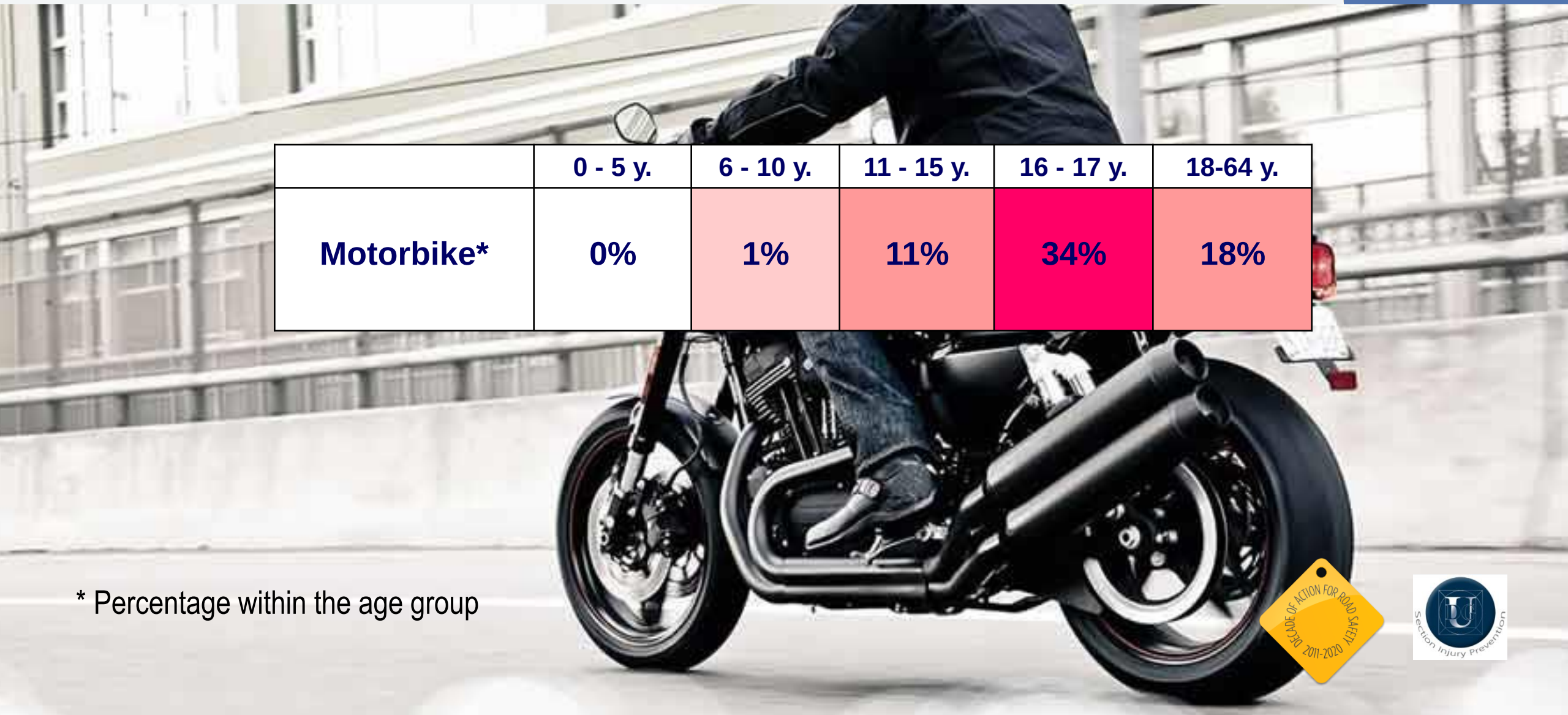
# Mechanism of Injury

| | 0 - 5 y. | 6 - 10 y. | 11 - 15 y. | 16 - 17 y. | 18-64 y. |
|---|---|---|---|---|---|
| Car-Occupant* | **20%** | **15%** | **16%** | **26%** | **33%** |



* Percentage within the age group

# Mechanism of Injury



| | 0 - 5 y. | 6 - 10 y. | 11 - 15 y. | 16 - 17 y. | 18-64 y. |
|---|---|---|---|---|---|
| **Motorbike*** | **0%** | **1%** | **11%** | **34%** | **18%** |

* Percentage within the age group

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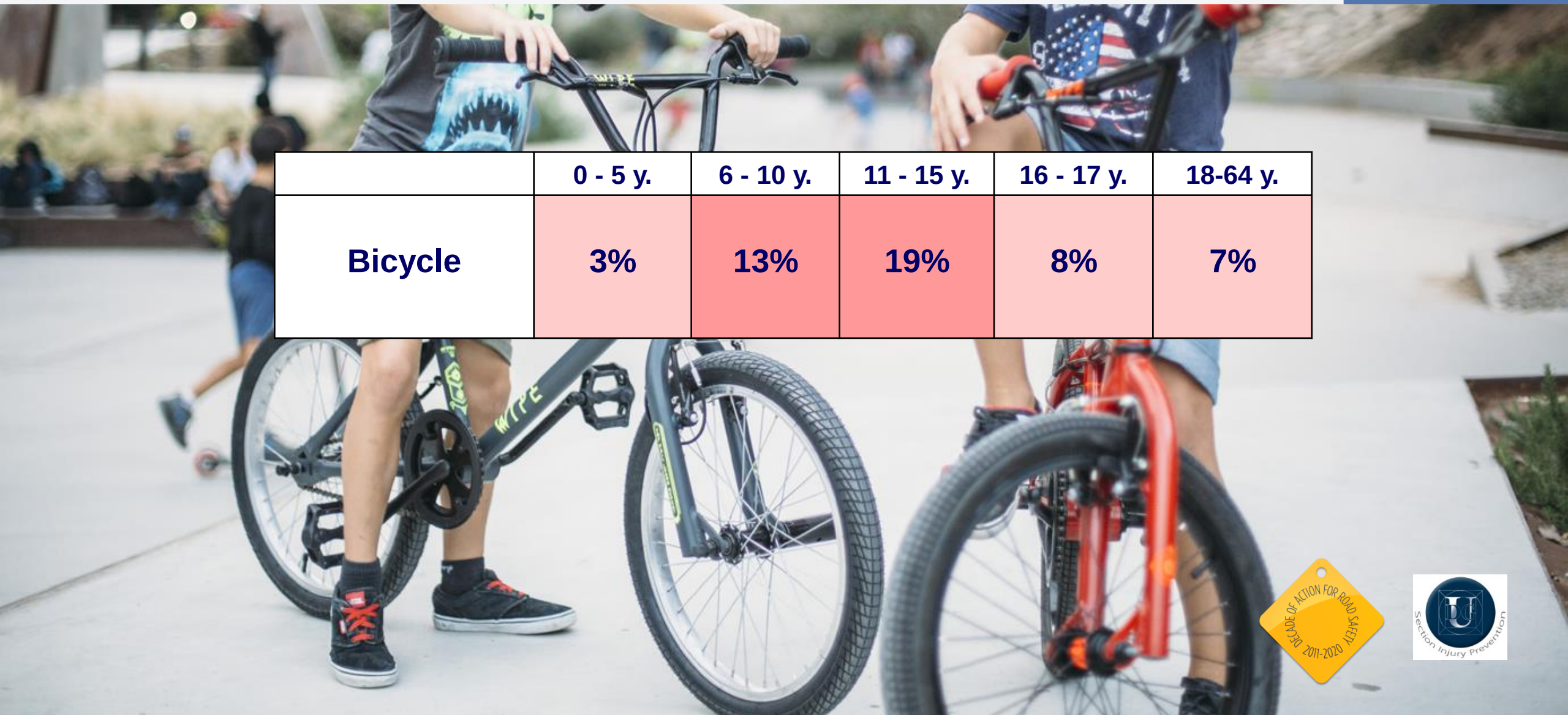
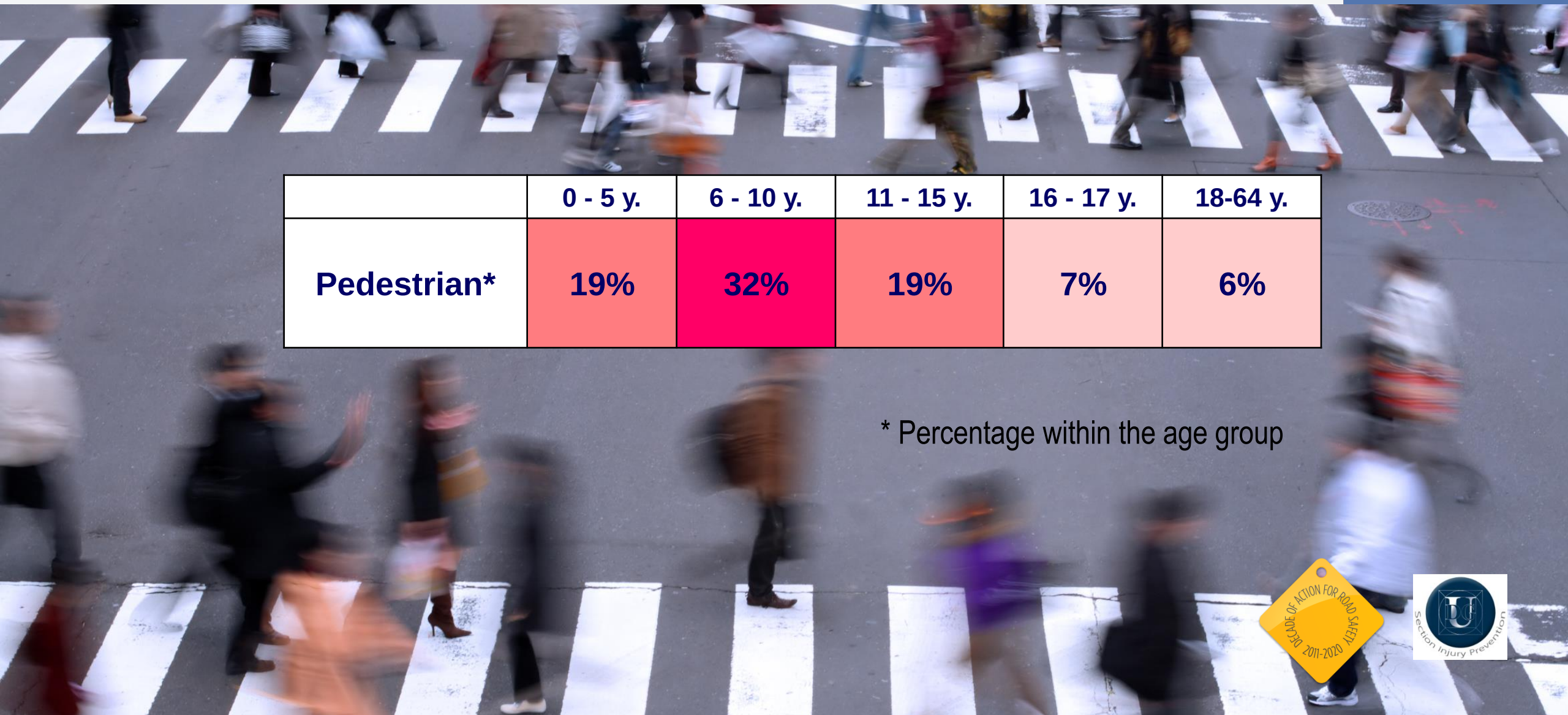
# Mechanism of Injury



| | 0 - 5 y. | 6 - 10 y. | 11 - 15 y. | 16 - 17 y. | 18-64 y. |
|---|---|---|---|---|---|
| **Bicycle** | **3%** | **13%** | **19%** | **8%** | **7%** |

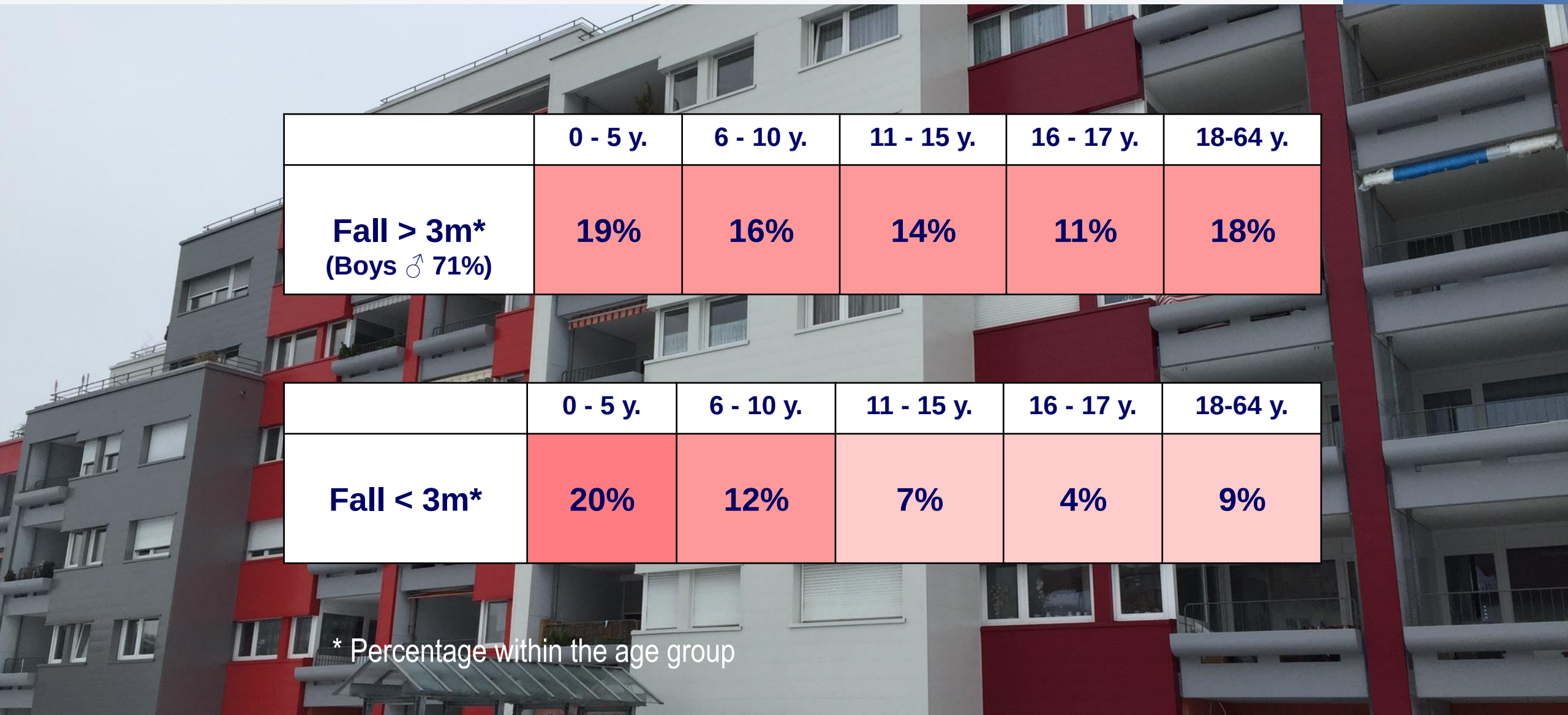
# Mechanism of Injury



| | 0 - 5 y. | 6 - 10 y. | 11 - 15 y. | 16 - 17 y. | 18-64 y. |
|---|---|---|---|---|---|
| **Pedestrian*** | **19%** | **32%** | **19%** | **7%** | **6%** |

* Percentage within the age group

# Mechanism of Injury



| | 0 - 5 y. | 6 - 10 y. | 11 - 15 y. | 16 - 17 y. | 18-64 y. |
|---|---|---|---|---|---|
| **Fall > 3m*** (Boys ♂ 71%) | **19%** | **16%** | **14%** | **11%** | **18%** |

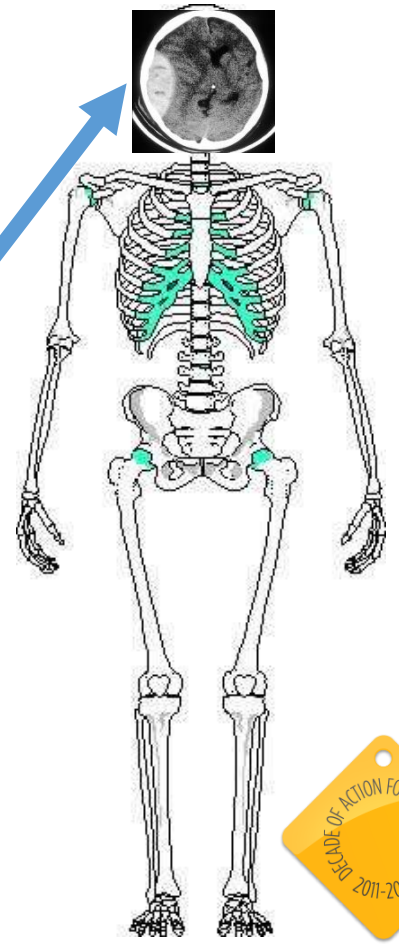
| | 0 - 5 y. | 6 - 10 y. | 11 - 15 y. | 16 - 17 y. | 18-64 y. |
|---|---|---|---|---|---|
| **Fall < 3m*** | **20%** | **12%** | **7%** | **4%** | **9%** |

* Percentage within the age group

# TraumaRegister DGU

**47.915 Patients → n=3522 (<18 yrs. / ISS ≥ 9 )**

| | 0-5 y. | 6-10 y. | 11-14y. | 15-17 y. | 18-64 y. |
|---|---|---|---|---|---|
| **Head AIS ≥ 3:** | **71%** | **64%** | **58%** | **51%** | **48%** |



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# TraumaRegister DGU

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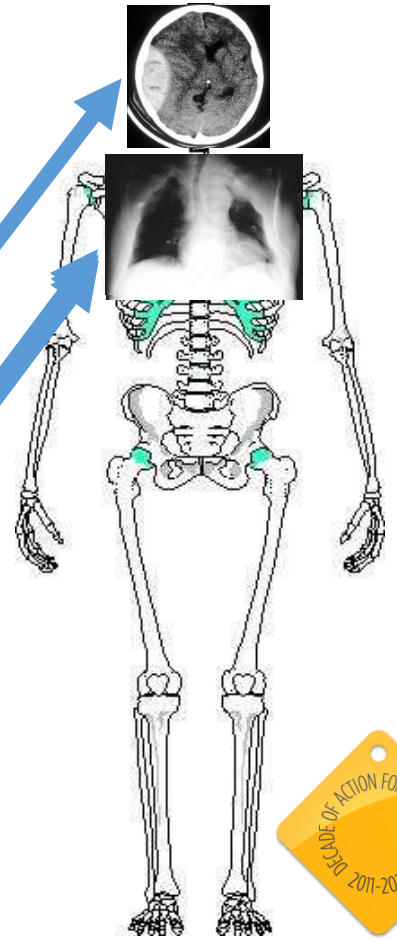
|---|---|---|---|---|---|
| Head AIS ≥ 3: | 71% | 64% | 58% | 51% | 48% ↓ |
| Thorax AIS≥3: | 31% | 35% | 43% | 51% | 58% ↑ |



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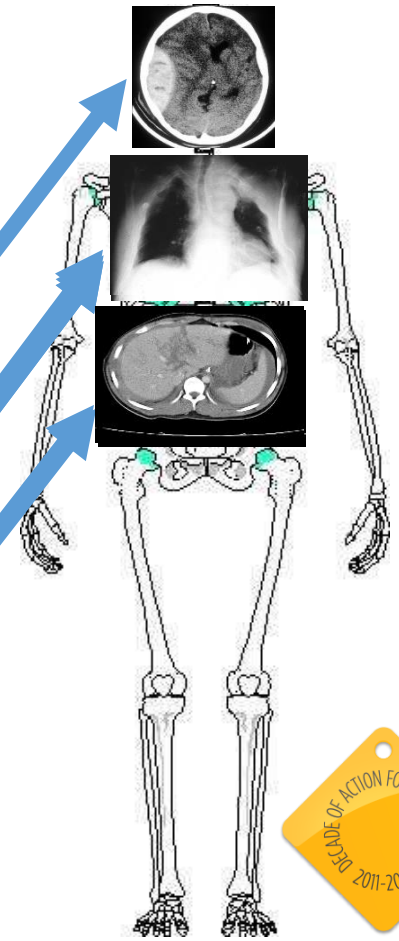
|---|---|---|---|---|---|
| Head AIS ≥ 3: | 71% | 64% | 58% | 51% | 48% ↓ |
| Thorax AIS≥3: | 31% | 35% | 43% | 51% | 58% ↑ |
| Abdomen AIS≥3: | 20% | 23% | 26% | 29% | 23% ↔ |



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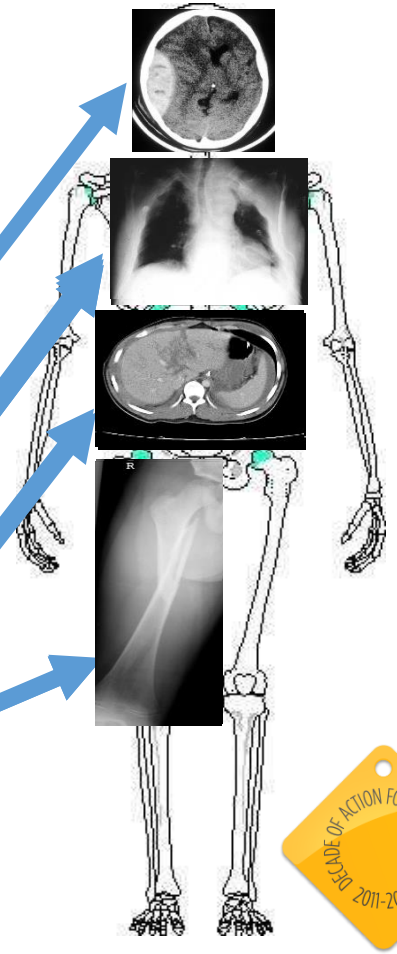
|---|---|---|---|---|---|---|
| Head AIS ≥ 3: | 71% | 64% | 58% | 51% | 48% | ↓ |
| Thorax AIS≥3: | 31% | 35% | 43% | 51% | 58% | ↑ |
| Abdomen AIS≥3: | 20% | 23% | 26% | 29% | 23% | ↔ |
| Extremities AIS≥3: | 19% | 31% | 33% | 42% | 36% | ↑ |
| Spine AIS≥3: | 9% | 8% | 19% | 27% | 33% | ↑ |



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# Prognosis

## Mortality vs. RISC-Score

| | 0 - 5 y. | 6 - 10 y. | 11 - 15 y. | 16 - 17 y. | 18-64 y. |
|---|---|---|---|---|---|
| **observed mortality** | 16,3% | 9,0% | 10,1% | 11,5% | 11,0% |
| **Predicted mortality** | 16,2% | 12,2% | 11,9% | 13,0% | 12,1% |
| **Difference** | 0,1% | 3,2% | 1,8% | 1,5% | 1,1% |

# National Activities

| *Pillar 1* | *Pillar 2* | *Pillar 3* | *Pillar 4* | *Pillar 5* |
|---|---|---|---|---|
| **Road Safety Management** | **Safer Road & Mobility** | **Safer Vehicles** | **Safer Road Users** | **Post Crash Response** |

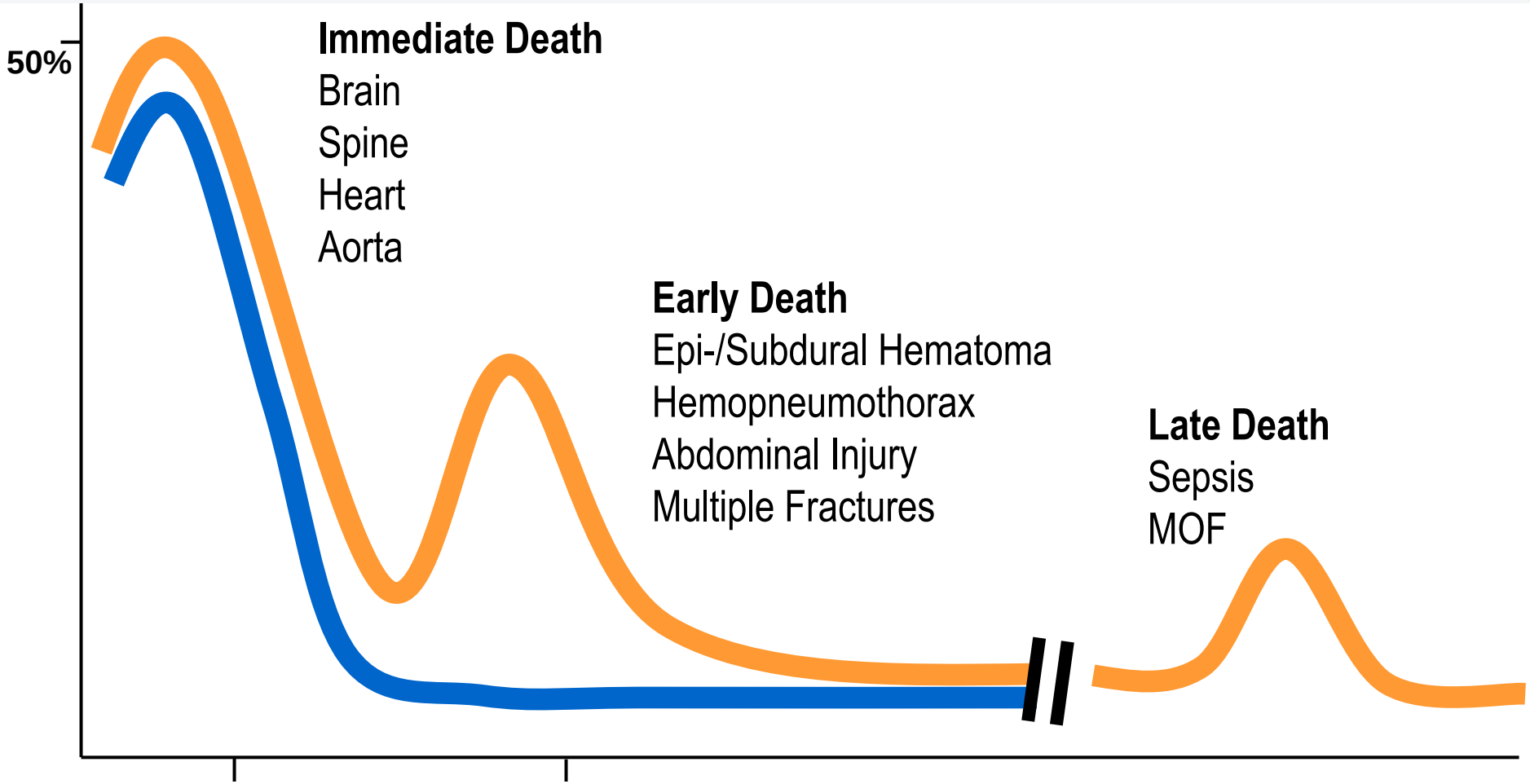
**Time = Life**

**Global Plan: Decade of Action for Road Safety,** *2011 – 2020 WHO*

**lost lost**
**TIME = LIFE**

# Time between accident and first aid

# Traffic Accidents Deaths




*Tscherne*

Adults
„GOLDEN HOUR“
Children
„GOLDEN 20 min“
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# Average Blood Volume

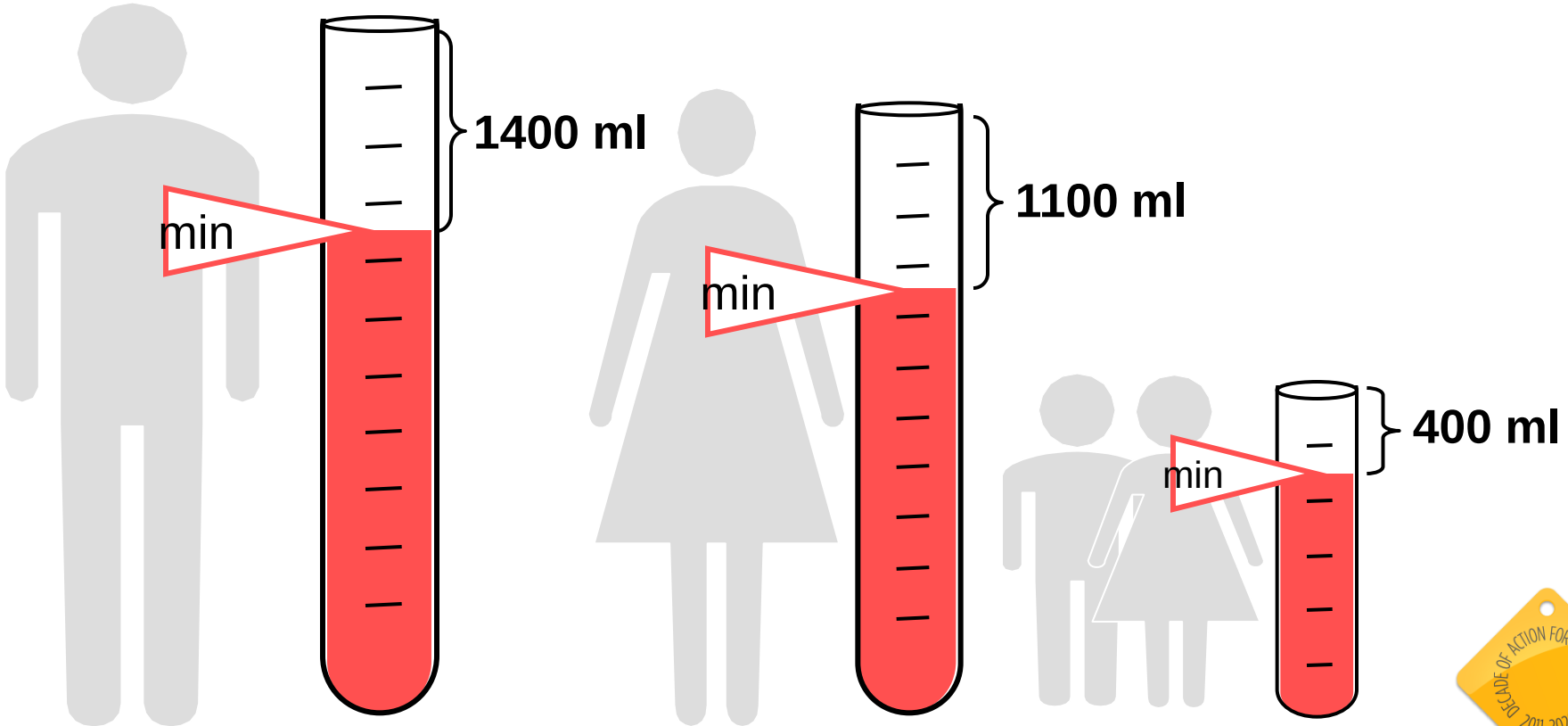




| | Male | Female | Children |
|---|---|---|---|
| Body Weight | 80 kg | 60 kg | 20 kg |
| Blood Volume per kg | 70 ml | 70ml | 80 ml |
| Total Blood Volume | **5600 ml** | **4200 ml** | **1600 ml** |

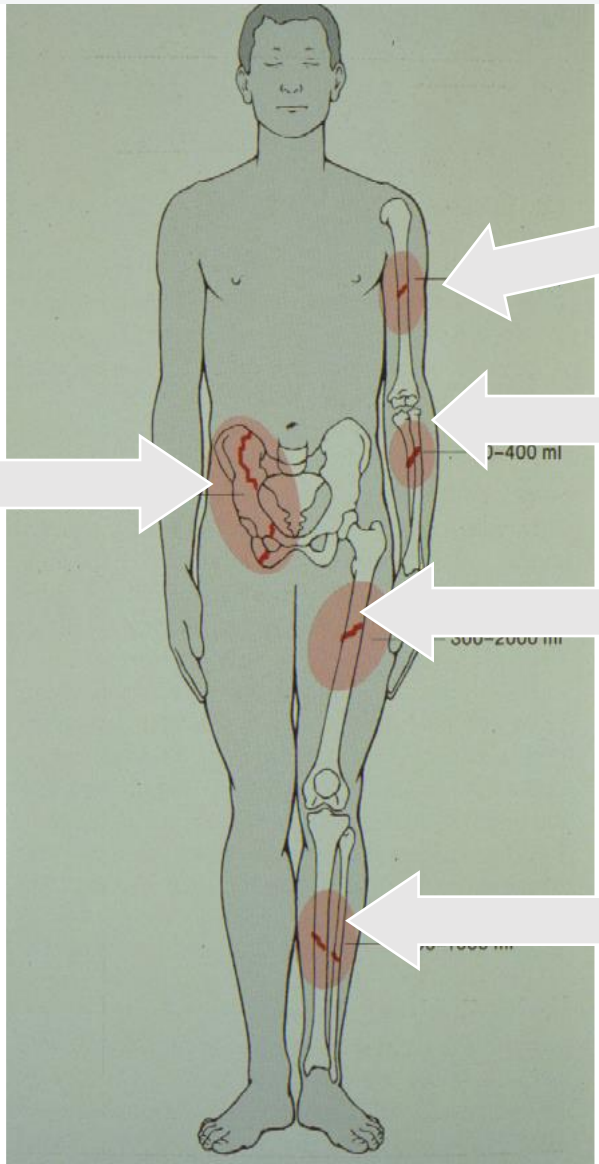
# Critical Blood Loss

## 20 - 30 Percent of Total Blood Volume



# Blood Loss Per Fracture

500 - 5000 ml



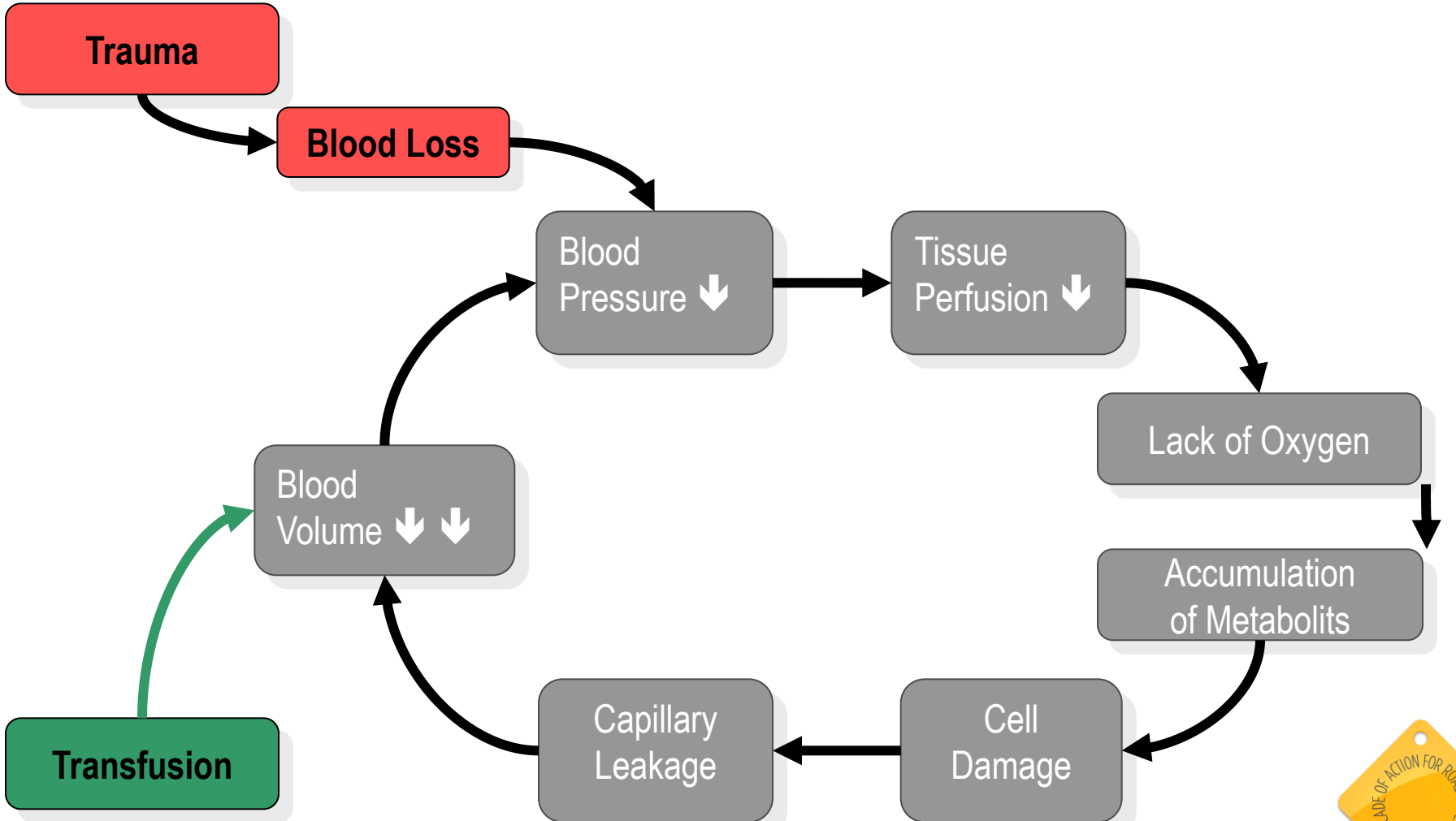
100 - 800 ml

50 - 400 ml

300 - 2000 ml

100 - 1000 ml

# Vicious Circle



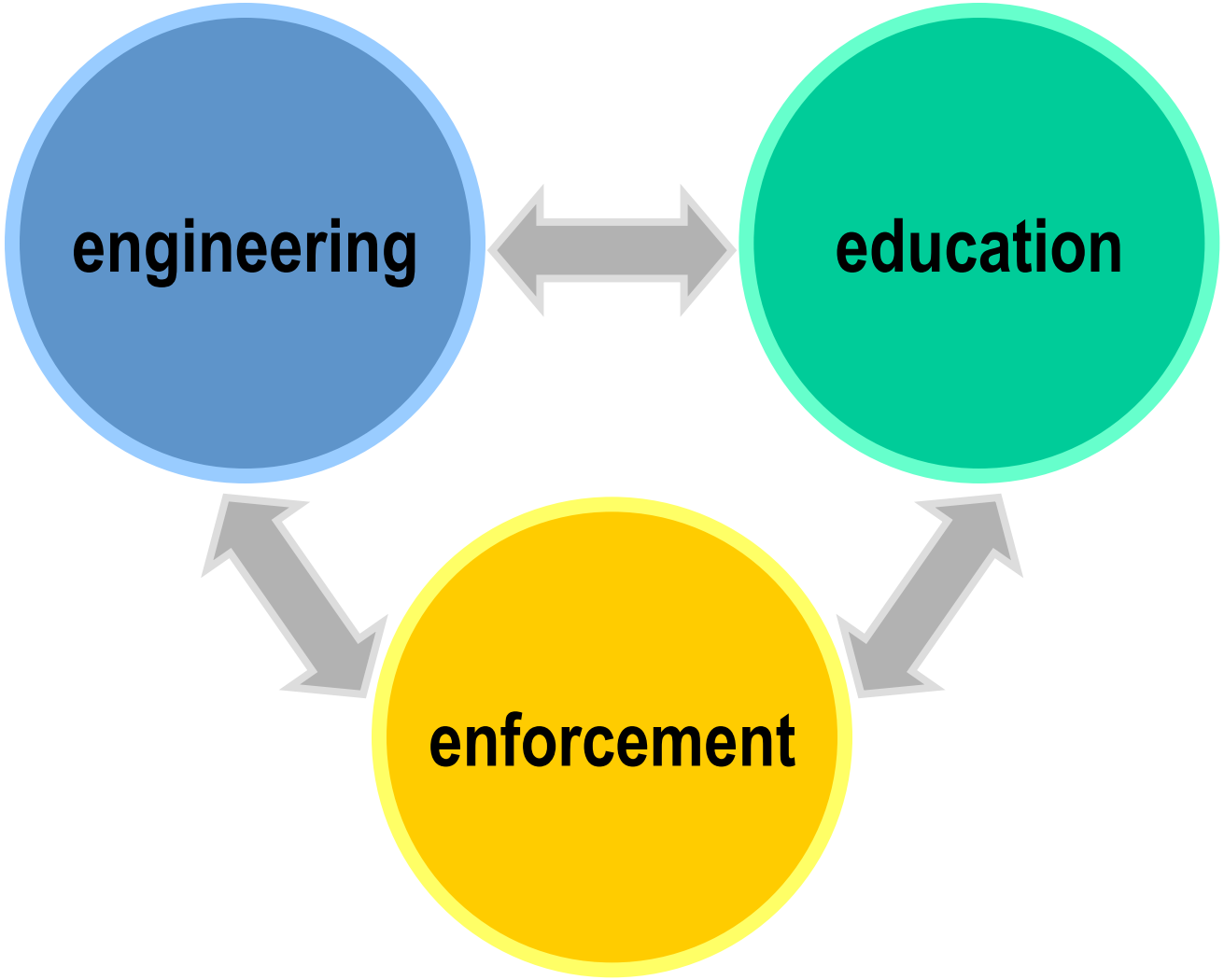
# National Activities

| *Pillar 1* | *Pillar 2* | *Pillar 3* | *Pillar 4* | *Pillar 5* |
|---|---|---|---|---|
| **Road Safety Management** | **Safer Road & Mobility** | **Safer Vehicles** | **Safer Road Users** | **Post Crash Response** |

- ADAC
- BMW
- DEKRA
- DGOU
- DVR
- MAN
- Government
  - Law
  - Police

**Global Plan: Decade of Action for Road Safety**
*2011 – 2020 WHO*

# Police Duties / Germany



# Radar Enforced

Petition richtet sich an President Barack Obama und an 1 mehr

# Adopt a Vision Zero goal and sign an Executive Order to Save Lives Not Dollars

Jerry and Marianne Karth Rocky Mount, NC

Together
we can save
millions
of lives.