

# SENIORS



SAFETY ENHANCED INNOVATIONS FOR OLDER ROAD USERS

## Project overview

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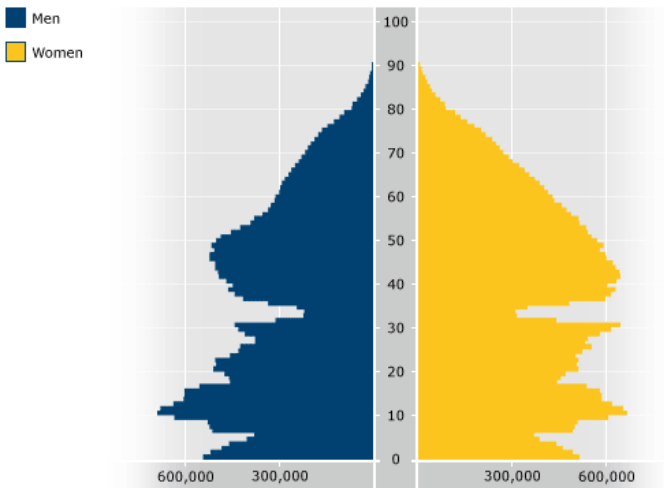
## Demographic change

**METRO GROUP**

### Age pyramid for Germany 1950-2050

The age structure of the population will change considerably between now and 2050.

#### Age structure 1950

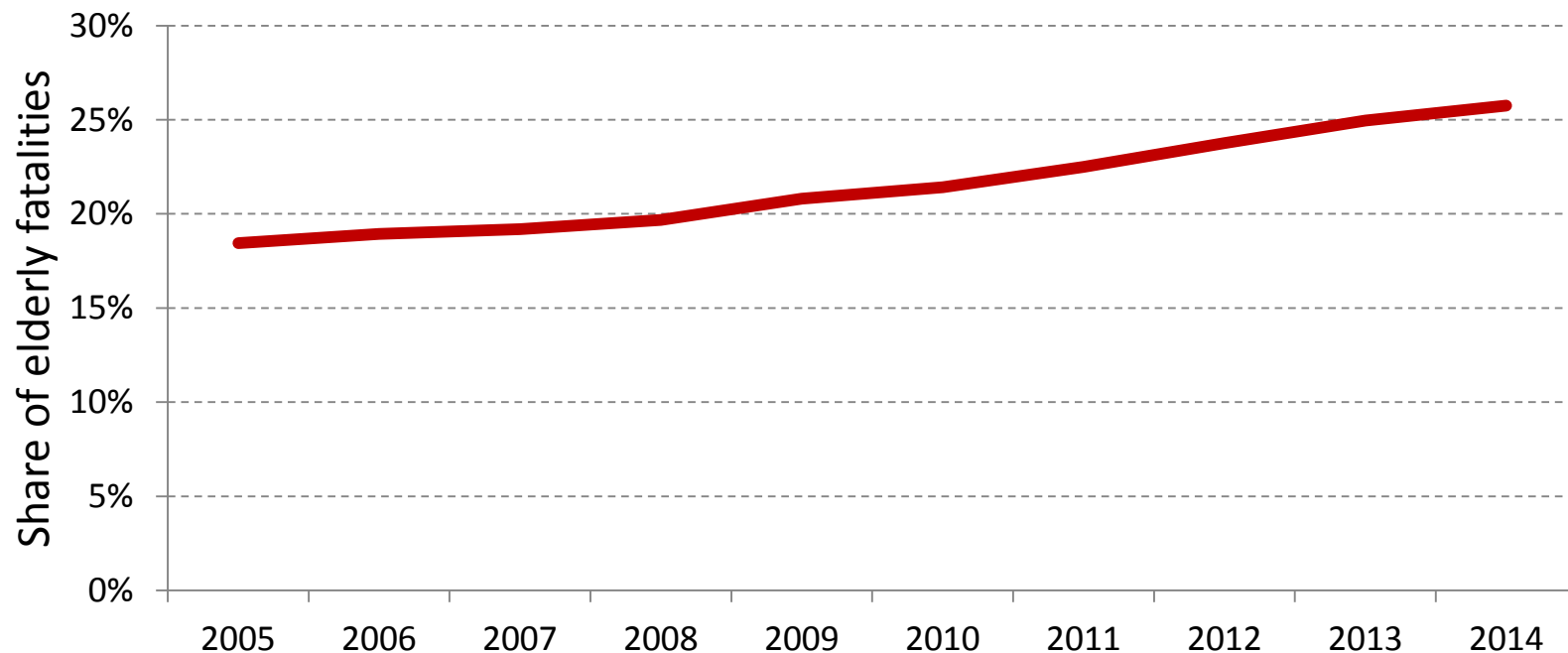


Status: 2003

Source: Federal Statistics Office

## Vulnerable road users

### Share of elderly fatalities



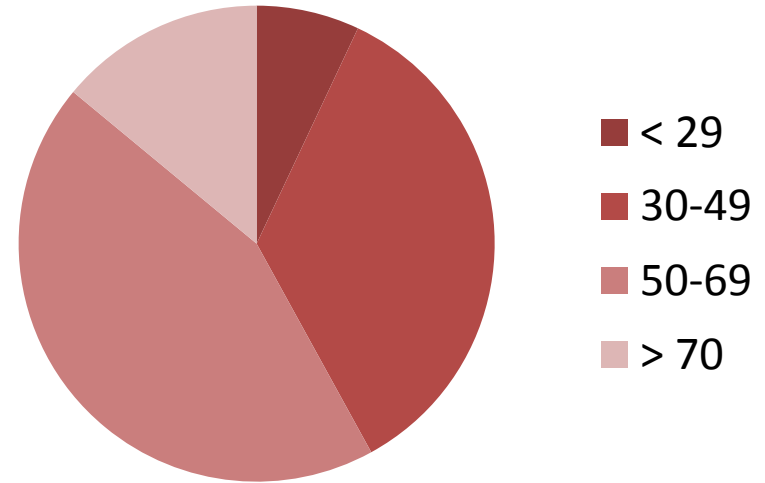
## Key target

Safe mobility = quality of life



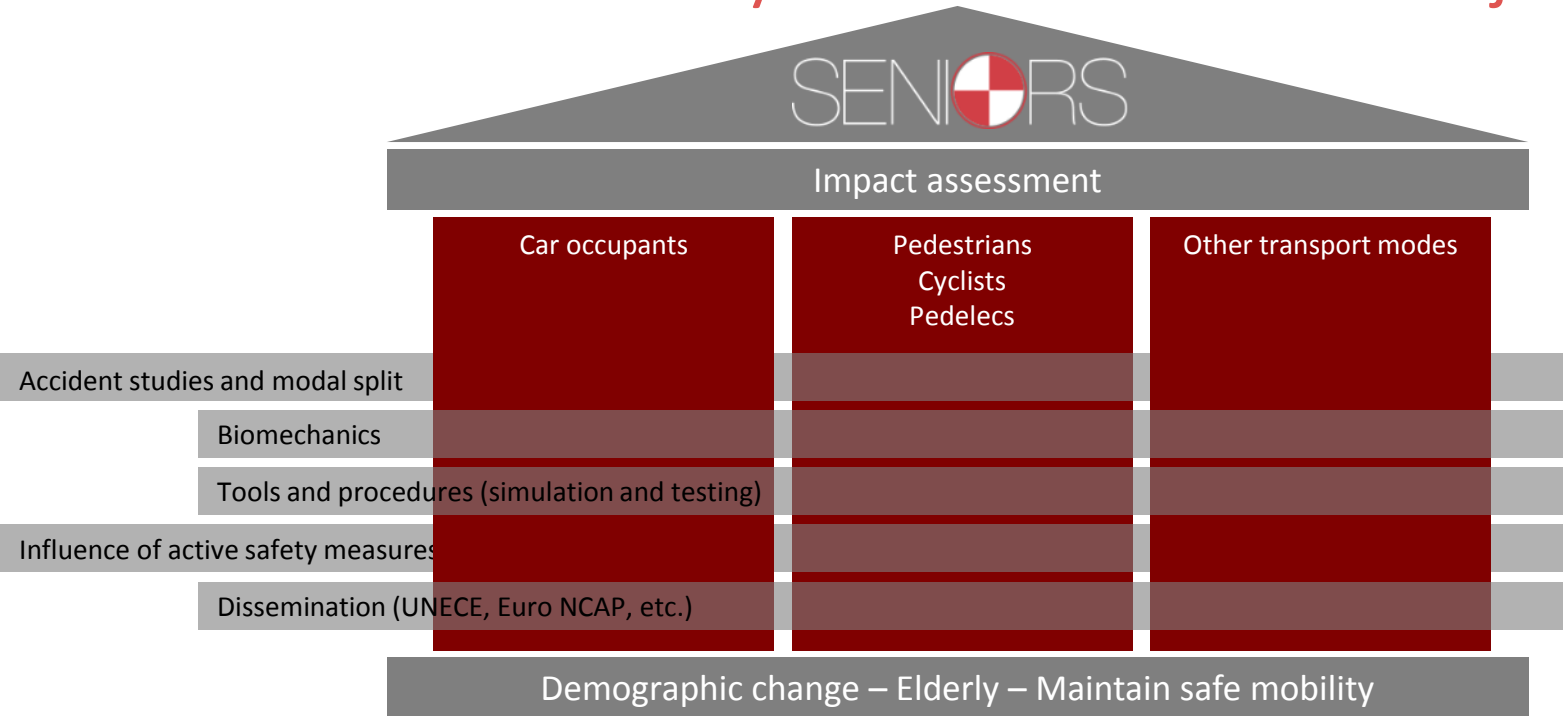
Image: highwaytosafety.com

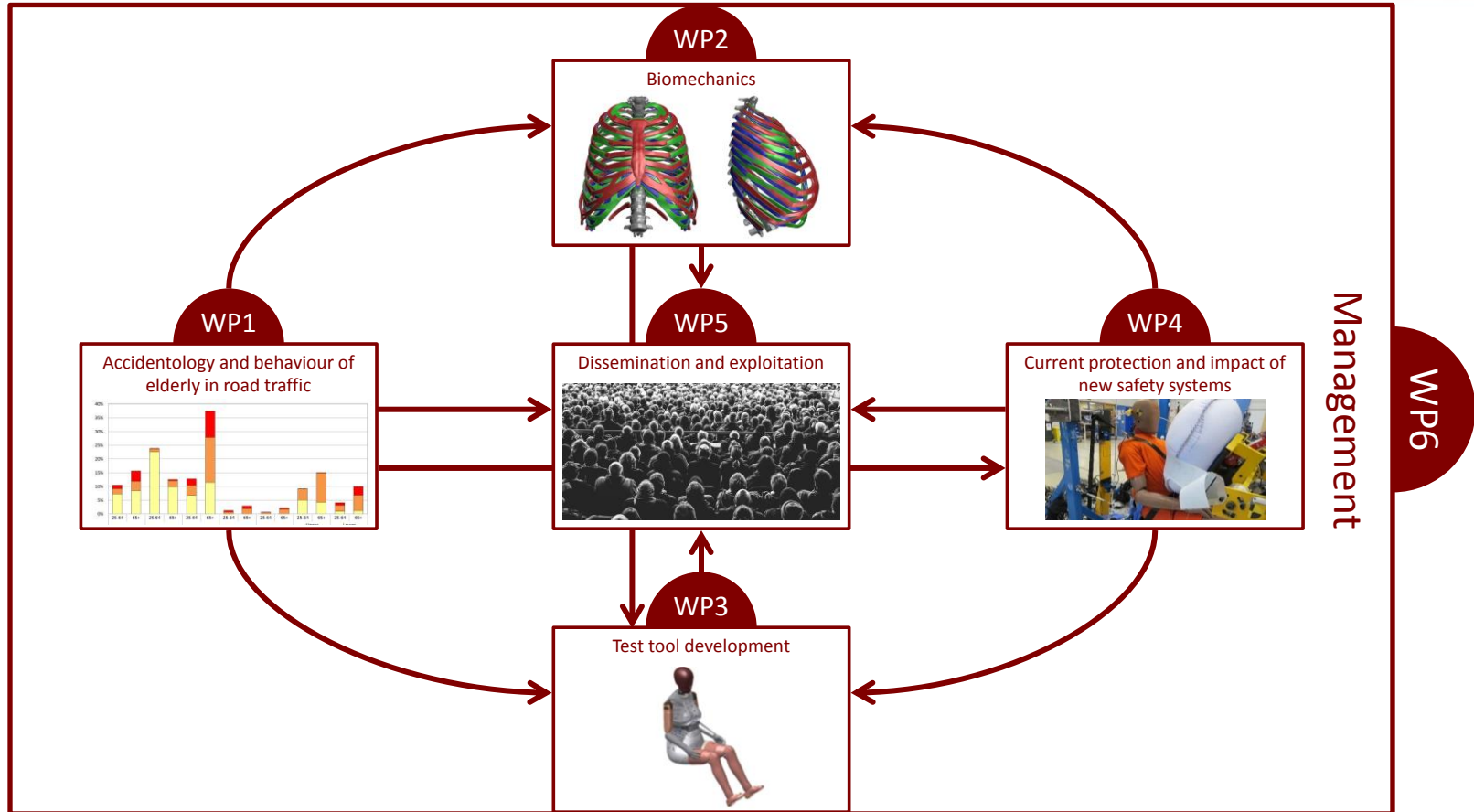
## Most new car buyers



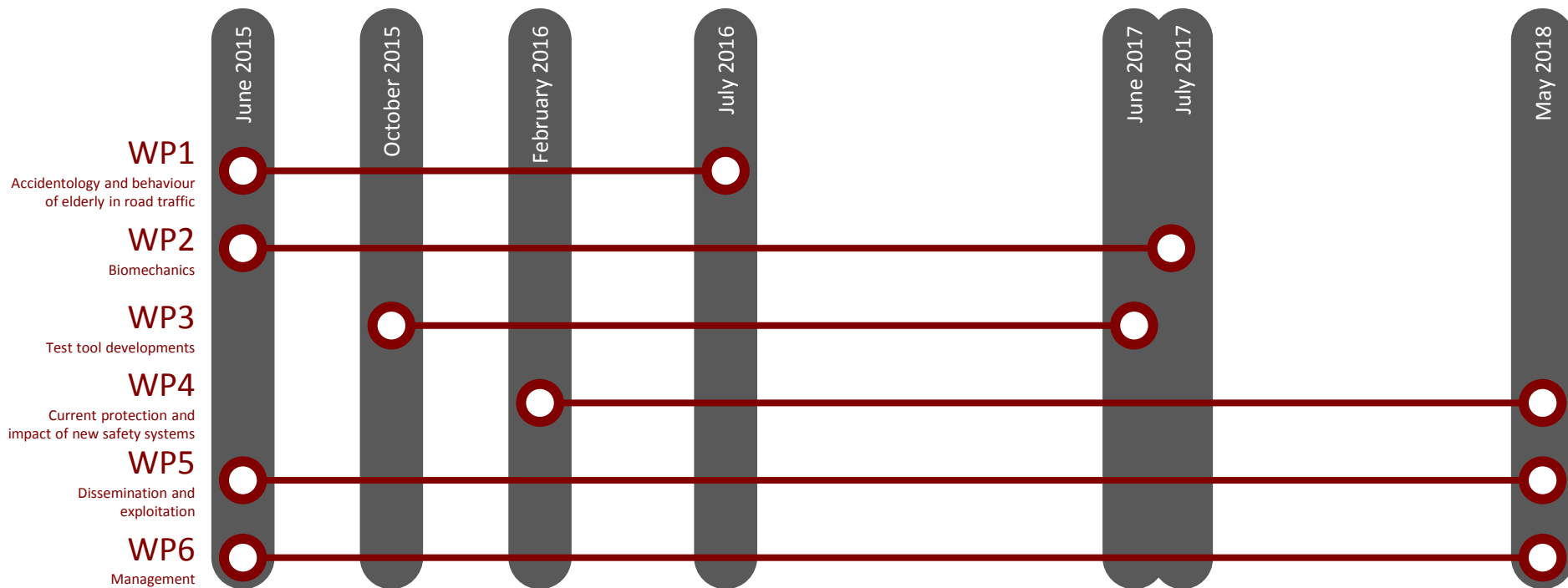
Mean age of new car buyers in Germany in 2012.  
Source: University of Duisburg-Essen

Provide the knowledge and enable the tools to reduce the number of elderly fatalities and serious injuries

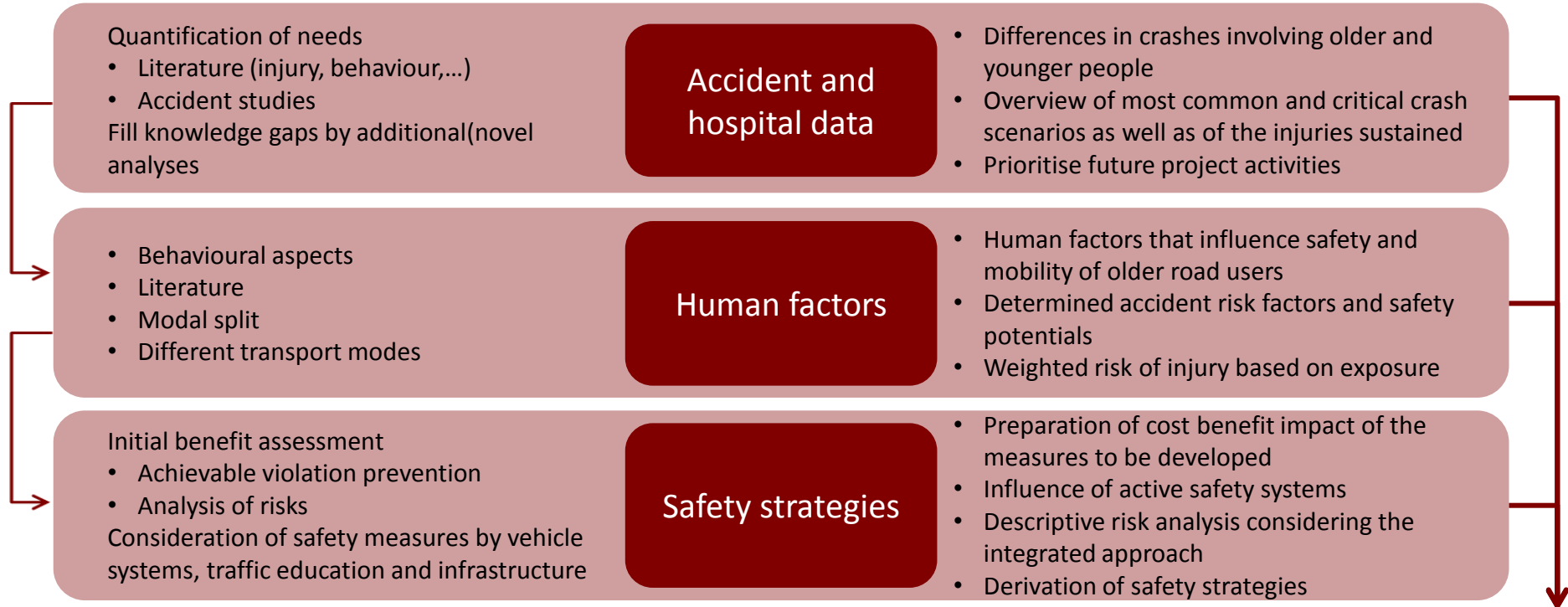




## Timing

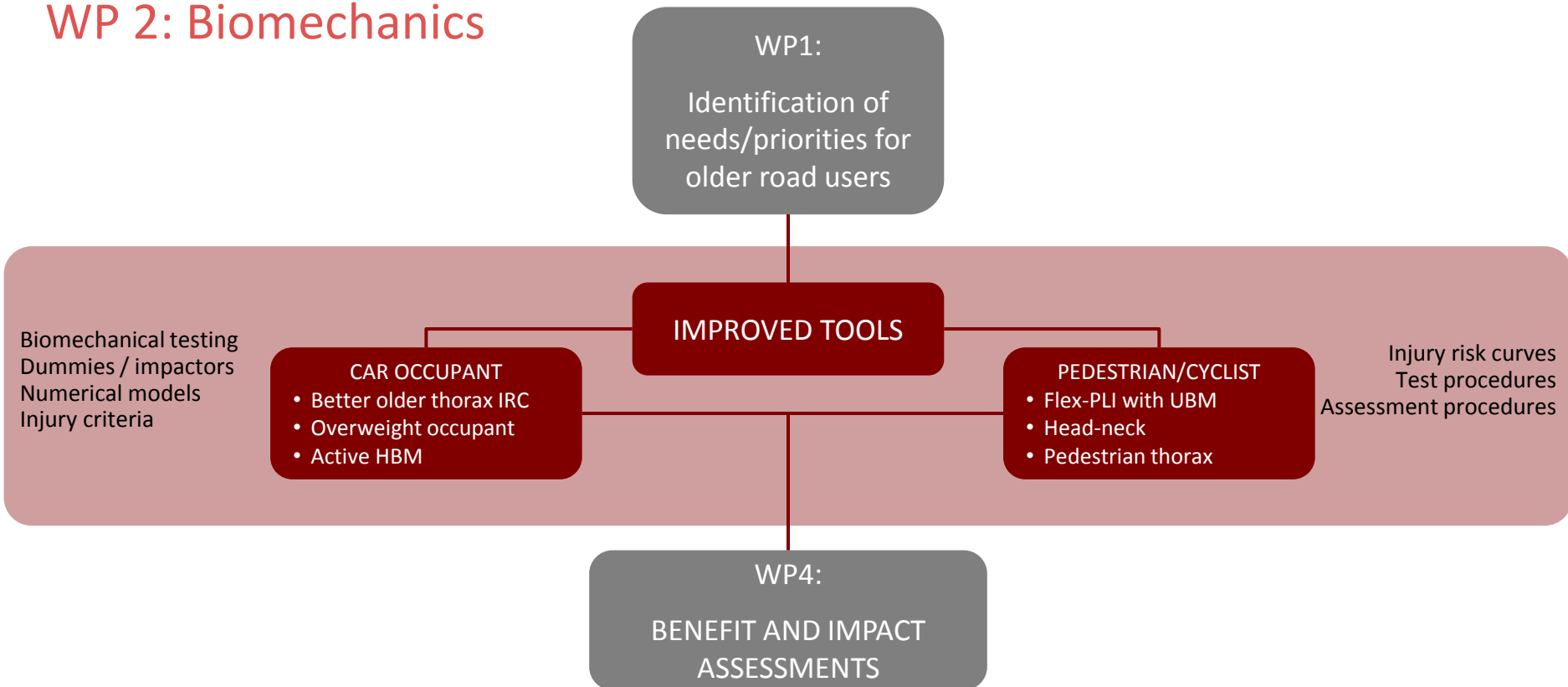


## WP 1: Accidentology and behaviour of elderly in road traffic





## WP 2: Biomechanics



## WP 3: Test tool development

WP1 Occupant size selection, overview of Injuries to address, loading conditions (scenarios)

WP2 Biomechanical requirements and injury risk curve developments

WP3

### Task 3.1 Design specifications

- Specification document for pedestrian safety tool updates
- Specification document for elderly – overweight dummy

Includes requirements on

- Anthropometry and biofidelity requirements
- Instrumentation
- Durability
- Handling

### Task 3.2 Tool Design

- Develop pedestrian safety tools for testing
- Develop elderly – overweight dummy prototypes for testing

Includes requirements on

- CAD modelling
- Material Selection
- Mold design and realization
- Realization and fine tuning of prototype parts
- Sensor development / installation
- Assembly

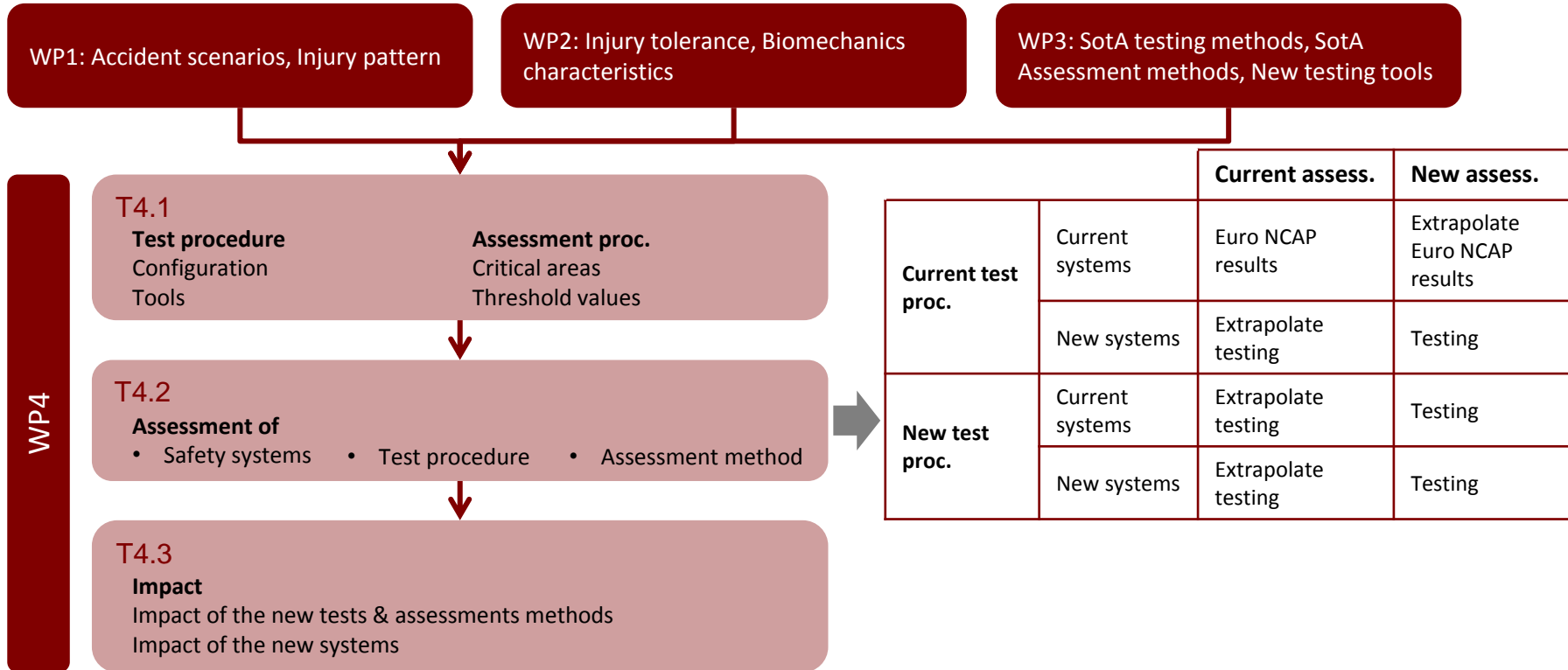
### Task 3.3 Tool Validations

- Repeating PMHS tests or other conditions defined in WP2
- Fine tuning of components if needed

Test tools for WP4

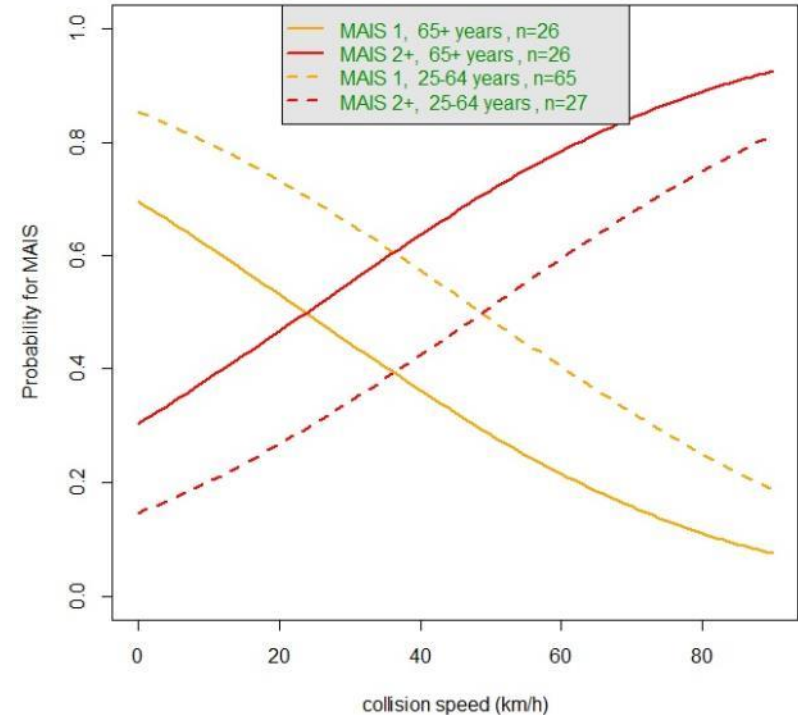
Test data for risk curve development in WP2

## WP 4: Current protection and impact of new safety systems



## New needs on the road in a changing society

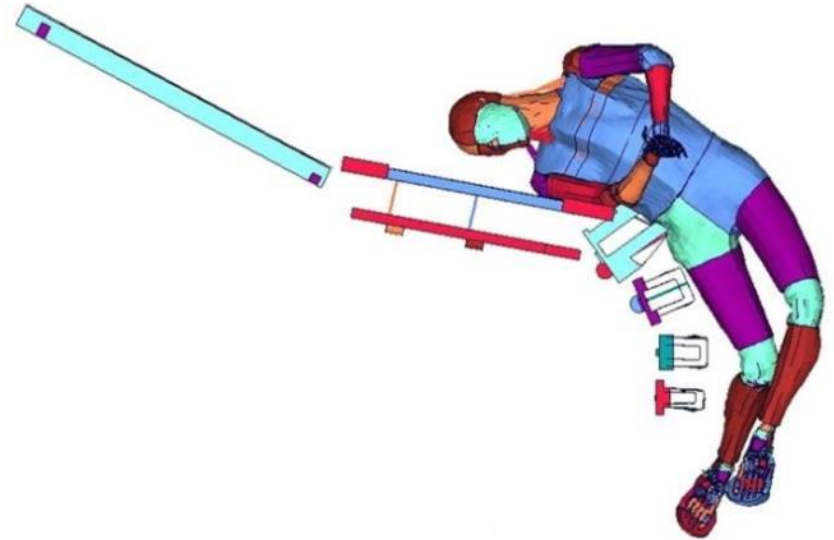
- Elderly overrepresented in injury statistics
- 2x Risk of thorax injury for older car occupants
- 10% more likely to suffer MAIS2+ injuries as pedestrians



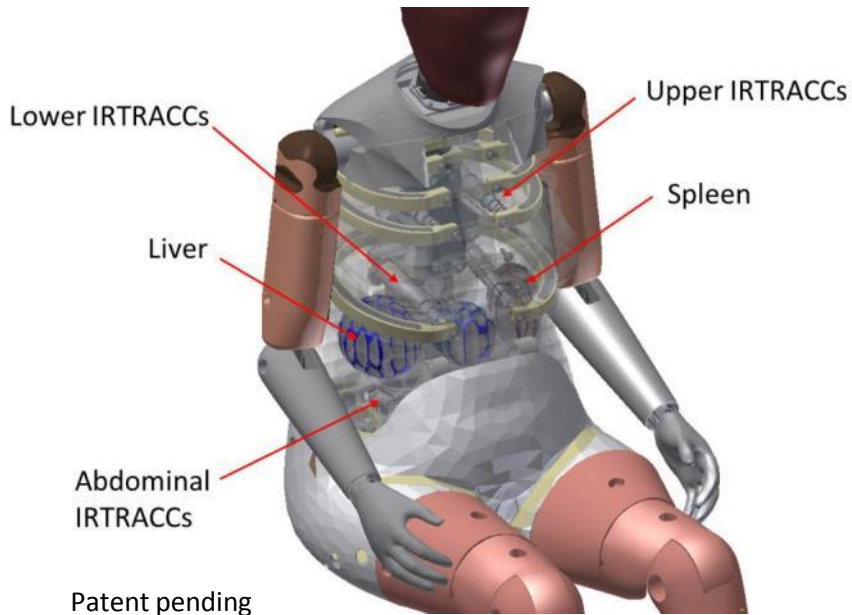
*Injury probability depending on collision speed for 25-64 and 65+ road users*

## Optimizing the safety of the elderly

- New FlexPLI-UBM with high correlation with HBM kinematics
- Considered for Euro NCAP 2025 roadmap
- Thorax injury prediction tool usability explored



## 3D printing to improve the safety of the elderly



*Elderly, overweight dummy*

- More realistic assessment of thoracic injuries
- Seatbelt interaction with pressure measuring organs
- 3D printed

## Latest publications

- Beebe, M., Ubom, I., Vara, T., Burleigh, M., & McCarthy, J. (2017). The Introduction of a New Elderly Anthropomorphic Test Device (EATD). In 25th International Technical Conference on the Enhanced Safety of Vehicles (ESV) National Highway Traffic Safety Administration. Paper number 17-0091.
- Fornells, A., Parera, N., Ferrer, A., & Fiorentino, A. (2017). Senior Drivers, Bicyclists and Pedestrian Behavior Related with Traffic Accidents and Injuries (No. 2017-01-1397). SAE Technical Paper.
- Wisch, M., Lerner, M., Vukovic, E., Schäfer, R., Hynd, D., Fiorentino, A., & Fornells, A. (2017). Road traffic crashes in Europe involving older car occupants, older pedestrians or cyclists in crashes with passenger cars—Results from SENIORS. In Proceedings of the 25th International Technical Conference on the Enhanced Safety of Vehicles (ESV). Paper number 2017-01-1397.
- Wisch, M., Lerner, M., Vukovic, E., Hynd, D., Fiorentino, A., & Fornells, A. (2017). Injury Patterns of Older Car Occupants, Older Pedestrians or Cyclists in Road Traffic Crashes with Passenger Cars in Europe—Results from SENIORS. In IRCOBI Conference Proceedings. Paper number IRC-17-17
- Zander, O., Ott, J., Wisch, M., Fornells, A., Fuchs, T., Hynd, D., ... & Lundgren, C. (2017). Safety Enhanced Innovations for Older Road Users (Seniors): Further Development of Test and Assessment Procedures Towards an Improved Passive Protection of Pedestrians and Cyclists. In 25th International Technical Conference on the Enhanced Safety of Vehicles (ESV) National Highway Traffic Safety Administration. Paper number 17-0268.
- Eggers, A., Ott, J., Pipkorn, B., Bråse, D., Mroz, K., Valdes, F. L., ... & Peldschus, S. (2017). A New Generic Frontal Occupant Sled Test Set-Up Developed within the EU-Project SENIORS. In 25th International Technical Conference on the Enhanced Safety of Vehicles (ESV) National Highway Traffic Safety Administration. Paper number 17-0261

## Latest publications

- Wisch, M., et al. (2017). "Road traffic accidents involving the elderly and obese people in Europe incl. investigation of the risk of injury and disabilities." Deliverable Report D1.2.
- Fiorentino, A., et al. (2016). "Behavioural aspects of elderly as road traffic participants and model split." Deliverable Report D1.1.
- Burleigh, M. (2017). "Introduction of a New Elderly Anthropomorphic Test Device." Carhs Presentation.
- Burleigh, M. (2017). "EC SENIORS PROJECT (Safety Enhanced Injury for Older Road Users)." BSI committee meeting Presentation.
- Zander, O., et al. (2017). "EU Project SENIORS: Evaluation of test tools for an improved assessment of pedestrian and cyclist injuries." Carhs Presentation.



## Partners



For further information:

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