



CONSOL – CONCerns & SOLutions
Road Safety in the Ageing Societies

Synthesis & Recommendations

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Deliverable 6 – Summary Report



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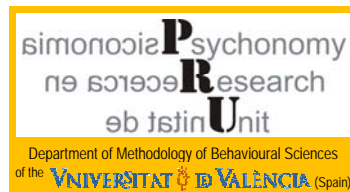
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This report is a summary report of the findings produced in course of the CONSOL project.

The project

As personal mobility has increased and is now seen as an acquired right, future transport policies have to be designed inclusively and enable all segments of the ageing European populations to stay safely mobile and lead autonomous lives as long as possible, as outlined in the Commissions White Paper.

With contributing partners from 8 European Countries an interdisciplinary research approach for analysing mobility behaviour, mobility needs and road safety of the growing group of older road users has been applied.

CONSOL aimed at advancing knowledge by combining current knowledge on mobility and safety with newest evidence from basic research (e.g., gender studies, social gerontology & findings on health & functionality with age), while also covering safety issues of seniors (e.g. single-pedestrian & non-crash public transport accidents). In view of urban infrastructures and situations, which pose risks in public environments, Best Practice Analysis and discussion of feasibility of measures have been performed. This has been done by analyzing the roles of the different relevant societal actors and stakeholders in regard to senior road user safety. Insight into decision and policy making processes has been provided.

The general objective was to promote and ensure safe mobility for all segments of the increasingly heterogeneous ageing European population in course of the following work packages:

- Advancing the current understanding of mobility needs and safety issues (with focus on different socio-economic variables)
- Covering under-studied knowledge gaps within this field (e.g.: single-pedestrian and non-crash public transport accidents)
- Mapping and analyzing the interplay of the different involved stakeholders and players, whose actions and decisions influence the creation and success of transport policies from a political perspective
- Best Practice Analysis of solutions for safety management of senior road users with focus on questions such as feasibility, relevant stakeholders, implementation)

The produced results help to understand the roles and responsibilities of the different societal actors and cover existing knowledge gaps in order to ensure that policy decisions are made on a solid ground, with a permanent focus on the heterogeneity of the group of older people in view of their mobility needs and issues.



The project	3
Introduction.....	5
1. State of the art.....	8
2. Mobility patterns among older road users.....	11
3. Accident analysis.....	14
4. Specific Accident Types	16
5. Decision makers in the area of senior road user safety.....	18
6. Legislation in driving licensing	23
7. Urban infrastructures	26
8. Conclusions.....	30
9. References	34
10. Further information on CONSOL	37

Introduction

The DG MOVE project CONSOL was aimed at providing an extensive view on the topic of road safety in the aging European societies. By applying a wide variety of different methodological approaches this topic has not only been assessed based on available statistical data in order to explore mobility and travel patterns, but also by applying qualitative approaches in order to integrate stakeholders and external experts into this highly topical research field. In this view there is a growing need for reliable data on both the mobility behaviour, including needs and barriers, and accident patterns among the older road users. This data is needed in order to be able to develop specifically adapted solutions and policies to counteract recent trends. Moreover specific types of mobility barriers, in regards to both legislative and infrastructural aspects, need to be evaluated and assessed based on available state of the art data, also by including relevant stakeholders and experts on an international level into the discussion. By focussing on specific fields, such as influencing factors on mobility patterns, by applying comparative data analysis, and specific accident types, such as single pedestrian accidents and non-crash public transport accidents, the CONSOL project provides insight on aspects, which are directly related to the road safety of senior road users. In this view the CONSOL project provides a sound basis for policy makers, legislators and researchers, which deal with safety and quality of life issues of older European road users.

During the 3 year lasting project (September 16th, 2011 to September 16th 2013) all tasks and deliverables have been finalised, including an extensive internal and external review process, ensuring the quality of the produced materials on a scientific level.

In order to integrate stakeholders and external experts from different fields, tangent to the areas of senior road safety and mobility of older road users, the project progress and results have been discussed intensely in two expert workshops. Initial results and the methodological approach of the CONSOL project have been discussed at the first stakeholder workshop in London, early 2013. This event provided the opportunity to evaluate not only first results and assess the feasibility of recommendations developed in course of the early project stages, but also to disseminate these findings among international stakeholders and experts in this research field.

In order to present all project results, the research process and needed adaptations and findings to external experts, a final expert workshop has been held in Vienna in the final project month of September, 2013. This closing event provided both external experts as well as the project team to discuss the findings, their relevance for policy and future research and to ensure a high level of dissemination among policy makers and other researchers by providing insight in the findings of the CONSOL project.

Although the work plan has been adapted to the ongoing processes in order to integrate findings of the initial work packages in the subsequent tasks, the final deliverables had to be delayed in order to allow comprehensive quality assurance process, but still there were no further delays to the general project timeline.

By applying an interdisciplinary approach on mobility behaviour and mobility needs of the growing group of older road users current knowledge on mobility and safety has been combined with newest evidence from basic research (e.g., gender studies, social gerontology & findings on health & functionality with age) with strong focus of safety issues specifically relevant for older road users. Starting with a comprehensive literature review, analysis of accident and mobility survey, expert interviews and best practice analysis the different tasks of the project covered a wide variety of different research methods:

Basic research and state of the art

In the course of the first work package (WP 1) a comprehensive state of the art analysis on demographic changes and transport in Europe has been performed in course of a literature research. The results of this deliverable provided the basis for the subsequent work packages, providing the theoretic basis for hypotheses and current scientific knowledge from various fields in order to guide the discussion on research questions.

Data analysis

Work packages 2 and 3 of the CONSOL project used current travel survey data and accident data to provide new insight, based on the research questions and hypotheses of the project.

WP2: Mobility patterns in the ageing population - Comparative study with travel survey data: focuses on travel survey data to comprehensively assess the mobility patterns of older European road users and provide insight on relevant factors influencing travel behaviour.

WP3: Accident patterns in the ageing population: was comprised of two different tasks that aimed at assessing accident patterns in the ageing societies on an international level.

Task 3.1 is aimed at a traditional analysis and review of exposure data with a focused perspective on different travel modes and differences in the partner countries by also taking different sub groups of older road users into account.

Task 3.2 is specifically aimed at special accident types that are considered to be of special relevance to the older age groups such as single pedestrian accidents and accidents in public transport with no crashes involved, which have been hardly investigated yet.

Evaluation and inclusion of external experts and stakeholders

In course of WP4 of the CONSOL project decision makers in the area of senior road user safety were mapped in a cross-sectoral approach to not only identify different stakeholders and relevant experts but also to be able to integrate external expertise (expert interviews) in the main research questions of the project such as: information on drivers licensing, national policies, infrastructural aspects and recommended solutions.

Best practice analysis and recommendations

In WP5 current practices in legislations on aged based population screening in European countries were analysed, and a transnational assessment of current urban infrastructures allowed gathering best practices and recommendations.

Task 5.1 focussed on the mapping process of different legislations in Europe for age based driver licensing including methods used, costs involved and evaluated outcomes and effects leading to evidence based recommendations on an international level.



Task 5.2 aimed at evaluating the urban infrastructure in the partner countries based on tools assessing safety risks as well as usability and accessibility for older road users. In addition best practices have been presented based on the results of already finalised EU projects.

1. State of the art

The increased longevity in the 20th century is a major social advance comparable to the reduction of child and infant mortality in the 19th century. This rapid ageing of our populations poses both great opportunities, but also significant challenges. The opportunities, sometimes termed the longevity or demographic dividend (Murphy & Topel, 2006; O'Neill, 2011), range from the personal (increased wisdom and strategic thinking) through to the societal and the financial: the longevity dividend was estimated to add £40 billion to the UK economy in 2010. The challenges arise from increasing levels of age-related disease and disability, economic vulnerability and negative societal attitudes to ageing (ageism) and further complexity is added to the picture by one of the key hallmarks of later life, increased inter-individual variability. Increased complexity is therefore a defining characteristic of later life, and it is not surprising that this complexity requires a more sophisticated palette of options for the transportation system as well (Coughlin, 2009).

In this regard the state of the art analysis performed in course the of the CONSOL project focussed on the following aspects to take all aspects of ageing and transport into account:

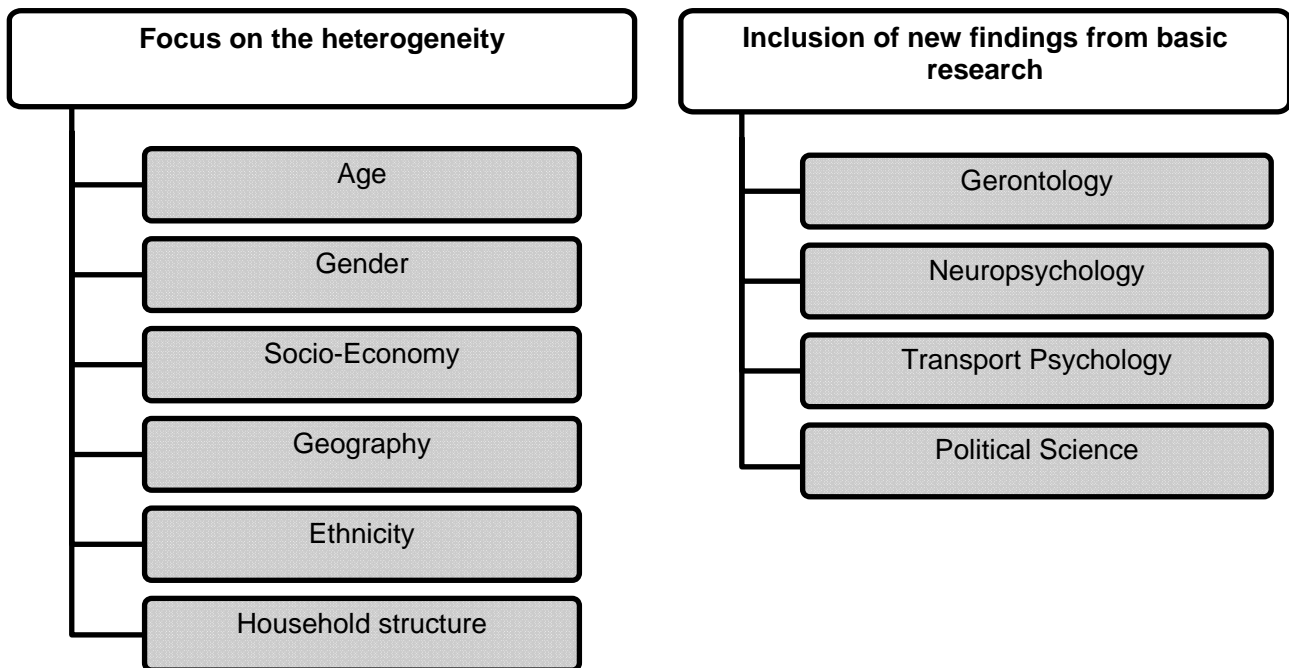


Figure 1: Approach of the CONSOL state of the art analysis

In Europe, the proportion of those aged over 65 as a percentage of the population aged 20-64 years, will double between 2010 and 2050 according to Eurostat projections (Lanzieri, 2011). It is assumed to have an impact on many factors, for example, travel demand, infrastructure needs, traffic safety, and climate impacts. Older people are a heterogeneous group and measures to increase their safety and mobility should acknowledge that.

Besides ageing, demographic change is also characterised by individualisation, visible, for example, in an increasing share of single-person households and alternative living arrangements, and by internationalisation (a growing share of people with an immigration background in the European population). Previous research activities have often resulted in recommendations, policy advice or measures that neglected the diversity and heterogeneity of old and ageing populations. Policies lack gender sensitivity even if we know that the majority of the older population is female and that mobility in old age is experienced and lived differently by men and women. Similarly, economic, ethnic and cultural, and geographic variations are often neglected.

Available literature shows that older people are making more trips compared to earlier cohorts of older people, especially in the leisure category and by car. Reasons for this development are better car access, better health and more active life-styles (Banister & Bowling, 2004; Hjorthol et al, 2010; INFAS & DLR, 2010). An increasing share of older people will keep driving until an advanced age leading to beneficial developments such as less social exclusion, more mobility and overall well-being. This while also providing safe transport for others, all older drivers are safe drivers and not a threat to other road users (e.g. Dellinger et al, 2004; Evans, 2000; Lafont et al, 2010). Nevertheless there is a higher risk of serious injury related to higher fragility involved leading to a need for better occupant protection by vehicle adaptation and technological advancements.

In regards to gender it has been shown that older women tend to give up driving too early, because they lack confidence or are discouraged by others (Rosenbloom, 2006; Siren & Hakamies-Blomqvist, 2005). Increasing women's confidence and experience in driving to keep older women safe and mobile imply a strong need for future research. Studies show that there are strong interactions of female gender and other socio-demographic variables such as lower income (Dubuis et al, 2007), belonging to an ethnical minority (Kim, 2011), or living in a single-household (Nilsson et al, 2011) that have different mobility implications for older women and men.

Geography also has a proven influence on mobility needs and behaviour; especially rural residents suffer from transport deficits and highly depend on others regarding their mobility needs (Ahern & Hine, 2012; Hanson & Hildebrand, 2011). High-density urban areas provide better conditions to maintain mobility in older life (Delbosc & Currie, 2011; Kim, 2011; Schwanen et al., 2001), but perceived danger is a major concern (Föbker & Grotz, 2006; Haustein & Kemming, 2008) often underestimated by experts (Risser et al., 2010).

While studies on mobility and ethnicity are very limited existing studies show that immigrants have less access to a car, and face more transport deficits, esp. immigrant women (e.g. Kim, 2011; Rosenbloom & Winsten-Bartlett, 2002). Differences can partly be explained with differences in income, residential location, etc., but some differences remain (e.g. Blumenberg & Shiki, 2007; Tal & Handy, 2010).

Household structure and living circumstances are another relevant factor in assessing the mobility of the older population. Living in single-households is associated with lower car access, lower satisfaction and a lower level of mobility for older people, but especially women and the older old live in single households. Older people's leisure activities (Haustein, 2011) or general mobility (e.g. Evans, 2001; Schwanen et al, 2001) increase with decreasing household size when other factors, such as age and gender are controlled for. Living alone has different consequences for older men and women (D'Ambrosio et al, 2008; Oxley et al, 2010; Nilsson et al, 2011) and for different age groups (Scheiner, 2006). Interactions of gender, age and household-variables need to be considered in this regard. The existing heterogeneity can be addressed by segmenting older people based on several variables at once with different approaches already found applying clustering based on mobility behaviour (Aigner-Breuss et al, 2010), sociodemographic variables (Hildebrand, 2003), health (Bell et al, 2010), and attitudes (Haustein, 2012) (see figure 2).

	Aigner-Breuss et al., 2010	Hildebrand, 2003	Bell et al., 2010	Haustein et al., 2008	Haustein, 2012
variables	car use	socio-demographic and household variables	health, household structure, occupation	socio-demographics, infrastructure, mobility-related attitudes	socio-demographics, infrastructure, mobility-related attitudes
segments					
Car oriented but restricted in mobility	Older people who predominantly use car (66%)	Disabled Drivers (5%)		Restricted Mobiles (11%)	Captive Car Users (24%)
Car-oriented, highly mobile		Affluent Males (39%) Mobile widows (29%)	Mobile persons (44%)	Mobile Car-Oriented (20%)	Affluent Mobiles (23%)
Open to all transport modes	Selective car users (19%)		Slightly restricted mobiles (26%)	Self-Determined Mobiles (21%)	Self-Determined Mobiles (30%)
Captive public transport users	Older people w/o access to a private car (15%)	Mobility Impaired (12%)	Highly restricted mobiles (30%)	Pragmatic PT-Oriented (15%)	Captive Public Transport Users (23%)
others		Workers (11%) Granny Flats (4%)		Bike-Oriented (19%) Eco-Friendly PT-Oriented (14%)	

Figure 2: Segments of older road users by used variables

Ageing and transport is often presented as a policy issue located in the transport sector. It is a multifaceted challenge, but one that also has the potential to afford significant economic opportunities for the European Union. These may be either through the elimination of unnecessary morbidity and institutionalization of older people by providing access to age-attuned transport, but equally the complexity of the market provides opportunities for new markets and technological developments for European industry. Knowledge-based policy making originates from several disciplines. Similarly, the potential solutions need to be realized on different sectors instead of being limited to the transport sector. The disciplines having a key role in producing relevant knowledge to the policy making needs regarding ageing and transport include naturally research on traffic behaviour, but also social and political sciences, gerontology and geriatrics, and neuropsychology. In order to understand the challenge the societies are facing sufficiently, it is necessary to have an up-to-date, multidisciplinary comprehension of the nature of the issue. Better design and maintenance of the physical environment as well as better infrastructural conditions and safe alternatives to the car need to be provided.

2. Mobility patterns among older road users

In course of the CONSOL project no new data was collected, hence analysis was based on the already available substantial data about the mobility and safety situation of older people in Europe. Empirical results from data collected in the course of the SZENAMO survey, the French FNHS and FNTS surveys, the KITE survey, the SIZE survey as well as the Spanish MOVILIA survey served as a comprehensive basis for assessment. With such large, different and heterogeneous data sets it was especially important to resolve a detailed research design, to ensure a comparable level of data analysis as well as to value the specific focus of each survey. CONSOL therefore conducted a threefold approach. The first level concentrated on the production of simple, but comparable analysis of distributions and mobility patterns. The second level aimed at obtaining findings about the relation between mobility patterns and problems occurring. The third level focused on the specific emphasis of each survey.

<i>Level 1: Comparisons between all participating partners/available data sets</i>	<i>Level 2: Comparisons between at least between two partners</i>	<i>Level 3: In-depth analysis of single data sets</i>
Description of data sets by utilizing general available demographic data Descriptive comparison of physical impairments Descriptive comparison of driving abilities Descriptive comparison of mobility behaviour	Descriptive comparison of general health status Descriptive comparison of physical fitness Descriptive comparison of modal split Questions on differences regarding: age groups, gender, place of living, size of household, employment, mobility patterns	Analysis of the particular focus of each study providing the opportunity for hypotheses testing and more complex statistical analysis. Effects of different factors (impairments, gender, etc. on mobility behaviour)

Table 1: Mobility survey data analysis approach

Age effects are significant in all countries. Results of the CONSOL analysis show, that the age of 75 represents an inflexion point in patterns of mobility, which was also identified in former studies. It must be kept in mind that most data analyses use age groups to simplify presentation and therefore this inflexion point has to be considered as a period of a few years from 75 to 79. This in turn needs to be set within the context of health and impairments. With rising age, in general, health declines with a rising number of impairments and health issues being observed. Health factors are most influential on the mobility of the elderly and older age groups. Statistics show that chronological age itself does not necessarily point to a decrease in mobility, especially for those not affected by debilitating health issues (see figure 3, example for Austria).

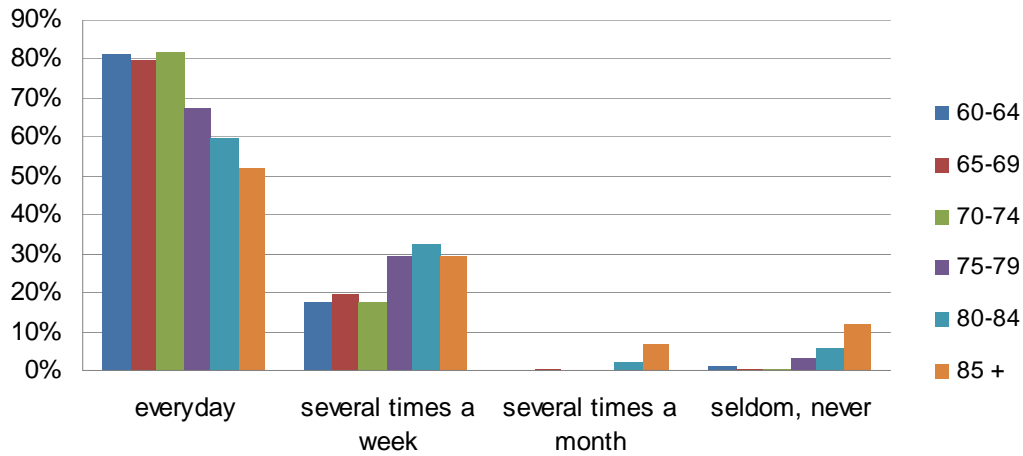


Figure 3: Frequency of leaving home by age group, AUSTRIA

Gender proves to be a significant factor with regard to the mobility behaviour and the attitude towards certain modes of transportation. Women show a lower level of mobility, but the more important difference lies in actual mobility patterns, which differ from men. CONSOL suggests that there is a gender difference in mobility of older people, but this difference mostly stems from the special importance of the car for men (see figure 4, example for Sweden), whereas women show a higher variety in modes of transportation, especially in view of public transport.

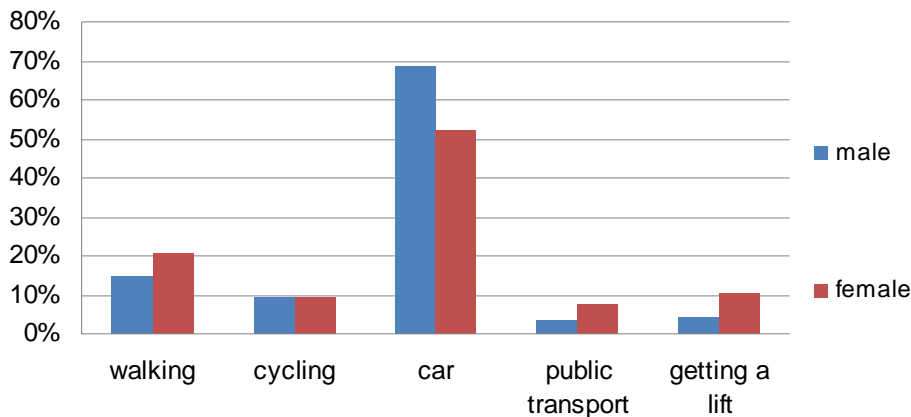


Figure 4: Preferred mode of transport by gender, Sweden

The car is the most preferred mode of transport in most of the observed countries, with a shift from being a driver to being a passenger with rising age. This dependency on the car is a crucial point, being a mode that can be more suitable for older age groups if, for example, public transport is not available. But cars have to be available and the driver licence maintained. If the licence is terminated, this dependency can lead to isolation and immobility. Other modes of transport differ by country, for example in Austria, walking is rated as the most preferred mode of transportation, with the car being less important in comparison (urban sample), riding a bicycle is very important

in the Netherlands, the Swedish population rates walking second, the car again being the most preferred mode of transportation.

A core finding of the mobility pattern analysis is the importance of subjective, or self perceived health status. This factor was identified in the SZENAMO survey, the Spanish Movilia survey as well as the SIZE survey. The general assessment of self-perceived health is good in all samples; the share of those who are dissatisfied with their own state of health is rising mostly from 80 years on. A poor perception of health has a direct effect on mobility, suggesting that if a person perceives his or her own health as poor on a subjective level, he or she will exhibit a lower level of mobility. Another interesting inference can be drawn. Self perception of health dominates other factors. Meaning that if a person reports having impairments, but rates his or her health as good, this person still shows a high level of mobility regardless of the impairment. Motor impairments account for a significantly higher share in the oldest age group with, for example, a percentage of nearly 50% suffering from restricted mobility due to some kind of motor impairment in Austria. This is also observed in the Netherlands, Sweden and France, where almost 60% of population aged more than 80 years reported to suffer from impairments. Sensory impairments (reduced eyesight, hearing) are rather widespread, but do not affect mobility in the same manner as motor impairment. There was no gender effect measured for impairments.

Impairments do have an effect, but do not automatically cease mobility. Findings point to a shift from leaving home everyday to leaving home only several times a week. In the Czech Republic 10% of non drivers report not driving because of sickness or impairments (main reason is not having a licence). In general it seems more appropriate to talk of a mobile older population, with a decline only in older age groups, driven by motor impairments or accompanied by a poor health perception. The SZENAMO dataset provides data about the assessment of opportunities for using different modes of transport. This perception of opportunities is in general quite high, especially for walking and driving a car. Cycling shows a rather poor perception, whilst opportunities to use public transport is positively assessed in urban areas and rather negatively in rural areas in Austria. In Sweden the opportunity to drive a car is high, in comparison to Austria and the Netherlands. The car was rated as the most important mode of transportation in most of the countries, but it is not available for all senior citizens. Thirty percent of Czech seniors report to have no car available and 31% percent of those having a car at their disposal report not having made any trip the in the past 8 weeks. Retirement shows different influences in the data sets available. In Austria and France retirement has no significant influence on mobility. In the Netherlands and Sweden transferring into retirement does have a significant effect, but only of minor strength. Spanish data shows that mobility is changing to a lower frequency and shorter distances travelled from home.

The findings of the comprehensive study on mobility patterns in the ageing European populations provide comprehensive insight, not only to the state of actual mobility behaviour in relation to a wide variety of influencing factors, such as gender, age and health, but also on data availability and the way certain variables are assessed in the course of social surveys in the fields of transport and mobility. This study can provide some vital recommendations for future research endeavours in these fields. Age itself is much less a predictor of mobility than has been assumed. Mobility only shows a strong decline after a turning point at around 75 years, until then people are mobile, but their mobility does not necessarily follow the same patterns. Work accounts for a high number of kilometres made per day or per week, but even when people are retired, the frequency of trips only decreases strongly about 10 to 15 years after retirement.

Sensory impairments do not show a strong effect on mobility in data available to CONSOL. Limited eyesight or hearing abilities are barriers which can be managed or compensated; motor impairments on the contrary are a severe threat to mobility. Data about the impact of different impairments are rare and therefore should be the focus of future studies.

3. Accident analysis

The traffic accident involvements for different older people sub-groups have been one major focus of the CONSOL project. Comparisons were made between transport modes, demographic subgroups and accident locations both within and between countries. Data from five countries were analysed (Great Britain, Denmark, the Czech Republic, France and Spain) with data from STATS19 (GB), Road Directorate (Denmark) and the CARE database (Czech Republic, France and Spain).

Differences in population size, modal choice and distances travelled produce variations in the casualty figures of different countries. The direct comparison of severity ratios between countries is difficult due to differences in the severity definitions and changes to these definitions over time. Throughout the analysis older people casualties have been split into three age categories (65-69, 70-79 and 80+). Differences in population size, modal choice and distance travelled produce variations in the casualty figures of different countries. The direct comparison of severity ratios between countries is difficult due to differences in the severity definitions and changes to these definitions over time.

However, some high-level trends were identified. The decrease in killed and seriously injured (KSI) casualties in all five countries between 1994 and 2010 indicate encouraging road safety improvements. This improvement was also found in KSI rates per million population in four of the five partner countries (see figure 5).

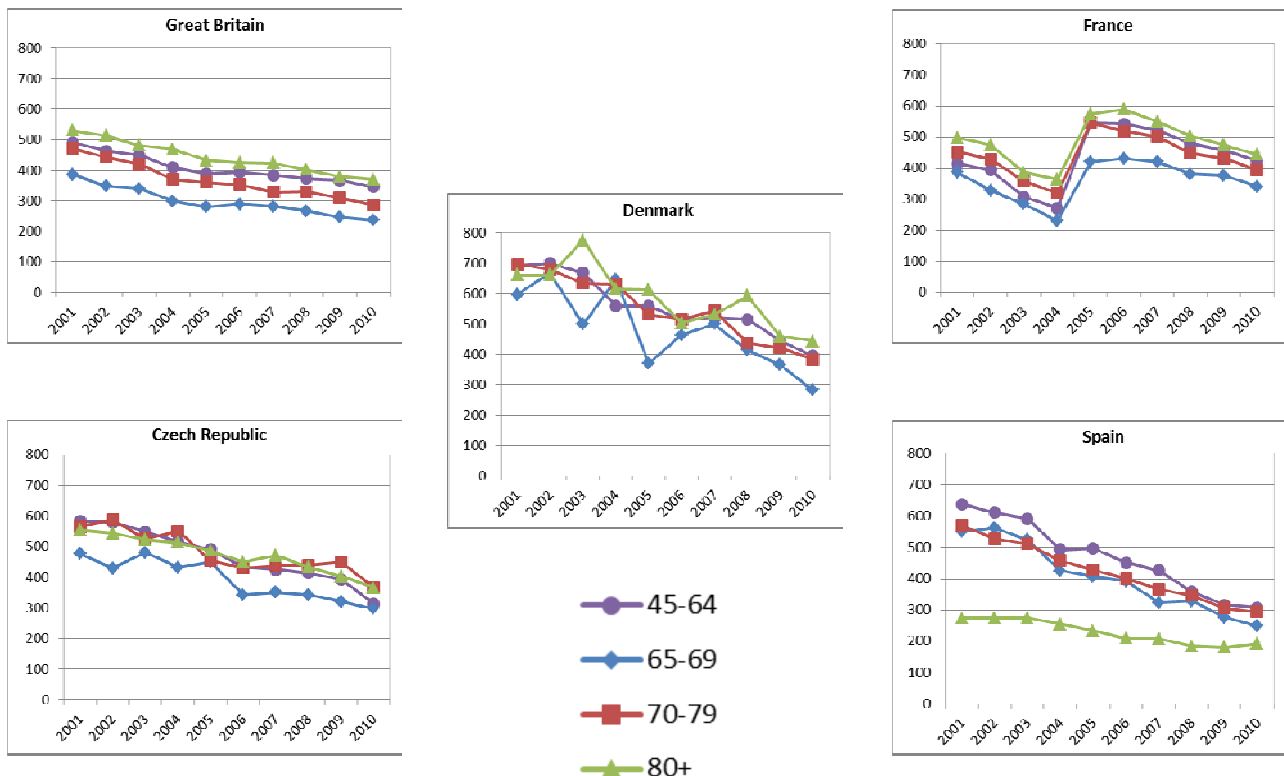


Figure 5: KSI rate by age group and year

Severity ratios are highest for road users aged over 80 years; this illustrates their physical frailty and greater propensity for serious injury when involved in a road accident. Road safety interventions should focus particularly on injury reduction mechanisms for this at-risk group.

Walking and being a car occupant are the major transport modes for older people. In each of the assessed countries over 40% of casualties aged 65-69 were car drivers or passengers, but the proportion of casualties which are car occupants decreases as age increases for all countries. A much larger proportion of casualties in the 80+ age group were pedestrians than those aged 65-69. This result may imply that as age increases vehicle use decreases and walking increases.

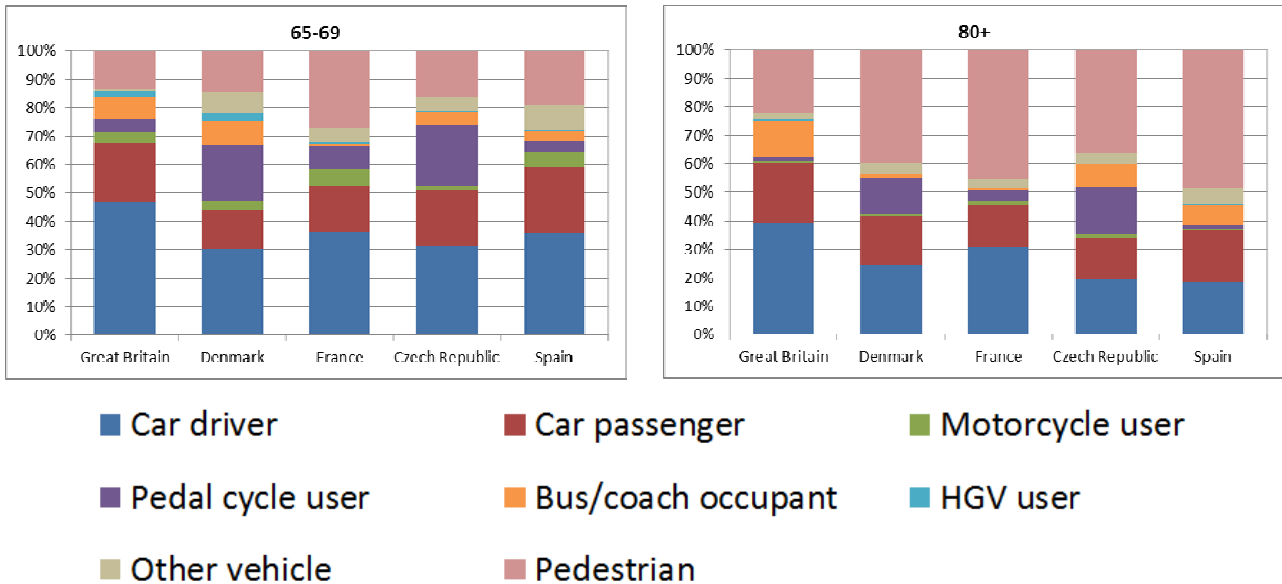


Figure 6: Proportion of casualties by transport mode (2010)

Pedal cyclists account for a much higher proportion of casualties in Denmark and Czech Republic than the UK, France or Spain (but casualty numbers are smaller and hence proportions are subject to greater fluctuation). Compared to the other countries, a very small proportion of casualties are bus/coach occupants in France.

Analyses of casualty rates for Great Britain and Denmark split by transport mode showed that individuals aged 70+ travel the least kilometres per year using the transport modes ‘walking’ and ‘bicycle’; however these individuals have the highest KSI casualty rate for these two transport modes. Similar analyses are required for other countries to inform conclusions on the relative risk of different transport modes for older road users. Given that the fastest growing population group in many countries is those aged 80+, travel surveys should be adjusted in such a way that finer differentiation between older road users are possible (e.g. 65-69, 70-79 and 80+). This would permit the comparison of the relative risk per kilometre travelled using a particular mode for all countries, an analysis which currently could only be performed for Great Britain and Denmark.

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National differences in severity definitions make comparisons of casualty trends between European countries difficult. This finding leads to a need for unification of severity definitions across Europe. A unification of fatal severity definitions across Europe has already begun but there is still a discrepancy between the definitions of serious injuries. In addition there is a number

of different analysis methods (e.g. casualty counts, casualty rates) and results are often not comparable between countries due to these circumstances.

In conclusion a number of aspects regarding data availability and data structure point out a strong need for unification and adaptation of data collection methodologies. The difference in severity definitions makes comparisons of casualty trends between European countries difficult. A process of unifying fatal severity definitions across Europe has already begun, but there is still discrepancy between the serious definitions. In addition the number of different analysis methods (e.g. casualty counts, casualty rates) and corresponding results are often not comparable between countries.

Population estimates show that over the past decade the age group 80+ has increased substantially in most countries leading to an increased need to adapt and improve safety measures for this specific group. Casualties per million miles travelled is high for casualties in late teens/early twenties and decreases as age increases until over 70 years when the rate begins to increase again. In order to account for the proven heterogeneity of the older age groups future travel surveys should allow for better differentiation in travel patterns beyond the age of 65. The number of older people is growing rapidly (especially those aged 80+) and there is a need to better understand the transport modes used by these individuals.

Transport modes proved to be an important factor in view of casualties among older road users. The majority of older casualties are car occupants or pedestrians. In GB, older individuals travel the fewest miles per year using the transport modes 'walking' and 'bicycle'; but these individuals have the highest KSI casualty rate for these two transport modes. In conclusion, despite positive reductions in the number of older casualties, the growing population should put them on the agenda of policy makers as a target group for interventions which are likely to benefit road users of all ages.

4. Specific Accident Types

The development of a traffic system that is age-attuned needs to take account of both mobility and safety issues, in particular in terms of interventions which lead to a change in the relative proportion of modes of transport utilized, as has been postulated for the impact of medical screening of older drivers (O'Neill 2012). From a safety perspective, it is becoming clear that the statistics for traffic-related injury have been dominated by impacts between motorized vehicles and either other motorized vehicles or unprotected road users to the point of neglecting other significant forms of traffic-related injury.

Two particular areas of concern in addition to the more well researched aspects of accident patterns in the ageing population are those of non-collision injuries in public transport and single pedestrian accidents. Although the research base for these forms of accidents is slender, the data are consistently suggestive of a significant need for both concern and further research, and to ensure that the factors underlying these accidents are addressed so as to enhance preserved safe mobility for older Europeans. A particular impetus is also given by the possibility that current policies in some European countries, such as medical screening of older drivers, may give rise to increased use of both public transport and walking.

A search was undertaken on the Transportation Research Board TRID, MedLine (PubMed), CINAHL and PSYCHINFO databases using the search terms: a) 'non-collision', bus, public transport, injuries, accidents, and b) falls, older people, single pedestrian accident. The resulting papers were screened for relevance to one or both topics.

One of the earliest studies reviewed accident data over a period of 12 months supplied by 30 bus operators, and covering about 30000 vehicles in the UK in 1980 (Transport and Road Research Laboratory 1980). Fifty-six per cent of the passenger injuries were sustained in non-collision accidents and 43 per cent of these occurred to passengers who were estimated to be over 60 years of age. This general pattern is reflected in research from Sweden, USA and Ireland. Although falls among older people have been recognized as a significant public health issue for many decades in Europe, a relatively new interest in traffic medicine is the extent to which these occur outdoors and particularly in geographical areas which can be considered to form part of the traffic environment.

The greatest challenge to delineating the extent of the problem is that these injuries and deaths are poorly captured in official statistics: most road traffic accident databases do not capture single-pedestrian accidents, and most falls and hip fracture databases do not capture the location of the fall, whether indoors, in garden/yard, or the traffic environment. This is despite the fact that ICD-10 classification systems commonly used in the developed world can code for an outdoor fall, but is frequently not recorded.

One of the largest studies available, (MOBILIZE in Boston USA), is a longitudinal analysis of a population aged 70 and over which indicated that indoor falls occurred mostly among the older old, and outdoor falls occurred predominantly among the younger old and fitter people with higher levels of activity. Indeed, this heterogeneity is also likely to apply also to measures to prevent both falls and single-pedestrian accidents among older people.

There is mounting and consistent evidence, albeit on a slender research portfolio, that non-collision injuries on public transport and single pedestrian injuries represent a significant risk to the health and well-being of older Europeans. It is of critical importance that traffic injury recording systems are broadened, to include both types of accidents.

5. Decision makers in the area of senior road user safety

Today there is a significant body of knowledge on several issues concerning senior mobility and safety. However, we know little about how knowledge translates into policies, and why certain policies are implemented while others are not. There is a clear need to better understand policymaking and the institutional and political conditions influencing implementation. The overall aim of the present study was therefore to map and analyse societal actors in the field of senior road users in seven European countries: Austria, the Czech Republic, Denmark, France, Spain, Sweden and United Kingdom. Besides getting descriptions of the collaborations and important actors in each country, the study also aimed to increase the knowledge of what forces may facilitate and hinder implementation of important policies and measures.

The mappings had two strategic starting points – the main national governmental organisations dealing with transportation and national senior organisations. Based on the results of the initial mapping, a complementary mapping was made in order to explore important collaborations and barriers and facilitators in the field of ageing and transportation. Interviews, documents and homepages were the main sources of data.

- National transportation policies: Generally older road users and the issue of ageing are mentioned in the national transportation policies of the mapped countries and thus regarded to be of importance. However, seniors often seem to be incorporated in the categories of persons with disabilities or vulnerable road users in safety and accessibility policies and seldom as an area of focus by itself. There are nevertheless variations between the countries in how senior road users are incorporated in national transportation policies.

Country	National transportation policies in relation to seniors
Austria	Austrian Transport Master Plan, mentions older road users in relation to accessibility and usability. The description of Austria illustrates how senior road users are mentioned at different policy levels.
Czech Republic	Seniors not mentioned in general transportation policy. In National Road Safety Strategy seniors are put forward even if issues of the ageing population will not hit the Czech rep. significantly until 2030
Denmark	Older road users mentioned in the national action plan for 2013-2020 for traffic safety, however not regarded as one of ten prioritised areas, like for example young drivers are. Seniors mentioned in policies for accessibility for disabled/mobility impaired persons.
France	Disabled persons and those with reduced mobility - mentioned in relation to transport rights in the Transport Code. In the Road Code the medical conditions that are not compatible with driving are established. Age is not identified in the list as a function that requires specific interest.
Spain	The Spanish Road Safety Strategy 2011-2020 identifies vulnerable road users and safe mobility in urban areas as two of six priorities. Older road users are explicitly mentioned in these contexts.
Sweden	In Swedish transportation policy (prop 2008/09:93) disability, gender equality and children are highlighted. Seniors - shortly mentioned in relation to usability for persons with disabilities and public transportation; public transportation in rural areas and safety for vulnerable road users
UK	The policy of local transport – e.g. free bustravel for seniors, the policy of accessibility focuses on disabled people, also documents focusing on seniors on best practice examples. The policy of road safety can be explicated by the Strategic Framework for Road Safety which mentions the importance of car travel for senior mobility

Table 2: National transportation policies in the area of seniors

- National governmental organisations: The results indicate that there are variations in how governmental organisations deal with senior mobility and safety. In Austria, for example, there seems to be many activities focusing on senior road users while in Denmark, as a contrast, it is claimed in interviews that activities have stopped due to lack of resources. Generally, the results indicate that there is a lack of a specific focus on seniors who are incorporated in the categories of persons with disabilities/mobility impairments or vulnerable road users. With regard to single senior pedestrian accidents, the issue is highly prioritised only in Sweden.

Country	National governmental organisations in relation to seniors
Austria	A clear focus on senior mobility and safety. A wide frame on the issue....
Czech Republic	Ageing society no current problem. Some activities preparing for senior road users as a future important issue.
Denmark	Senior road users not a prioritized group. Explicit statements that authorities are not working with this group. Lack of resources
France	Older road users are not prioritized in French administration. Vulnerable road users, pedestrians of special concern in relation to safety. Disability of concern in relation to accessibility. Present work of including transport in future old age policy.
Spain	Specific strategies for senior pedestrians, drivers, public transportation – seniors are taken into account in policies. In the mappings - educational activities and work with driving licence issues
Sweden	Seniors - mentioned in some strategic plans of the Swed. Transp. Adm. However interviews give the same image that senior are not prioritized today in STA. There are activities and work focusing on senior single pedestrian accidents driven by The Swedish Civil Contingencies Agency
UK	United Kingdom. Little on-going work on older drivers at the main national transport authorities due to lack of resources.

Table 3: National governmental organisations in the area of seniors

- National senior organisations: The results indicate there are clear variations between the mapped countries in the work and activities of senior organisations with regard to mobility and safety. In some countries such as France, the involvement of senior organisations in traffic issues seem low while in other countries such as Austria, Sweden and Denmark the involvement seems higher.
- Barriers and facilitators: Several barriers were mentioned in the interviews. One important barrier was the lack of priority and focus specifically on older road users. This was viewed as an obstacle to get funding for activities focusing on senior road users. Another barrier was the lack of involvement of senior organisations in some countries, and difficulties of getting senior organisations interested in matters of transportation. The organisations cover a wide range of topics and traffic safety and mobility are often marginalised in relation to topics such as health, social and financial issues. A third important barrier mentioned was conflict of goals, for example, the goal of efficiency versus the needs of vulnerable users in public transportation. It is also brought up that in the planning of transport, commuting to work and freight traffic are prioritised and the main factors in socio economic calculations of benefits and costs. The loss of work time for a commuter who has to wait is incorporated in the calculations while the cost

for a non-working senior often is not. This means that measures improving the conditions for seniors in planning can be neglected.

Barrier	Examples/elaboration
Lack of economic and other resources	<ul style="list-style-type: none"> • The financial crisis makes it difficult to get funding • Difficult to get funding for senior road users • Difficult to get enough qualified staff • Having to rely on volunteers (NGOs)
Lack of priority of/focus on older road users	<ul style="list-style-type: none"> • Policies focus on disability and other vulnerable users but not specifically on older road users • The needs of older road users with mobility restrictions are believed to be covered by measures for disabled people, and healthy older road users are regarded as having the same status as any other road users • Single events and actions may take away attention from the problem as a whole
Lack of involvement of the users (seniors)	<ul style="list-style-type: none"> • Strong representatives of seniors is lacking in contrast to handicap organisations – senior issues are not put forward • Lack of interest in road safety and mobility in senior organisations. The organisations cover a wide range of topics so traffic safety and mobility is marginalised because health, social, and financial issues are prioritised • Senior organisations only organises a part of the senior population. Difficult to involve and reach seniors which are not members of senior organisations
Conflict of goals/disagreement between stakeholders	<ul style="list-style-type: none"> • Goal conflicts in public transport; efficiency versus the needs of vulnerable users • Emphasis on work commuting and goods traffic in public transport - senior issues can be neglected • Conflict between measures by technical staff and the citizens suggestions/needs • The dilemma of getting the needs of seniors integrated in policies while avoiding stigmatisation • No basic agreement between political parties and change of laws with the change of governments
Negative image of older road users	<ul style="list-style-type: none"> • Society can react negatively to older drivers accidents • Older drivers are afraid of losing their license and therefore reluctant to test their vision • Ageing is not seen as appealing. Inclusive design of vehicles is not easy to market.

Lack of knowledge/data	<ul style="list-style-type: none"> • Lack of research knowledge on the mobility/accessibility needs of seniors • Vague and challenging definitions of accessibility and mobility • Difficult to quantify the social benefits of measures • Research knowledge is not adapted in a good way to practitioners • Lack of detailed and structured data on accidents
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Table 4: Barriers in the area of senior's policies

Facilitators were not expressed as clearly as barriers in the interviews. Nevertheless, results indicate that the involvement of senior organisations can be a strong force in implementing measures. The collaboration between the National Society of Road Safety and the senior organisations in Sweden is one example of this. Our results also indicate that the existence of policies focusing on senior road users as well as (a) strong coordinating actor(s) which can legitimise issues of senior road users and mobilise other actors are important facilitators.

- Single senior pedestrian accidents: Generally this issue was not viewed as a high priority among the actors interviewed in the mapped countries. The issue were viewed as difficult to handle due to its multi-sectorial character and it was unclear which actors that ought to be involved. Traditionally, single senior pedestrian accidents have not been regarded as traffic accidents, still many actors needed to prevent these kinds of accidents are actors from the transportation field. At the same the focus with regard to fall accidents has been on indoor environments and single pedestrian accidents has frequently been left out. One exception to the inattention was Sweden were there was a strong mobilization among several actors on single pedestrians accidents. It seems that the work of a governmental commission as well as coordination work by governmental organisations had overcome some of the challenges of multi-sectoriality and brought actors from different sectors together.
- Senior public transport incidents and accidents: The results indicate that the issue of senior public transport incidents and accidents is not a key issue in any of the mapped countries. The activities and work within this area are fragmented rather than systematic.
- Driving licence issues and seniors: There are variations in the overall views on older drivers which seem to follow the traditions and practices in the respective country with regard to fitness to drive. In countries with restrictive policies (e.g. mandatory assessments of older drivers) several interviewees seem to view older drivers as a safety problem. In contrast, in countries where there are no mandatory medical assessments such as Sweden and United Kingdom, interviewees among the authorities clearly expressed that older drivers as a general population are not a safety problem. One clear result was also that senior organisations generally were against or critical towards existing mandatory assessments of older drivers. The issue of fitness to drive is broad and involves several practices beside the controversial measure of mandatory assessments. Examples of activities and practices brought up in the interviews were information, workshops, training and education. Many interviewees emphasised the importance of driving for older drivers and that prolonged driving could be essential for their mobility. In this context the opportunities of a graduated licence were put forward. Physicians were also mentioned as an important group to involve in the practices of fitness to drive.

Senior road users are recognised as a road user group of importance in most of the mapped countries. In the main national governmental transportation policies, issues of seniors were usually treated as an aspect of other broader road user categories: persons with disabilities/mobility impairments and vulnerable road users. In many cases this may be a fruitful way of organising

work and resources in a field of many different competing issues. However, this also means there is a need of complementary policies and work where different issues of senior road users are brought together and integrated. Otherwise, we believe, there is a clear risk that important questions and needs of the older population will be neglected. The mappings in this report indicate that there is currently in some countries a lack of this other kind of focus on seniors which can be viewed as one barrier to systematic and effective work aiming at improving senior mobility and safety.

A focus on seniors makes it possible to take everyday life perspectives into account. In everyday life, we use many modes of transportation and change between them. It is thus important to understand the *patterns of use* of transport in order to understand the overall mobility and safety of different groups of road users (see e.g., the report of work package 1 in the CONSOL project for segmentation of older road users). A lack of focus on seniors means that knowledge and measures on different modes of senior transportation may not be related to each other as well as there will be few efforts of integrative approaches of the role of transportation in everyday life for seniors.

Another general important result in the mappings which ought to be highlighted is the variation of the involvement and work of senior organisations. In some countries national senior organisations seem inactive with regard to transportation issues. This is of course a problem concerning the implementation of measures, as well as the incorporation of the user perspective in the planning and forming of the transportation system. There is a clear need to explore these results further in research.

There are variations in how the mapped countries deal with the driving licence issues. In some countries there are mandatory assessments at old age, in others not. On which grounds are the different kinds of practices implemented? For example, there is little support in scientific literature for the effectiveness of mandatory assessments of older drivers, but still it is implemented. Why? In order to get a better understanding of this matter we urge that there is a need for in-depth research focusing on policies, politics and actors focusing on driving licence issues in order to understand the implementation of practices.

One remaining question of the mappings is also how the policies and activities on a national level relate to the international level as well as regional/local levels. The CONSOL project focused on the national level and thus largely left out issues of other societal levels. Nevertheless, the mappings indicate that some issues are experienced to be difficult to work with on a national level, for example, incidents in public transportation, due to local variations. Also, sometimes there seems to be a gap between the national level and the local level where local actors can be frustrated by the lack of guidance or conflicting recommendations from the national level. These kinds of issues also need further research in order to increase the knowledge on implementation processes and how policies and activities on different levels can be formed to strengthen each other.

6. Legislation in driving licensing

Against the background of the aging population, the question of the fitness and safety of older drivers has been widely discussed. Research from various countries has indicated that licensing policies are not evidence based and tests that are commonly used to assess the fitness to drive show at best very low correlations with accident rates. Chronological age *per se* seems to be, in the case of mature drivers, at best only a weak predictor of safe driving performance. Yet, licensing policies based on chronological age are widely used and many countries have chosen to invest in age-based testing of driving fitness. More evidence based policies have been called for, both out of ethical and economic reasons.

In CONSOL, the different driver licensing policies in the 27 EU countries have been described and their effects assessed based on evaluation studies. The mapping of licensing policies in Europe indicates considerable heterogeneity of existing policies (see figure 7).

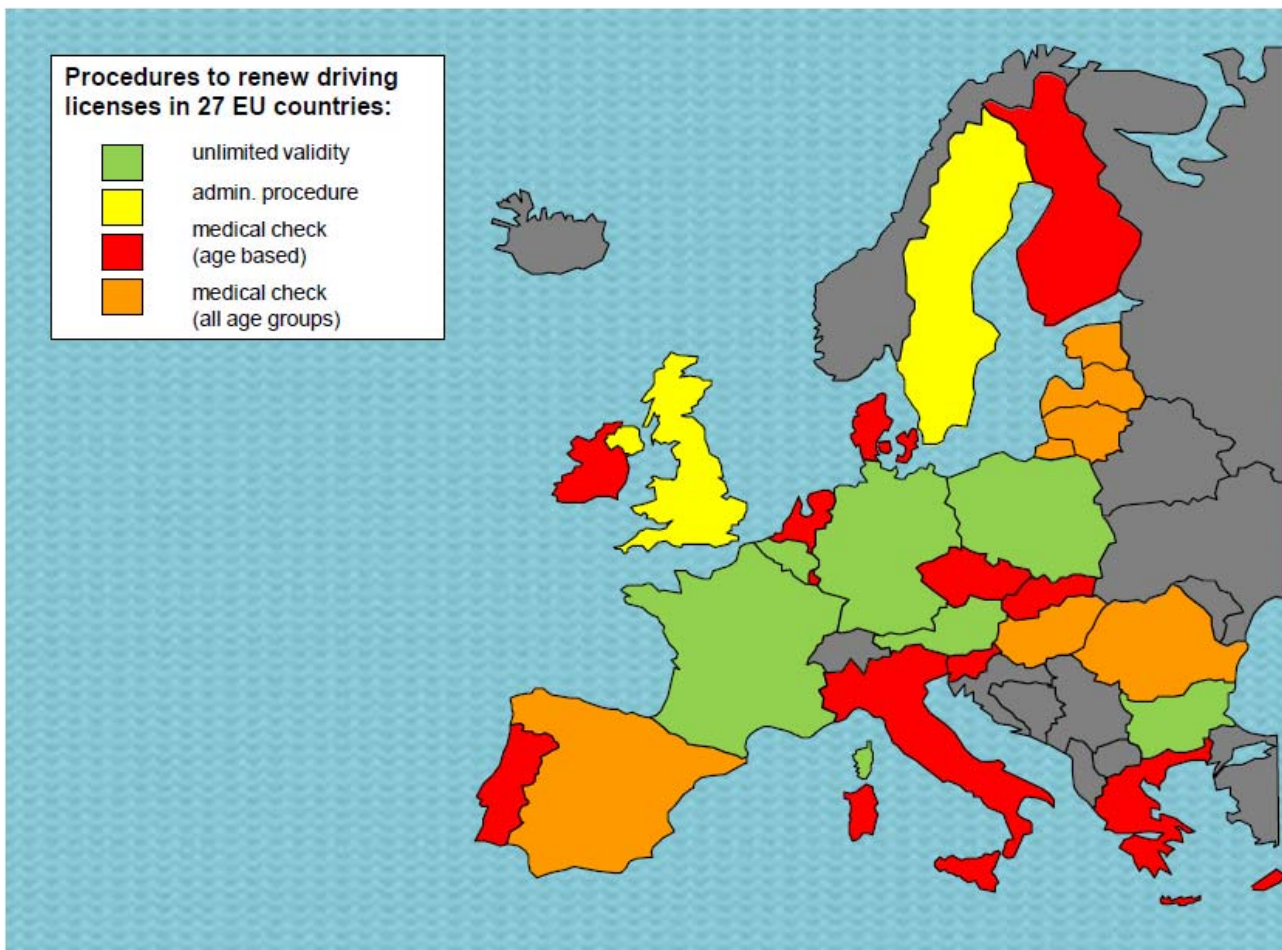


Figure 7: Types of driving licences in Europe

Six out of 27 countries, most of them in Central Europe, issue unlimited licences (Austria, Belgium, Bulgaria, France, Germany, Poland), and the licences issued by the remaining 21 countries vary greatly. In some countries licenses have to be renewed every 10 years, while in other countries the license has to be renewed for the first time at a specific age. In most cases the intervals become shorter with increasing age. Most of the countries that issue licenses require medical examinations (with limited validity) to renew the license. The methods used to assess the fitness to drive vary with regard to the testing procedures and the medical professionals involved, but

general practitioners have a dominating role. There is also a considerable heterogeneity regarding the direct costs paid by the licensee in connection with license renewal.

Based on a literature review regarding effects of age-based assessments of older drivers there is no evidence supporting the assumption that general age-based assessments have any proven safety benefits. However, the review of evaluation studies identified possible safety benefits of more specific measures, namely in-person renewal (as opposed to renewal by mail) and restricted driving. These effects were, however, all found in American studies and it is not clear whether all of them can simply be transferred to the European context. The few existing European evaluation studies all conclude that aged-based licence renewal is associated with negative safety effects for older people, because it triggers a shift from the car to unprotected modes of transport. In addition, driving cessation is associated with negative mobility and health related effects. Older drivers are a safe group of drivers and a general screening of the whole population of older drivers does also not appear as a reasonable societal investment. In sum, age-based screening implies large societal and private costs and decreases transport safety on a system level. To take away the licence would only appear justified if it was possible to reliably identify unsafe drivers. Existing measures, however, fail in that respect. Apart from the negative consequences for the older person who has to cease driving, the relatives, who have to take care for the older persons' future transport needs are also concerned. Finally, the GPs, when in charge of this decision, often find themselves in an ethical dilemma.

Previous research has demonstrated that older drivers per se are a safe group of drivers, and that they do not pose a threat to other road users' safety (e.g. Dellinger et al., 2004; Evans, 2000; Hakamies-Blomqvist et al., 2002; Haustein et al., 2013; Lafont et al., 2010). Against this background a general screening of the whole population of older drivers does not appear reasonable from a cost-benefit perspective. In addition, losing a driving licence has a number of negative outcomes for older drivers themselves with regard to safety, mobility and health. To take away the licence would only appear justified if it was possible to reliably identify unsafe drivers. The existing measures, however, fail in that respect. Apart from the negative consequences for the older person who has to cease driving, also the relatives, who have to take care for the older persons' future transport needs are concerned. Finally, the GPs, when in charge of this decision, often find themselves in a dilemma of not wanting to restrict their patient's mobility on the one hand and having concerns over the person's driving ability on the other hand.

It is recommended to shift the focus of managing older road users' safe mobility to prolonging older persons' safe driving careers, instead of restricting their mobility and exposing them to the higher risk of unprotected transport modes. Women especially often give up their licence when they are still fit to drive (Siren et al., 2004) and could be even more encouraged to do so by an extensive renewal procedure. If the population based health visits at certain ages are seen as a necessary investment, it is recommended these visits to have more meaningful scope than that of traffic safety only. Providing a general health assessment for seniors at certain age milestones, for example, would not only be less ageist but also serve a purpose in public health promotion and disease prevention.

In addition to political measures, technological advances in the development of driver assistance systems and autonomous cars are an option to support longer driving careers. The acceptance of new technologies, however, highly differs between different segments of older people, which should be taken into account (Haustein, 2012). Moreover, advanced driver assist systems have often been criticised for not being user-friendly with regard to an older target group, especially the human-machine interface (Gstalter & Fastenmeier, 2013).

Restricted driving should be considered as a means to keep older people with driving related deficits auto-mobile under specified conditions (e.g. for specified ways), instead of taking the

license completely away. This concerns especially drivers in rural areas, where alternatives to the car are not available or affordable.

Finally, voluntary driver trainings for older people have been suggested as a means to prolong older peoples' driving career (Gstalter & Fastenmeier, 2013). In a study with control-group design such trainings could be shown to be effective in improving the ability to master difficult traffic situations at an advanced age (Poschadel et al., 2012). In Austria there are initiatives organized by the Austrian Ministry of Transport and Innovation in collaboration with the national board of traffic safety such as the "Risk competence training for elderly motorists" project aiming at raising awareness and risk mitigation through developing individual compensation strategies regarding both mode choice and driving behaviour. These activities are based on voluntariness and practicability while avoiding medical or performance tests. In the future, the number of the oldest-olds will increase significantly as life expectancy increases. At the same time, the ageing new cohorts are likely to differ from the preceding cohorts regarding their health, functionality, and mobility patterns. With respect to the new cohorts, it is very likely that we will experience a significant increase in the number of older drivers as they are usually more experienced and more active drivers than their parents, and will probably continue to drive into old age (Haustein et al., 2013; Siren & Haustein, 2013).

Yet, the majority of older drivers choose to cease driving at some point of their lives. Recent research suggests that training and pre-planning giving up driving may mitigate the negative consequences post driving cessation (Musselwhite, 2010; Musselwhite & Shergold, 2013). As the risk of getting injured or killed is higher for older people as pedestrians, cyclists and passengers of public transport, it is also important to support older persons early enough in the safe use of alternative modes of transport to mitigate the end of their driving career and related feelings of dependence and restricted mobility. Some public transport providers offer respective courses, e.g. the Essener Verkehrs-AG (EVAG) 7 offers bus trainings for the generation 50+, which combine information and exercises, such as boarding and alighting a bus in a safe way.

It is further recommended that people with no access to public transport, or no ability to use it, should be provided with compensatory services, such as door to door service or taxi vouchers. The adequacy of car-sharing or more informal transport services for different segments of older people should also be considered. For details on good practises we refer to the CONSOL WP 5.2 report.

In the future, a higher share of older people will hold a license and keep driving until an advanced age. Based on the results it is recommended to shift the focus from restricting their mobility to prolonging older persons' safe driving careers. This should be supported by soft policy measures as well as technological advances up to autonomous cars. In addition, different kinds of mobility services have to be provided to ensure a high level of mobility after driving cessation. Taking into account the increasing heterogeneity of older road users, the various measures should be designed for and addressed to different target groups of older road users.

7. Urban infrastructures

Another objective of the CONSOL project was to analyse examples of practices aiming at managing the safe mobility of older road users in an urban environment. More specifically, good practices regarding accessible infrastructure and public transport from the perspective of older road users have been reviewed and safety issues relevant to older road users in an urban context identified. A tentative definition of a good practice was defined as a practice which has to be designed for older people (or people with reduced mobility), designed in cooperation with end users (older people), evaluated and sustained (duration of the initiative). Objectives of this best practice approach have been to review good practices in accessible and public transport infrastructure with the perspective of older road users, to identify safety issues relevant for older road users in an urban context to make recommendation for “senior friendly” cities in Europe.

Safety issues have been identified by utilizing the safety framework developed by Wretstrand & Marin-Lamellet (2011) in the ACCESS2ALL project, were assessed based on the ISO 14971 standard (Medical devices - Application of risk management to medical devices) and focussed on the level of risk, which was defined as the interaction between the likelihood of situations and the severity of injuries. In course of the process a strong focus was laid on at risk situations for older people especially in view of falls in the street and the public transport context and collisions on streets and in public transport contexts. Based on the above data sources the following major risk situations have been identified:

Risk of falls in the street context

- Falls on streets are mainly linked to the characteristics of the pavement: Uneven pavement is the major factor causing falls on streets, followed by slippery pavement (with external contributors like rain or ice).
- Non detection of stairs is only a limited factor in this context, except for cases of visual impairment.

Risk of collisions in the street context

- When walking, the probability for collisions with obstacles on the street is low. Mixed traffic can lead to issues, especially with vehicles with a low noise level (e.g.: scooters, bicycles, etc.)
- Crossing streets: involves a high risk level with a critical severity level, which is potentially higher if there is mixed traffic involved (cars, PT vehicles, bicycles).
- The issue of low noise vehicles (i.e.: electrics/hybrid cars) and the risk of non detection needs to be investigated further as this poses a risk especially for older people.

Risk of falls in the PT context

- Irregular flooring is especially an issue in this regard. Falls could have a frequent occurrence but the severity of the involved injuries is assessed to range from negligible to only minor.
- Main risks are falls on stairs in this context, due to functional disabilities or to a negative effect of crowds. The consequences involved are of high severity.
- In this context escalators are also presenting a risk for the older population.

Risks of collisions in the PT context mainly stem from

- The space shared by pedestrians and public transport vehicles
- The low noise level of modern vehicles (hybrid buses)

Results of the CONSOL project gave support to the fact that the older population is very heterogeneous. It has been shown that different segmentations of older people in subgroups is essential for understand the mobility needs and issues in traffic (Haustein et al 2013). These segmentations are based on several socio-demographic variables, mobility-related attitudes or mobility behaviour. Based on the four subgroups identified by Haustein (2012) the older population has been assessed in view of measures adapted to the specific needs of each group.

Captive car users: have rather good access to cars; they have low walking activity and have a negative feeling about public transport, walking and cycling. They are older than the affluent mobile and self-determined mobile sub-groups, they have more disabilities and live more often alone. People in this subgroup are more likely men living in peripheral areas.

Affluent mobiles: people in this subgroup have the highest car equipment level, a high-income level and the largest social network. They have a bad perception of public transport but are very keen to use soft modes like walking and cycling. These older people have a high feeling of mobility necessities; they often live with their partners and are less likely to have functional limitations. They finally also have better access to information and communication technologies, like mobile phone and internet.

Self-determined mobiles: in this subgroup, older people have good access to both cars and public transport and are very positive regarding walking and cycling. They more often live in areas where most of the facilities are easily reachable, often together with their partners, they are less likely to have functional limitations and have good access to communication technology.

Captive public transport users: these older people find it easy to use public transport in their everyday life; they have the lowest car ownership level and also the lowest income level. They are not keen to cycle at all and use walking in the context of the use of public transport mainly. They are older than the affluent mobiles and self-determined mobiles subgroups; they have more disabilities and live more often alone. Most of the persons in this subgroup are women and they more likely live in central areas; they have very limited internet access and only 54% of them have a mobile phone.

Based on this clustering of older people designing focused actions according to the typology of older people identified is strongly recommended as the safety of each of these sub-groups needs to be approached by specific measures (see table 5).

	<i>Captive car users</i>	<i>Affluent mobiles</i>	<i>Self-determined mobiles</i>	<i>Captive public transport users</i>
Personal schemes	+++	0	0	++
PT user training	+++	++	+	+
Public transport Information provision & travel planning	+	+++	+++	++

Pricing and incentive measures	+	++	+	+
Policies for older drivers (refresher courses, retraining sessions, etc.)	+++	+	+	+++
Health issues	+++	+	+	+

0 not concerned; + little relevance; ++ mild relevance; +++ high relevance

Table 5: list of measures by target group relevance

Captive car users: these older people should be targeted by public transport training at an early stage of their ageing process, in order to prevent them from being dependent on their cars; this means that the training programmes should be adapted to them, as they have low practice and expertise related to mobility by public transport services. Considering their low technology equipment level, they should be targeted for pre-trip information provision using conventional paper medium. Initiatives regarding pricing, such as England’s older person’s bus pass, are also very important for these subgroups of older people; because they have low income and live in suburban or rural areas. Finally, they should also be targeted by health issue initiatives and particularly the promotion of walking. Due to their functional level, the promotion of cycling is not recommended for them.

Affluent mobiles: public transport training and pre-trip information provision via web platforms should more closely target these older people, in order to improve their modal shift capacities. They can be interested by all the other categories of practice identified, as they get older.

Self-determined mobiles: these individuals can be interested by all the topics identified, with the exception of personal schemes.

Captive public transport users: this group is well identified in practice about public transport training and health issues, but it seems that for the future, they should be also be targeted by older driver training/refresher courses. Currently, this group consists mainly of women who don’t have a driving license. While it is considered that in the next generation of baby boomers, women will have a higher driving license rate but will be more prone to stop driving early, it is of great interest to develop actions that will encourage these women to stay active drivers, or to drive again if they have stopped.

More than 40 good practices have been collected in 14 countries, including the USA. Despite of having elaborated a formal framework for the selection of good practices examples, it has been rather difficult to make a selection without being subjective in the process. The documentation available about existing practices is quite sparse and difficult to access. From all the cases collected it can be observed that few initiatives really target older people in the considered context. Older people are most frequently included in the “people with disability” category in Europe. Initiatives dedicated to older people are more frequent in the health, well-being and social (generation sharing) areas and this seems to show that European society still perceives ageing as mainly a medical issue. The other important issue highlighted by this report is that older road users are mostly considered as a homogeneous group. It is very rare that initiatives, designed to improve older people mobility and safety, specify the characteristics of the older people who participate. Gender differences are not considered for the set up of the action planned but it usually comes to the result that participants are mainly older women, particularly if the action is concerned with public transport.



Based on the data available and the best practices collected it can be concluded that there is a lack of information on the targeted groups of older people and their respective needs in view of the identified risk situations. Most of the practices collected did not specifically focus on older people and their specific needs. Moreover most of the practices considered the older population as a homogeneous group and did not focus on the different sub-groups. This is a major issue as it has already been pointed out that different sub-groups have distinctly different abilities and needs when it comes to the issue of road safety. Therefore actions need to consider the heterogeneity of the ageing populations and target these by adapt measures to improve efficiency and sustainability by considering the accessibility design criteria for urban environment and planning processes as a basic need.

8. Conclusions

The results gathered in course of the different tasks, which are available in the produced deliverables, cover a broad field of issues, barriers and problems the sub-groups of the older populations in Europe are facing. While presenting the state of the art based on available literature, scientific data in regards to mobility patterns and accident statistics, a number of conclusions can be drawn in view of the data availability and ongoing practices and policies.

Data availability

In order to be able to provide an overview of accident statistics and identify mobility patterns and the consequent needs and issues influencing the mobility behaviour of older road users a sound data base is needed. Moreover data consistency starting from data collection methodology, sampling, available variables etc. are especially important for country comparisons and inference of found results. In course of the analysis process within the CONSOL project a number of issues arose in regard to both availability and consistency of the data used. In regards to the mobility pattern analysis based on travel survey data from the participating partners countries the following issues have been observed:

- Travel survey data availability is limited, especially in view of older road user mobility behaviour.
- Comparability is limited due to:
 - Different sample structures
 - Different variable sets and operationalisations and used concepts
- Quality of life variables and indicators allowing assessment of subjective factors are missing in most travel surveys.

The data analysis highlights the importance of subjective factors, such as the self-perception of health status. CONSOL suggests that the perception of the health status is a strong determinant of the mobility level of a person. This is most interesting, because it points to countermeasures, not only aiming at increasing the health of Europe's older generation, but also the perception of their health.

The accident data analysis performed to provide an overview of the safety situation of older road users was based on STATS19 (UK) Road Directorate (Denmark) and the CARE database (Czech Republic, France and Spain) and also lead to a number of issues and consequent conclusions:

- Severity definitions need to be unified across Europe, as comparisons of casualty trends between European countries is especially difficult
- Analysis methods also vary (e.g. casualty counts, casualty rates) and results are often not comparable between countries
- Travel surveys should allow for a better differentiation in travel patterns and transport modes used for those aged 65+ to allow for more specific analysis of accidents taking the heterogeneity of the target population into account. This would also permit the comparison of the relative risk per kilometre travelled using a particular mode for all countries.

Again unification of both variable definition and data collection methodologies is strongly advised. In certain fields there are already endeavours to improve these processes on a European level.

Safe mobility for older road users

Based on literature reviews, data analysis, expert interviews and Best Practice Analysis the current state of road safety of older road users has been assessed:

- There is an inflexion point between 75 to 80 years, with age being a strong predictor of immobility only after 80 years pointing out the high level of heterogeneity among the target group. The results of the CONSOL project stress the importance of subjective factors (assessment of health), especially as physical impairments proved to be more restricting than sensory impairments.
- The analyses of casualty proportions by road user type showed that the highest proportions of casualties of seniors arise from driving a car, being a car passenger or a pedestrian. This suggests that these modes of transport play a significant role in older road user mobility. Cyclist casualties formed a reasonable proportion of the overall casualties in Denmark and the Czech Republic, whereas a comparatively large proportion of casualties were recorded as bus or coach passengers in Great Britain.
- Analyses of casualty rates for Great Britain and Denmark split by transport mode showed that individuals aged 70+ travel the least kilometres per year using the transport modes 'walking' and 'bicycle'; however these individuals have the highest KSI casualty rate for these two transport modes.
- Non-collision injuries on public transport and single pedestrian injuries represent a significant risk to the health and well-being of older Europeans leading to a need for traffic injury recording systems to be broadened to include both types of accidents
- Population estimates show that over the past decade the age group 80+ has increased substantially in most countries leading to an increased need to increase safety measures for this group as casualties per million miles travelled are increasing from 70 years onwards.

In conclusion, despite positive reductions in the number of older casualties, the growing population should put them on the agenda of policy makers as a target group for interventions which will benefit road users of all ages.

Policies and decision making processes

Based on the performed mapping processes and interviews with selected experts from institutions and associations relevant in the field of older road users lead to the following conclusions, focussing on ongoing policies and initiatives essential for improving the road safety of the ageing populations:

- There is a need of complementary policies and work where different issues of concern to senior road users are brought together and integrated. The mappings performed in course of the CONSOL project indicate that there is currently, at least in some countries, a lack of this complementary focus on senior road users. Especially mobility and transportation of older road users needs to become a stronger focus of the national policies.
- In some countries national senior organisations seem inactive with regard to transportation issues. This is a problem concerning the implementation of measures as well as the incorporation of the user perspective in the planning of the transportation system. There is a need to explore these results further in research.

- In order to better understand the variations in driving license policies, there is a strong need for in-depth research on the implementation of practices, for example, by studies directly focusing on policies, politics and actors.
- Activities in CONSOL were strongly focussed on policies and activities on the national level and thus largely left out issues on regional/local levels as well as the international level. In order to understand implementation processes, there is a need to understand how actors and policies work at different levels as well as how policies and activities on different levels can be formed to strengthen each other.

Legislation

The mapping of licensing policies in Europe proved a considerable heterogeneity of existing policies, with most of the assessed countries issuing unlimited licences, and the licences issued by the remaining 21 countries varying greatly with regard to age of first assessment, periodicity of renewal, methods used in the assessment and costs incurred by the person seeking to extend the licence.

- In general, policies in place in the involved countries, regarding the assessment of older people's ability to drive are not evidence-based.
- There was no evidence found supporting the assumption that general age-based assessments have any safety benefits. On the contrary, possible negative safety effects, as shift from driving a car to unprotected modes of transport are triggered.
- Age-based screening implies large societal and private costs and decreases transport safety on a system level.
- Only few safety benefits found: in-person renewal (as opposed to renewal by mail) and restricted driving (found in US studies).
- Societal investments should produce benefits – this should also apply to screening and other similar measures
- Measures that restrict older people's mobility, especially when they fail to demonstrate the intended safety effect, need to be avoided.
- If the society wants to invest in age-based screenings, they should be adjusted so that they would provide benefits for the society: instead of traffic safety scope, a broader public health scope with focus on preventive health care, for example.

Practices and risk situations

In terms of recommendations for EU policy or other research programmes, the CONSOL project came to the following recommendations in regard to practices in view of urban infrastructures:

- Actions and practices regarding the built environment need to be designed according to the typology of older people identified by Haustein (2012): Captive car users, Affluent mobiles, Self-determined mobiles, Captive public transport users
- Development processes with a more holistic and explicit way concerning the inclusion of older pedestrian needs to become an integral part in the design and planning processes of urban infrastructures.

- Promote an older pedestrian environment friendly handbook on a EU level: the limit of the person with reduced mobility approach could be that designers focus mainly on the problems of wheelchair users or blind people, but underestimate the question of older people
- Develop awareness programmes on the potential benefits from the use of new on board technologies to overcome sensory and cognitive
- Develop a knowledge base on triggering factors of modal shift for older travellers by supporting national initiatives.

Overall the CONSOL project provided a wide set of conclusions and recommendations that are very specific to the assessed topics and approaches to analysing the general mobility and road safety of older road users. These results are comprehensively available in the respective deliverables of the CONSOL project, publicly available for download on the project website¹:

- Deliverable 1: ***Demographic Change and Transport***
- Deliverable 2: ***Mobility patterns in the ageing populations (summary report and technical report)***
- Deliverable 3: ***Traffic accident patterns in the ageing population (WP3.1) and Accident patterns in the ageing population: non-collision injuries on public transport and injuries of single pedestrians (WP3.2)***
- Deliverable 4: ***Stakeholders and practices in the field of senior safety and mobility***
- Deliverable 5: ***Driver Licensing Legislation (WP5.1) and Case analyses of practices aimed at managing the safety of senior road users (WP5.2)***
- Deliverable 6: ***Synthesis & Recommendations***

¹ CONSOL project homepage: www.consolproject.eu

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10. Further information on CONSOL

Homepage with all deliverables and project data: www.consolproject.eu

Consortium:



AUSTRIA: Factum Chaloupka & Risser OHG (Co-ordinator)



DENMARK: DTU - Technical University of Denmark, Department of Transport

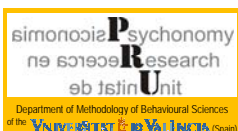


UK: TRL Limited – Transport Research Laboratory



IFSTTAR

FRANCE: IFSTTAR - Ifsttar French institute of science and technology for transport, development and networks



SPAIN: UVEG - Universitat de Valencia-Estudi General



SWEDEN: VTI - Statens väg- och transportforskningsinstitut



CZECH REPUBLIC: CDV - Centrum Dopravního Výzkumu (Transport Research Centre)



IRELAND: TCD - Trinity College Dublin