

## The unmet travel needs of the older population

Liu, Carlo; Tight, Miles; Burrow, Michael

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# **THE UNMET TRAVEL NEEDS OF THE OLDER POPULATION: A REVIEW OF THE LITERATURE**

CARLO LUIU

C.Luiu.1@pgr.bham.ac.uk

School of Engineering, College of Engineering and Physical Sciences, University of Birmingham,  
Birmingham, B15 2TT, UK;

MILES TIGHT

M.R.Tight@bham.ac.uk

School of Engineering, College of Engineering and Physical Sciences, University of Birmingham,  
Birmingham, B15 2TT, UK;

MICHAEL BURROW

M.P.Burrow@bham.ac.uk

School of Engineering, College of Engineering and Physical Sciences, University of Birmingham,  
Birmingham, B15 2TT, UK;

**ABSTRACT** *Unmet travel needs can be defined as trips and activities that people need or would like to do more, but for a variety of reasons they are prevented from doing so. This paper provides a critical evaluation of the literature focused on unmet travel needs, with the aim of assessing the scope of existing studies on this topic and better understanding the full context of older people's mobility. This narrative review identifies how travel needs in later life have been assessed, and the barriers that affect the ability of older people to fulfil these needs. Due to the heterogeneity of older people and differences in research approaches, the analysis of the literature is not conclusive in terms of identifying the real impact of the analysed variables and measures on unrealised mobility. Nevertheless, of the studies analysed, on average at least one-third of older people report unmet travel needs. This situation was found to worsen with age, and women were reported to be more affected than men. The pursuit of leisure, and in particular visiting friends and family, was found to be the activity most associated with unmet travel needs.*

**Keywords:** older people, unmet travel needs, unfulfilled mobility, mobility needs, quality of life

## **Introduction**

The mobility of older people has been the focus of numerous empirical studies during recent years. Statistical evidence shows how, over the next decades, the maturation of the so-called “baby-boom generation”, in addition to increased longevity and declining birth rates, will result in considerable demographic change in developed and developing countries (Lanzieri, 2011; OECD, 2001). It is likely that these changes will have significant repercussions on the transport system in relation to the potential growth in demand for transport provision and consequently on transport planning and management. Therefore understanding the mobility needs of the older population and the factors affecting their fulfilment will become an increasingly important issue for policy makers and service providers in the future.

Mobility and transport needs have been analysed and classified in several ways in the literature. Metz (2000) proposed five key-elements to describe mobility in relation to quality of life and personal needs: achieving access to desired people and places; psychological benefits of movement; health benefits of movement (e.g. physical exercise), benefits from involvement in social and local community and benefits from potential travels. Mollenkopf, Hieber, and Wahl (2011) define out-of-home mobility as a basic human need and an emotional experience, in addition to being necessary to fulfil social needs and express personal autonomy and freedom, move and take part in the natural environment, express a person's life force and to be stimulated and entertained. Davey (2007), Ahern and Hine (2012) and Siren, Hjorthol, and Levin (2015) grouped transport needs into two main categories: “serious needs”, such as medical appointments and emergencies, and

“discretionary needs”, such as spontaneous trips, visiting people and in general as a means of achieving pleasure. Knight, Dixon, Warrener, and Webster (2007) highlight the importance of transport in order to be independent, gain freedom, to be in control of one’s life, be mentally stimulated, keep a good level of both social relationships and physical exercise and to be able to do loved activities. Inspired by Maslow’s hierarchy of human needs (Maslow, Frager, Fadiman, McReynolds, & Cox, 1970), Musselwhite and Haddad (2010) proposed a three-level pyramid of transport needs based on self-awareness. In their hierarchy “Practical needs” are seen as primary, and are basically the ones related to day-to-day, functional and utilitarian travel, such as meeting appointments (e.g. medical) or visiting shops, services and other people (e.g. friends or family). “Social needs” are seen as secondary and are associated with psychological feelings of independence, sense of control of one’s life, and “keeping in tune with society”. Finally, “aesthetic needs” are seen as tertiary, and are associated with travels for pleasure and entertainment, such as travel for relaxation or to visit the natural environment. Both Hjorthol (2013) and Nordbakke and Schwanen (2014) followed the classification of wellbeing as satisfaction of the needs proposed by Allardt (1976) about three conditions of life: “having”, “loving” and “being”. They adapted this concept to mobility whereby: “Having” aspects are associated with the personal sphere, such as commuting, accessing health service or shopping; “Loving” is related to the social sphere, such as visiting friends or family; and “Being” is associated with enjoyment and the pursuit of leisure activities.

### **Unmet travel needs**

Unmet travel needs can be defined as those mobility needs that remain unfulfilled due to the inability to accomplish needed or desired journeys and activities. When considering older people, it is important to highlight the relevant heterogeneity with regards to age, gender and health conditions. This heterogeneity makes it more difficult to fully understand older people’s mobility patterns and needs and consequently the extent to which their transport needs are satisfied is not clearly explained by the existing literature (Hjorthol, 2013). Siren and Hakamies-Blomqvist (2004) explained the reasons why traditional approaches studying mobility and travel behaviour often fail to identify the intricacy of mobility in later life. Mobility is usually assessed in terms of travel behaviour, demand, preferences, choices, satisfaction and activity patterns or access to transport options. While these approaches are broadly valid for studies looking at the overall population, it is likely they may not be sufficiently effective to allow specific insight into the needs of the older population. Several studies have shown that with retirement, older people tend to significantly change their lifestyle, and consequently their mobility patterns (Coughlin, 2009; Haustein et al., 2013; Siren & Haustein, 2015). Retirement implies older people have more free time to spend on

desired leisure activities, but at the same time less financial resources and sometimes poorer health conditions (Siren & Hakamies-Blomqvist, 2004). For these reasons, when analysing travel patterns and behaviours of older people, it is necessary not only to take into consideration realised mobility, but also the travel needs and wishes that cannot be satisfied. As highlighted by J.-K. Kim, Ulfarsson, and Sohn (2014), when older people do not undertake out-of-home activities it might be due to a lack of transport options or an unfriendly environment, rather than having no need to travel.

The aim of this narrative review is to define the unmet travel needs of older people and identify which factors affect the fulfilment of travel needs in later life. Moreover, potential solutions are proposed to reduce the gaps among existing studies evaluating unmet travel needs and to better understand the full characteristics of older people's mobility.

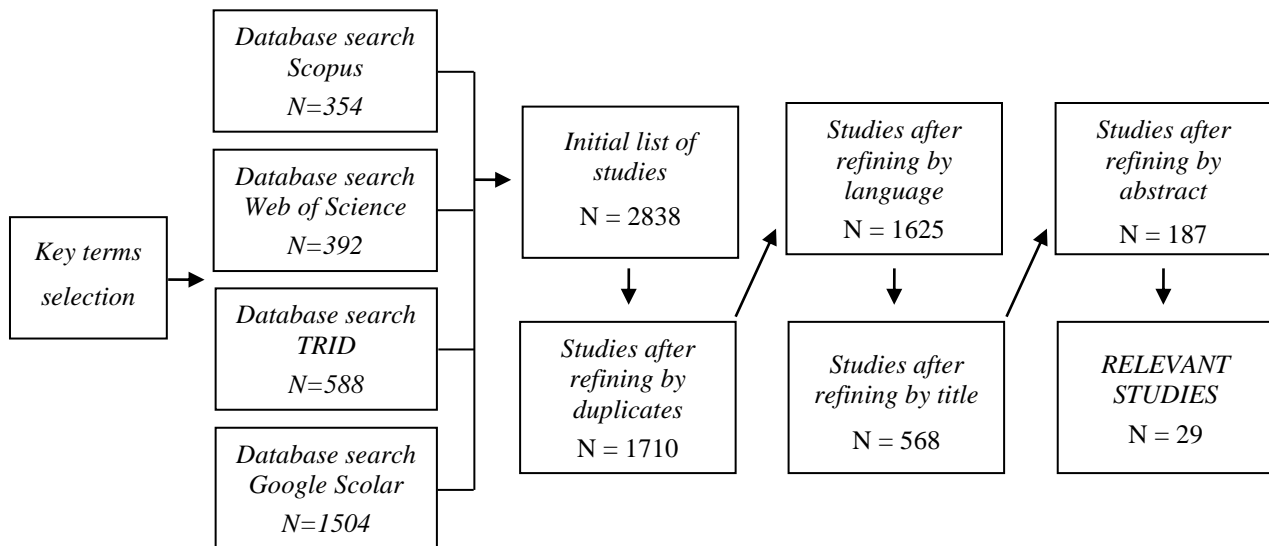
### **Methodology**

To identify the studies to be included in this review, a three-step systematic database search was performed. The first step consisted of defining the key search terms. Key terms identified were “unmet travel needs”, “unmet mobility needs”, “unfulfilled travel needs”, “unfulfilled mobility needs”, “unrealised mobility”, “suppressed mobility”, “out-of-home mobility needs”, “outdoor mobility needs” and “travel needs”. Thereafter, the key terms were searched in Scopus, Web of Science and TRID databases. An additional Google Scholar search with the same key terms was also performed, with the aim of surveying potential studies not published in journals, such as conference papers, books and reports. Each term was searched in combination with “older people” or “elderly people” in title, abstract and keywords. Studies published before 2000 were excluded from the database search in order to have an updated literature. The search returned a total of 2838 studies, and the distribution of studies identified per database in relation to each keyword is provided in Table 1.

**Table 1.** Distribution of studies per database and keywords

| <i>Keyword combination</i> |                  | <i>Scopus</i> | <i>WoS</i> | <i>TRID</i> | <i>Google Scholar</i> | <i>Total</i> |
|----------------------------|------------------|---------------|------------|-------------|-----------------------|--------------|
| Unmet travel needs         | + Older people   | 3             | 4          | 12          | 17                    | 36           |
| Unmet mobility needs       | + Older people   | 33            | 42         | 17          | 30                    | 122          |
| Unfulfilled travel needs   | + Older people   | 0             | 0          | 2           | 14                    | 16           |
| Unfulfilled mobility needs | + Older people   | 0             | 1          | 2           | 8                     | 11           |
| Unrealised mobility        | + Older people   | 0             | 0          | 0           | 3                     | 3            |
| Suppressed mobility        | + Older people   | 1             | 1          | 1           | 3                     | 6            |
| Out-of-home mobility needs | + Older people   | 7             | 14         | 22          | 2                     | 45           |
| Outdoor mobility needs     | + Older people   | 18            | 27         | 5           | 12                    | 62           |
| Travel needs               | + Older people   | 173           | 184        | 217         | 863                   | 1437         |
| Unmet travel needs         | + Elderly people | 2             | 2          | 13          | 10                    | 27           |
| Unmet mobility needs       | + Elderly people | 18            | 18         | 16          | 17                    | 69           |
| Unfulfilled travel needs   | + Elderly people | 0             | 0          | 2           | 10                    | 12           |
| Unfulfilled mobility needs | + Elderly people | 0             | 1          | 2           | 8                     | 11           |
| Unrealised mobility        | + Elderly people | 0             | 0          | 0           | 3                     | 3            |
| Suppressed mobility        | + Elderly people | 0             | 5          | 1           | 2                     | 8            |
| Out-of-home mobility needs | + Elderly people | 3             | 3          | 25          | 2                     | 33           |
| Outdoor mobility needs     | + Elderly people | 13            | 13         | 7           | 12                    | 45           |
| Travel needs               | + Elderly people | 83            | 77         | 244         | 488                   | 892          |
| <b>TOTAL</b>               |                  | <b>354</b>    | <b>392</b> | <b>588</b>  | <b>1504</b>           | <b>2838</b>  |

In the third step, an assessment of relevance was undertaken to filter and identify the most relevant studies for the review, as shown in Figure 1. The process consisted of firstly removing duplicates and by excluding studies not written in the English language. Finally, studies were analysed by title, abstract and text. Of the 1625 remaining studies, also excluded were those studies not related to the transport, geography, social science and gerontology fields (e.g. tourism); those focused only on medical conditions or clinical issues of older people (e.g. nursing, dental care or physical rehabilitation); and those for which the full article could not be retrieved. Following the above process, a non-exhaustive set of 29 studies was identified for further narrative synthesis.



**Figure 1.** Relevance assessment process

### Conceptual framework for analysis

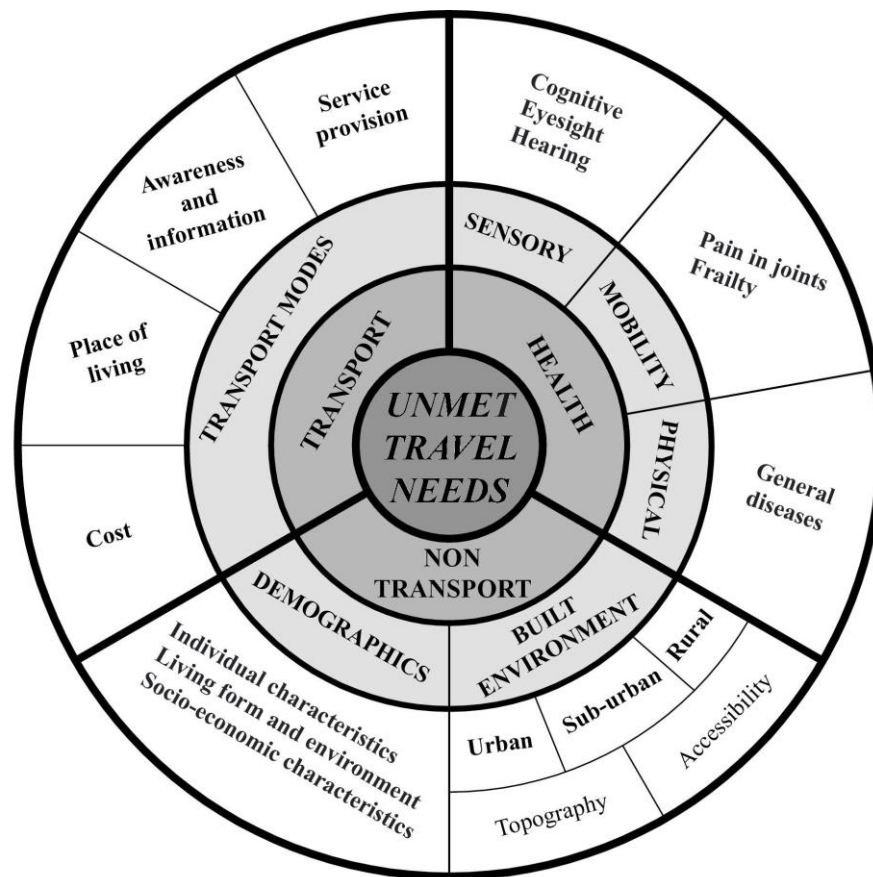
As previously mentioned, mobility and travel needs have been described and classified in several ways, often using a hierarchical scale based on importance. Moreover, these kinds of classification often do not consider that some primary activities might at the same time help to meet secondary travel needs (e.g. shopping as a primary need as well as a social/leisure need). Due to this lack of homogeneity, this paper analyses unmet travel needs from the perspective of barriers and the factors causing them, rather than from the point of view of needs. Starting from the classification of barriers proposed by WS Atkins (2001), a conceptual framework was developed to analyse factors leading to unmet travel needs based on three main categories: health, transport and non-transport-related issues.

Health issues were classified in terms of physical, sensory and mobility impairments. This category includes general physical problems due to disease; personal mobility problems such as frailty and reduced mobility and sensory problems related to limited eyesight and hearing or cognitive impairments.

Transport issues are the focus of much of the literature particularly the relationship between mobility and unmet travel needs. The developed framework disaggregates transport issues related to different modes (car, public transport, flexible transport services, taxi, walking and cycling) in terms of accessibility, service provision, cost, information and awareness and place of living.

Non-transport issues are characterised in the model in terms of socio-demographic characteristics of individuals and built environment. The first category includes characteristics such as age, gender,

income, employment status, education, marital status, household structure, social network and caring duties. The second is characterised by geographical location (urban, sub-urban, rural), topography and accessibility to transport and activities.



**Figure 2:** Conceptual framework for analysis

## Results

### *Overview of the reviewed studies*

The identified set of studies consists of studies looking at unmet travel needs in both direct and indirect ways. It comprises 23 journal articles, one conference paper and five reports. Following the example of Böcker, Dijst, and Prillwitz (2013), Table 2 highlights the methodological approach, data collection methods, variables, measures and statistical analyses used and context of where the studies were undertaken.





Twelve of the selected studies were specifically designed to assess unmet travel needs in later life. Kasper and Scheiner (2002) analysed modal choice and mobility barriers in terms of unfulfilled activity wishes. Scheiner (2006) investigated the impact of car availability and settlement structure on unfulfilled leisure activity needs. Siren and Hakamies-Blomqvist (2004) described mobility options and resources by analysing both travel behaviour and unfulfilled travel needs. Both J.-K. Kim et al. (2014) and S. Kim (2011a) analysed transport deficiencies in later life (i.e. inability to undertake an activity due to lack of transportation). Musselwhite and Haddad (2010) focused their study on differences in fulfilled travel needs between drivers and ex-drivers, while Haustein and Siren (2014) examined drivers, former drivers and people who never drove. Similarly, Siren and Haustein (2014) looked at the effect of not renewing driving licence on mobility patterns, unfulfilled mobility needs, physical and psychological well-being. Wasfi, Levinson, and El-Genidy (2012) examined the relationship between travel demand and activities in terms of both realised and unrealised mobility. Hjorthol (2013) investigated the relationship among travel needs satisfaction, desired activities and quality of life. Similarly Nordbakke and Schwanen (2014) analysed the relationship between transport and wellbeing in terms of satisfaction of mobility needs. Finally, Nordbakke (2013) analysed opportunities for mobility using Sen's capability approach to wellbeing.

In general, the identified studies show that at least one-third of older people report unmet travel needs. Groups most affected were found to be women and the oldest older (75 years old and above). Leisure trips, particularly visiting family or other people, were the out-of-home journeys that older people said were most unfulfilled. The following paragraphs highlight the main barriers affecting travel needs in later life, according to the conceptual framework outlined above.

### ***Health issues***

The literature suggests that health issues seem to be the ones that most significantly affect travel needs among older people. Such issues are consistently reported across all of the studies investigating unmet travel needs among older people. In general, people self-reporting good health conditions show more desire to do more activities (Hjorthol, 2013). Not surprisingly, health problems are most reported by the oldest population (75 years old and above) and women. This is in line with other research showing that health impairment levels rise with advancing age (Haustein et al., 2013). Health impairments affect mobility in different ways. Reduced ability to move often results in people undertaking less diverse activities. Scheiner (2006) showed that health impairments or disability not only reduce frequency of activity, but more especially reduce the range of activities undertaken, due to the prioritization and selection of activities. Physical and

mobility impairments affect also the use of transport modes. Older people face problems in using public transport due to difficulties in boarding and alighting and also where stops are more than a critical distance from home or destination (Buys, Snow, van Megen, & Miller, 2012; Davey, 2007; Gilhooly et al., 2002; Hjorthol, 2013; Wretstrand, Svensson, Fristedt, & Falkmer, 2009). Moreover health problems are considered as the main predictor for driving cessation (Haustein & Siren, 2014; Haustein et al., 2013; Hjorthol, 2013), especially due to deterioration of vision and physical, cognitive and hearing impairment (Adler & Rottunda, 2006; Brown & Ott, 2004; Ragland, Satariano, & MacLeod, 2004; Seiler et al., 2012). Finally, health problems may lead to unmet travel needs in indirect ways. Knight et al. (2007) and Siren et al. (2015) both report that participants explained how poor health conditions of relatives or friends reduced their travel activities due to a lack of travel companions.

### ***Transport issues***

#### *Positive impact of the car in the urban environment*

Gerontological research stresses the importance of the private car to the older population. Older people with no access to cars are considered “among the least mobile, among those most at risk for social isolation and inadequate service availability” (Evans, 2001). Moreover, “those who drive, who own cars, who have ease of access to a car, and who report that they can easily get a lift if they do not themselves drive report higher quality of life than those who do not” (Gilhooly et al., 2002). Unlike other transportation modes the car is available at any hour, provides door-to-door transport and allows older people to travel where and when they want (Davey, 2007). Furthermore, apart from being a transport option, driving has been found to provide older people with feelings of freedom, independence, control and youthfulness (Siren & Hakamies-Blomqvist, 2005), and compensates for health/physical impairments when undertaking daily activities (Siren & Hakamies-Blomqvist, 2004).

Several studies have specifically tried to understand the impact that cars have in order to fulfil mobility needs and wishes, with different results. Siren and Hakamies-Blomqvist (2004) concluded that the chance to drive is crucial to satisfy travel needs. Controlling for other variables, holding a driving license, as well as living in an urban environment, were found in their study to be the only significant variables that can be used as predictors of mobility. Musselwhite and Haddad (2010) showed that driving a car helped to meet practical needs and allowed people to realise both social and aesthetic needs. Conversely, former drivers report numerous difficulties in achieving satisfactory levels for all three dimensions. Practical needs are influenced by the burden of not being able to travel without spending large amounts of time planning the journey. Social needs are

particularly affected and can lead to psychological issues. Feelings of anxiety, depression and annoyance are the most commonly reported, especially for those seniors who were forcibly prevented from driving and who had not planned for their future without a car. Finally, the research shows that once older people stop driving they rarely achieve their aesthetic needs. Such needs are often seen as unnecessary and so older people find it is difficult to ask relatives or friends for a lift. At the same time, destinations associated with meeting aesthetic need are often expensive and difficult destinations to reach with alternative transport modes. Haustein and Siren (2014) showed that possessing a driving license was very important to meet personal travel needs. Unlicensed older people (especially women and the oldest older groups) report more unmet travel needs and greater dependence on others. Overall, they concluded that “more positive attitude towards, more experience with better access to alternative transport cannot sufficiently compensate for mobility problems due to lack of option to drive” (Haustein & Siren, 2014). Siren and Haustein (2014) found that those not renewing their driving licence had more unmet travel needs compared to those renewing it. This was especially so for leisure activities such as visiting other people, pursuing a hobby and going out with a specific purpose. Wasfi et al. (2012) suggest the main reasons for unrealised mobility were no availability of a car or people available to ask for a lift, together with weather conditions. Similar findings about impact of driving licence possession, car availability and evidence that non-drivers have more limitations in achieving activities are also found in J.-K. Kim et al. (2014), Haustein et al. (2013), S. Kim (2011a), Mollenkopf et al. (2002) and WS Atkins (2001).

The importance of access to private transport is confirmed by Davey (2007) and S. Kim (2011b). Both studies focused on driving cessation and showed that the car remains the preferred transport option after stopping driving and that lifts from other people were the best alternative to using ones own car. Davey (2007) found that almost one-third of the participants asked for lifts from relatives or friends to fulfil all their transport needs, with two-thirds having lifts on a weekly basis and a quarter on a daily-basis.

#### *Positive impacts of the car in sub-urban and rural environment*

The importance of the car seems to be particularly relevant in a sub-urban and rural context. It is seen as fundamental for personal well-being (Shergold, Parkhurst, & Musselwhite, 2012) and it is considered the transport mode that comes closest to meeting the desires and needs of older people (Mollenkopf et al., 2002) by providing flexibility, autonomy and independence (Glasgow & Blakely, 2000). Mollenkopf et al. (2002) found in a study across five different countries that older people who are able to drive or use a car as a passenger are more satisfied about their mobility needs than

those who do not have car access.

Zeitler and Buys (2015) focused their work on suburban areas in Australia and identified two important reasons for continued car use. First, low-density environments are characterised by trip-chaining, because of the necessity of organising activities due to longer travel distances to reach desired destinations. In this sense the car allows older people to easily involve themselves in everyday activity compared to other modes, thanks to its flexibility and speed of access. This is especially true for leisure activities and shopping activities, due to the ability of the car to transport purchased goods or equipment conveniently. The second aspect that emerged from this study is the importance of the car not only to satisfy personal needs, but also to provide assistance and support to family, friends and other people in a community. Volunteering activity is perceived as “money in the bank” if considered as a mutual exchange. Similar findings were reported by both Shergold et al. (2012) and Glasgow and Blakely (2000) and was especially important for access to healthcare facilities or shopping activities. Both Rahman, Strawderman, Adams-Price, and Turner (2016) and Adams-Price (2013) found that volunteer driver based schemes were the best potential alternative to driving a car, especially if provided by someone from within the community, such as from a church or senior centre. This was in part attributed towards the personal connections developed between users and the drivers. Adams-Price (2013) showed that participants were willing to pay a fee of between \$1 and \$5 per trip in order to use this option.

Five studies found that asking for a lift was considered the preferred option for people who cannot drive even in sub-urban and rural environments (Glasgow & Blakely, 2000; Hanson & Hildebrand, 2011; Shergold et al., 2012; Ward, Somerville, & Bosworth, 2013; Zeitler & Buys, 2015). Despite the characteristics that make cars the preferred option, rides from other people were also positively evaluated for the social interaction involved. Lifts from others increase the feeling of being cared for by other people, reduce loneliness and make possible the development of mutually beneficial relationships (Glasgow & Blakely, 2000).

#### *Negative or unrecognised impacts of cars*

The FRAME project (Kasper & Scheiner, 2002; Scheiner, 2006) examined the impact cars have on meeting the mobility needs of older people. Kasper and Scheiner (2002) found that in contrast to most evidence, older people holding a driving licence and having access to a car in the household report more unfulfilled wishes than people with no car availability. Comparing the effects of car and season tickets for public transport, Scheiner (2006) argued that it is not car availability that allows people to keep a high level of mobility and consequently to satisfy their needs, but rather it is a healthier and more mobile lifestyle that leads older people to more frequently use the car for their

trips. This study critiqued other research for not controlling for socio-demographic background variables when comparing drivers and non-drivers. It shows that the influence of cars decreases and becomes irrelevant when other background variables, such as health, employment and gender are introduced into the statistical models used to infer correlation.

The FRAME project point of view is partially supported by two other studies. Nordbakke (2013) recognizes the importance of the car to compensate for physical impairments and the effect of car availability to fulfil travel needs for specific situations, such as travelling during the night or when public transport services are difficult to use. However, using Sen's capability approach to wellbeing (Sen, 1993), Nordbakke's study shows that it is more the ability to manage opportunities and develop strategies for mobility than the ability to drive that allows older people to meet their travel needs. In order to be mobility independent, three conditions need to be satisfied: experience in using alternative transport modes, high quality of the transport system and accessible activities in both time and space. Similarly, Nordbakke and Schwanen (2014) found that driving ability, and other general transport related factors, are not sufficient to explain unmet travel needs when other variables such as general outlook on life, activity participation, social support and network and contextual conditions for mobility are controlled for.

Despite the fact that moving from being a driver to a passenger is often considered the preferred option to private transport, it may be problematic. Many people feel reluctant to ask relatives or friends for a lift, due to the fact that they cannot reciprocate, and also because of concerns about other's driving skills and behaviours or gaining access to the back of a car (Davey, 2007; Siren et al., 2015). Nordbakke and Schwanen (2014) affirm also that due to pride and guilt, older people self-censor themselves and reduce the amount of help they need. WS Atkins (2001) point out that in addition to reluctance to ask for lifts, other problems are related to the feeling of maintaining independence, lack of spontaneity involved in adapting their plans to another driver's schedule and difficulties in offering some form of payment to the people providing the lift.

### *Public transport*

One of the main reasons why older people heavily rely on cars is because of a lack of valid alternatives to private transport. In the FRAME project (Kasper & Scheiner, 2002), almost one-quarter of participants reported unmet travel needs due to the inadequacy of public transport. The main issues identified were related to security/safety on board, difficulties in getting information, physical accessibility problems, vehicle equipment, and the unsuitable location of stops and stations. Other reported barriers are the cost of journeys, attitudes of the staff, and comfort issues (WS Atkins, 2001). However, the most common criticism of public transport is related to unsuitability or

unavailability of service provision in particular areas or for specific destinations. Despite the fact that older people have more time to spend and that they adjust their schedules around services (Su & Bell, 2009), public transport is considered too infrequent and unreliable, running at unsuitable times, often late, and not providing efficient services during off-peak times, such as evening, night or during weekends, or in suburbs and rural areas. Furthermore, older people report lack of connections and networks among buses or with other modes, such as rail-based or ferry services, involving long waiting times between bus or mode changes (Buys et al., 2012). These difficulties are especially valid for “discretionary” travel. While public transport generally succeeds in providing for “serious” travel activities, it is less good for “discretionary” travel activities, particularly when they are spontaneous or unplanned (Davey, 2007). A clear example in this sense is given by Musselwhite and Haddad (2010) and Siren et al. (2015). Journeys to reach countryside or natural places, such as the coast or forests, are regarded as very difficult to achieve with public transport, due to the lack of service or the high cost of provision, especially during weekends or holidays. Once again, if private transport is not an available option, discretionary trips may be reduced or ceased (Davey, 2007).

Service provision problems are particularly accentuated in sub-urban and rural areas. In a study by Hanson and Hildebrand (2011), none of the participants recognised public transport as a valid alternative to the car. Public transport is usually not provided at night-time, weekends and holidays and there is limited provision during day-time hours (Glasgow & Blakely, 2000). Moreover, the fixed-routes limit access for those who do not live close to bus stops, especially if mobility impaired (Glasgow & Blakely, 2000; Ward et al., 2013). Ahern and Hine (2012) highlight the fact that due to a lack of a good public transport service provision, life without car in rural areas in Northern Ireland and the Republic of Ireland is very difficult. As currently provided, public transport links rural areas with big towns only at peak hours. Consequently, the people of Northern Ireland and the Republic of Ireland are becoming more and more car dependent in order to meet their transport needs.

A common barrier emerging from several studies is the effect of low familiarity of older people with alternative transport solutions to cars in their local area. This is particularly true in sub-urban and rural environments, where the heavy reliance on the car for travelling has produced a mono-modalism that does not incentivise older people to know about potential alternative modes (Shergold et al., 2012). J.-K. Kim et al. (2014) found that knowledge of how to use public transport to reach a specific destination reduces the amount of unmet travel needs. Zeitler and Buys (2015), show that many people considered alternatives to the car inconvenient, but when asked about public transport availability in their local area they showed limited awareness. Similarly, Adams-Price

(2013) showed almost half of participants report no familiarity with public transport options, and more than one-third with transport options specifically designed for older people in their place of living. Rahman et al. (2016) highlight the fact that low familiarity also influences approval towards potential use of alternative modes once people have stopped driving.

Nonetheless, despite these negative aspects, public transport presents positives as well. Using public transport is generally cheaper than car ownership once fuel, insurance, taxes, maintenance and depreciation costs are considered (Buys et al., 2012; Glasgow & Blakely, 2000; Shergold et al., 2012). This is especially true in countries providing free bus schemes for older people (J.-K. Kim et al., 2014). Public transport is also positively evaluated for the social aspects involved. An example in this sense is provided in the study by WS Atkins (2001), where some participants report missing the chance of meeting new people and interacting with them, after stopping using public transport. This is particularly true in the local context where people tend to know each other and it is easier to find known people on board (Glasgow & Blakely, 2000; Shergold et al., 2012).

#### *Flexible transport services*

Flexible transport services (FTS), such as demand-responsive-transit, dial-a-ride services, special-transportation services, community transport services or shared taxis, are often considered a good alternative to private and public transport, thanks to their flexibility and door-to-door characteristics (Finn, 2012; Rosenbloom, 2009). S. Kim (2011b) found that use of these transport options is associated with age and are usually preferred by the “oldest older”, since older people tend to drive as much as they can, and once they stop driving they are more likely to use flexible transport services due to their comparability with the car. According to Ward et al. (2013), FTS are seen as vital for some participants without car access and who are particularly affected by lack of provision of public transport. Three studies (Adams-Price, 2013; Glasgow & Blakely, 2000; Rahman et al., 2016), found that shuttle bus and senior-centre shuttle buses were positively regarded, even if not as much as volunteer driving schemes, in order to undertake shopping activities and visit senior centres, as well as for the social enjoyment of travelling with other people.

In their study of rural transport in Northern Ireland and the Republic of Ireland, Ahern and Hine (2012) found that community transport plays an important role for people without car access. However, while this kind of service was highly appreciated by women, it was conversely considered not so suitable by older men. They regard community transport as a “feminised” service, shaped mainly to meet women’s needs, such as shopping or visiting clubs or social groups, forcing them to be more car dependent than older women.



Other issues related to FTS usage can be grouped as two main factors: service provision and information/awareness. FTS need to be booked in advance. Despite the fact that booking need not be an issue for health appointments or shopping activities, it has been found to be a barrier for spontaneous trips (Glasgow & Blakely, 2000). Some services tend to give priority according to the purpose of the journey. Again, the pursuit of leisure activities can be penalised due to the low priority compared to medical appointments (Glasgow & Blakely, 2000). The use of shuttle bus and senior-centre shuttle buses tend mainly to be limited for special occasions and are not always available since they do not run on a daily-basis. Furthermore, if they are not specifically designed they may not meet the needs of older people with physical or mobility impairments (e.g. a school bus) (Glasgow & Blakely, 2000). The lack of awareness and knowledge about how FTS are provided has been identified as a potential barrier to their uptake. Ward et al. (2013) showed participants are often confused about the existence of FTS where they live, what kind of destinations can be reached and the limitations of the service. Confusion was also increased due to the presence of more available schemes in the same area, especially if provided with different modes. Finally, use of FTS was identified by Glasgow and Blakely (2000) as strongly associated with impairment or for being a specialised transportation for seniors. Consequently, the young-older report low consideration of this transport option because of the stigma linked to using FTS.

#### *Other modes*

Other modes of travelling such as walking, cycling and using a taxi do not present relevant impacts on travel needs fulfilment. Walking and cycling are considered important to access other modes as well as modes in their own right, in addition to being a recreational activity. Moreover, building them into a daily routine leads to an increase in physical activity which directly benefits health and well-being and provides a sense of freedom, independence and relaxation (Mindell et al., 2011; Hodgson et al., 2004). Three studies found walking and cycling to be valid transport options for older people for short-distance trips (Glasgow & Blakely, 2000; Hanson & Hildebrand, 2011; Zeitler & Buys, 2015). This is particularly true in urban environments, especially when compared with other transport options such as public transport (Buys et al., 2012). However both walking and cycling in later life are strongly affected by physical and mobility impairments (Glasgow & Blakely, 2000). Furthermore, in the rural and sub-urban context, the lack of infrastructure, such as sidewalks, and the more frequent longer distances to destinations make it more difficult to consider walking and cycling as valid options to travel (Glasgow & Blakely, 2000).

Taxis were generally not considered a valid option in almost all the studies analysed, mainly due to the cost involved in using this mode. Other issues identified included low reliability of service

provision, late arrival after booking (Davey, 2007), inadequate availability of service in rural areas (Glasgow & Blakely, 2000) and rudeness of drivers (Glasgow & Blakely, 2000).

### *Non-transport issues*

#### *Socio-demographic aspects*

Due to differences in sampling and country of investigation, the impact of background socio-demographic variables varies a lot among studies. On average, evidence shows that age, gender, income and education do not appear to be significant in several studies. As previously mentioned, the oldest older are the ones with more unmet travel desires and needs, but this is probably linked to deterioration of health condition with increasing age. Nordbakke and Schwanen (2014) show how older people with low income have fewer and shorter journeys compared to others, but no results were highlighted in terms of unmet travel needs. Empirical research has found that women report more willingness to make more trips (Hjorthol, 2013; Siren & Haustein, 2014), have lower car access and lower driving license holding rates (Mitchell, 2013) and tend to give up driving earlier and on a voluntary bases compared to men (Hjorthol, 2013). However gender effects do not have a significant impact on fulfilling travel needs, with very few exceptions, such as in Scheiner (2006) and S. Kim (2011a). Scheiner (2006) found that older females report more unmet travel needs than males, but most probably because only licensed people were investigated, as highlighted by Haustein and Siren (2014). Employment status was shown to be relevant by Scheiner (2006), most likely because of the limited amount of free time available to carry out desired activities.

Marital status and living in households with more than two people are probably the most controversial among non-transport related variables. With regard to marital status, living alone increases leisure and social needs due to the necessity of satisfying these needs outside the home (Nordbakke & Schwanen, 2014). This is especially valid for widows (Hjorthol, 2013). In contrast, living together with a partner reduces the likelihood of unfulfilled travel needs. Social contacts could be satisfied inside the home and the chances of getting a lift are higher (Haustein & Siren, 2014; J.-K. Kim et al., 2014). Nordbakke (2013) highlights the importance of having a good social network of family and friends not only to be more active, but also to increase the potential transport options. Musselwhite and Haddad (2010) suggest that among unlicensed people, individuals not living with a family who “took them out for a ride” would rarely meet aesthetic needs. However, living with a partner might also be a cause of unmet travel needs. This is the case when a partner has to take care of his/her spouse due to health impairment, with consequent reduction of frequency of other activities (Knight et al., 2007; Mollenkopf et al., 2011; Scheiner, 2006). This is valid also when older people live in a household of more than two people. Both S. Kim (2011a) and J.-K. Kim

et al. (2014) found older people living with one or more children under 18 years were more likely to report unmet travel needs due to caregiving duties.

### *Impact of the Built environment*

The role of the built environment and place of living also showed discrepancies in terms of impact on unfulfilled mobility. Mollenkopf and Flaschenträger (2001) recognise the importance that the built environment has in keeping an independent and mobile life among older people. Evans (2001) highlights the importance of the built environment for spatial and temporal accessibility of activities. However when looking at unmet travel needs, spatial context does not seem to play a greater role. Three studies (Hjorthol, 2013; Nordbakke & Schwanen, 2014; Scheiner, 2006) show the influence of the built environment is limited. All types of living area investigated (urban, suburban, rural) and leisure facilities available in the local area (Scheiner, 2006) were shown to have insignificant impacts on unfulfilled mobility, when other variables are controlled for. Living in an urban environment allows older people to have shorter journeys compared to those living in sub-urban and rural areas, but it does not affect realised mobility and mobility desires. Haustein and Siren (2014) found the role of the local environment “insignificant and weaker than expected”. While living in urban areas reduces unmet travel needs for leisure activities, this is not true for shopping needs. Higher population density tends to raise the effect of unmet travel needs related to leisure activities, while the combination of perceived ease of using public transport and living in a big city tend to have the opposite effect.

In contrast, Siren and Hakamies-Blomqvist (2004) found the local environment, together with holding a driving license, are the only significant predictors of mobility that satisfies travel needs. S. Kim (2011a) reports older people living in suburban areas mention more unmet travel needs compared to those in urban areas. Moreover, the existence of places or activities reachable within walking distance reduces unfulfilled needs. Similarly, Nordbakke (2013) shows that some participants decided to move from the outskirts to the centre of a city in order to benefit from better public transport service levels and shorter distances to access facilities. The topography of the built environment can also affect travel needs if hills and gradients are present (J.-K. Kim et al., 2014), particularly to reach public transport stops (Buys et al., 2012). Length of time living in an area was linked to a decrease in unmet travel needs, probably thanks to the social networks established over time and knowledge about transport options available in the local area (J.-K. Kim et al., 2014).

## **Discussion and conclusions**

### ***Measures for better assessing unmet travel needs***

The results from the studies reviewed show there is still ambiguity in the literature in explaining whether older people's travel needs are satisfied or not. This illustrates that the existing literature on realised mobility is not yet enough to evaluate adequately travel needs in later life. As suggested by Hough, Cao, and Handy (2008), when assessing mobility needs it is crucial to take into account the amount of desired mobility together with realised journeys. It is clear that the role played by unmet travel needs must not be underrated. For these reasons, it is interesting how little investigation has been undertaken concerning unmet travel needs in later life, given the growing interest in issues related to the ageing of the population in many countries. Discrepancies in the results of different studies arise from the use of different approaches and focus on assessing unmet travel needs and the consistency of measures, variables and samples investigated, as highlighted in Table 2.

Great effort has been put into assessing the relationship between the role of cars and unfulfilled mobility. The majority of the studies reviewed here conclude that car access is necessary to fulfil mobility needs. This appears even more evident in rural areas and in car dependent societies, such as the U.S.A. However two studies (Kasper & Scheiner, 2002; Scheiner, 2006) challenge this evidence and raise a significant question about the real impact of the car and its connection to circumstances in life requiring travel. The main criticisms of these studies in relation to other studies are that the comparison between drivers and former drivers is not sufficient to address the real impacts of cars because of the small numbers of people who have never driven and hence the difficulty to evaluate their transport attitudes; the absence of significant socio-demographic variables, especially health; and the main reliance on realised mobility to assess transport needs. Nordbakke (2013) and Nordbakke and Schwanen (2014) point out how a more inclusive approach is needed to better assess unfulfilled mobility. Indeed, positive experiences and ability to manage mobility opportunities, social support and networks, participation in activities, general satisfaction with life and contextual conditions for mobility are rarely investigated when assessing the unmet travel needs of licensed/unlicensed older people, but still are essential factors in their mobility.

As Wasfi et al. (2012) highlight, travel survey methods are generally not designed to understand unmet travel needs. On average, unrealised mobility is usually assessed solely by asking questions about general mobility satisfaction or if there are times older people cannot carry out activities they want to make. In the first case the main weakness is that, unless not exactly defined, satisfaction rates might be biased due to the fact that satisfaction and dissatisfaction do not automatically exclude each other, but are two different concepts (as cited in Siren & Hakamies-Blomqvist, 2004).

In the second case the level of importance of the desired activities is not always clear. In the literature, travel needs are often categorised from a hierarchical point of view based on importance of the journey (e.g. serious versus discretionary travel). However, when asking older people about the importance of their unmet needs, this difference rarely comes to light, with a few exceptions (Siren & Haustein, 2014; Wasfi et al., 2012). We know that future generations of older people are likely to be healthier and wealthier and with higher mobility expectations (Coughlin, 2009). Therefore, it is important to understand the difference between the activities older people need to do more and the ones they wish to do more. In this sense it might be interesting developing travel diary techniques that combine the two dimensions of the travel activity, fulfilled and unfulfilled, in order to gather not only detailed information about realised mobility, but also all trips that for some reason are not achievable. In depth background information about participants is also necessary to better understand the underlying complexity of older people themselves. Health conditions, as well as current and past (when assessing former drivers) travel experiences, attitudes towards all transport modes and life transition points are necessary to better describe travel activity and consequently need to be taken in account.

### ***Future research focus***

The next wave of older people will be the ones related to the so-called baby-boomer generation. Both Coughlin (2009) and Siren and Haustein (2015) suggested that changes in mobility patterns and behaviour of this group will be significantly different compared to previous generations. In the light of the findings found from this review, three main issues need to be addressed by future policies and studies. First, the role of women is changing and older women are expected to be more independent compared to previous generations (Coughlin, 2009). Therefore, it is reasonable to expect more demand for general mobility from this group. However, older women are usually the ones burdened with running a household. Baby boomers have been described as the “sandwich generation”, due to caregiving duties of both their parents and grandchildren (as cited in Siren & Haustein, 2015). Given this review identified that unmet travel needs are affected by gender effects and also caregiving activities, there is therefore a need to understand more deeply the changes forecast for older women and solutions to reduce potential risks of unrealised mobility.

Second, baby-boomers will be characterised by increasing demands for leisure activity, however this review found that leisure activities are the ones older people report to be more unfulfilled. Therefore, there is a need for more investigation of leisure activities and factors that influence these, as well as mobility patterns, accessibility, travel choice and lifestyle in order to meet not just basic and necessary needs.

Finally, ageing in place is another phenomenon associated to baby boomers. This is especially valid for contexts such as the U.S.A., in which almost two-thirds of older people live in sub-urban and rural areas (Rosenbloom, 2004). In this review, built environment and place of living were shown to be insignificant for unrealised mobility, with very few exceptions. However, J.-K. Kim et al. (2014) found positive associations between ageing in place and a decrease in unmet travel needs. Urban, sub-urban and rural structures vary from country to country and therefore comparison of findings is difficult. Nevertheless, Scheiner (2006) underlined how a specific spatially differentiated analysis of both leisure and non-leisure activity might lead to a more peculiar spatial effect. Moreover, Nordbakke (2013) highlights how the quality of location, built environment and presence of parking facilities at an activity may constitute either a barrier or an incentive for mobility. Further investigation of this aspect, as well as supporting studies with spatial analysis designed to understand accessibility to transport options, service and leisure facilities might help to assess the real relevance of built environment and the development of transport services that effectively meet the needs or desired activities in later life.

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