

Available online at www.sciencedirect.com**ScienceDirect**

Transportation Research Procedia 14 (2016) 1134 – 1143

**Transportation
Research
Procedia**

www.elsevier.com/locate/procedia

6th Transport Research Arena April 18-21, 2016



Barriers and their influence on the mobility behavior of elder pedestrians in urban areas: challenges and best practice for walkability in the city of Vienna

Flora Strohmeier^{a,*}^a*Austrian Road Safety Board, Schleiergasse 18, Vienna, Austria*

Abstract

„Walking for the sake of walking and not for the sake of mobility” is a common motive of elderly pedestrians to maintain their level of activity and thereby independence. In order to improve the walkability of streets and urban spaces, and to design accessible mobility services, it is important that urban and traffic planners consider different kinds of barriers and understand their influence on mobility like detours, avoidance, etc. For instance, diverse situations and conditions like social interaction, lack of resources or emotional barriers may hinder Persons with Reduced Mobility (PRM) from accessing services or from moving independently. This PhD-study focuses on the barrier perception from senior citizens, who are a subgroup of PRM. The aim is to collect and examine all possible obstacles, their influence on mobility behaviour and to outline user needs of older pedestrians with surveys and personal interviews. Thus, a checklist based on collected user needs is proposed, which can be used as a planning tool to evaluate the quality of pavements and its surroundings. Its implementation and contribution to plan accessible environments is further described, focusing on the impact and usability of the checklist which is based on results of the mobility diaries.

© 2016 Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of Road and Bridge Research Institute (IBDiM)

Keywords: Accessibility; demographic change; age-friendly environment; mobility barriers; surveys; elderly road user; walkability

* Corresponding author. Tel.: +43650 4419 351.
E-mail address: flora.strohmeier@gmail.com

1. Background and Objectives

The demographic change leads to major alteration in social structures that affects different functions of the city like housing, mobility, supply, education, work and leisure. Therefore, the need for safe and age-friendly design of communities and cities rises. By 2030 25% of Austria's inhabitants will be older than 65 years and by 2050, even 30%. But also the share of people older than 80 is increasing rapidly (Statistik Austria 2014). Scenarios describing the demographic change predict two groups of older people¹: the share of fit older people who consider themselves as old in a later phase of their lives will increase. They will be still active (travelling, working, leisure, etc.) up to 75+ years (Bundesministerium für Verkehr, Innovation und Technologie 2013). The second group are ill people, who are depending on home care or medical care (GOAL Consortium 2012).

Another trend is the increasing importance of active mobility like walking and cycling. It is promoted because it is healthy and contributes to well-being and fitness (Bundesministerium für Verkehr, Innovation und Technologie 2013; Mollenkopf and Engeln 2008) but also because it's cheap, flexible and easy to access. Walking is considered one of the most effective measures of preventive care for road traffic injuries (OECD 2015). The importance of safety and security is especially high for older road users. The vulnerability is rising significantly for this age-group: 9% of all road accidents affect a person older than 65 years, but among the fatalities this age-group is over-represented, with 25% (Bundesministerium für Verkehr, Innovation und Technologie 2011 (b)).

The share of older people, suffering from physical restrictions which affect their mobility behaviour will rise within the next decades. Older people often try to maintain their level of mobility because it means not only physical exercise, but also autonomy and participation in social life (Haustein and Siren 2015). With increasing age, the distance and frequency of trips tends to decrease due to the changing purposes of trips in the post-employed phase. But as long as all necessary resources (physical and mental condition, financial resources, access to transportation) are available, participation in social activities and satisfaction of needs are the main motives for trips (Hieber et al. 2006).

The individual health condition might influence the perception of spatial and built barriers as it limitates cognitive and physical abilities. In Austria there are about 1.8 Million inhabitants suffering from health problems, which are directly affecting their mobility behaviour. About 1 Million suffers from mobility restrictions (including 50.000 persons in wheelchairs), 0.8 Mio. inhabitants suffer from general physical or mental impairments, like debility of sight, physical /neurological constraints, debility of hearing or learning difficulties (Statistik Austria 2007).

A Person with reduced mobility (PRM) is defined as „any person whose mobility when using transport is reduced due to any physical disability (sensory or locomotory, permanent or temporary), intellectual disability or impairment, or any other cause of disability, or as a result of age, and whose situation needs appropriate attention and adaptation to his or her particular needs of the service made available to all passenger“ (Interoperability Unit European Union Rail System 2013). Senior citizens are only mentioned as a sub-group of PRM. An older person may, but must not, be included in the group of PRM.

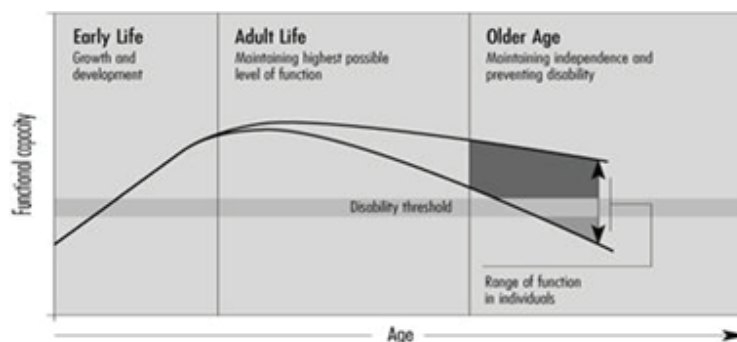


Fig. 1. Range of Functions in the Life Span (Kalache & Kickbusch 1997, adapted from Council of the European Union 2012).

¹ the following terms will be used synonymously: older age, senior citizens, old(er) person.

However, as the age-group is very big and heterogenous, a more precise description of mobility needs, their access to mobility (services) and personal activity level needs to be developed (Haustein and Siren 2015). The so-called range of functions is widening with a higher age, as described by Kalache and Kickbusch (1997) in Figure 1. In this study, the term „older people“ refers to a person who belongs to the group of 65+ years, and is retired.

Mobility describes all kinds of movement like physical, mental or social mobility. Regarding traffic, mobility is defined as „*movement outside the house to overcome spatial distances. It serves someone to use and extend living space and environment*“ (Bundesministerium für Verkehr, Innovation und Technologie 2011 (a)). Different definitions are applied depending on the context: „vertical mobility“ in social sciences describes social rise or decline. „Horizontal mobility“ stands for overcoming spatial or physical distances (Bundesministerium für Verkehr, Innovation und Technologie 2011 (a)). In this paper mobility refers to the latter.

Statistics distinguish age groups mainly by occupation: children (0-6 years), adolescents (7-18 years), adults (19-64 years) and senior citizens (65+ years). The World Health Organization, adapted from Die Armutskonferenz 2015, proposes a further distinction for the second half of one's life as following: elder people (60-75 years old), old people (75-90 years old), very old (90+ years) and long-lived (100+ years). Glascock and Feinman (1980) suggested that the changing social role is the predominant factor of defining old age. What matters further are social networks and personal attitudes as well as the living environment (Shergold et al. 2014).

This study focuses on influences on every-day-mobility of an older person and their perception of barriers. Defining and implementing adequate measures that stimulate mobility in higher age is defined as one objective as well. Therefore, a combined method of collecting qualitative and analysis quantitative data was applied. Main data sources are a general report on mobility data „Traffic in Numbers (Verkehr in Zahlen)“ (see HERRY Consult and Bundesministerium für Verkehr, Innovation und Technologie 2011) and current reports on walking (see MA 18 Stadtentwicklung und Stadtplanung 2013; Bundesministerium für Verkehr, Innovation und Technologie, Walk-space.at – der Österr. Verein für FußgängerInnen, Schwab et al. 2012).

2. Methodology

The applied methodology combines mobility diaries and interviews to find out more about needs and challenges old people are confronted with on daily trips. Mobility diaries are very useful to examine in detail daily trips and activities, to localise barriers and to collect different personal points of view on barriers (Chaloupka-Risser et al. 2011). The diverse and individual perception on trips is expected to reflect the potential of accessible design on every-day-mobility of senior citizens.

2.1. Mobility Diaries

Mobility diaries were completed by n=68 persons, 35 were male and 33 female in the city of Vienna, as Figure 2. The data collection with mobility diaries took place for one week in winter (December 2014 to February 2015) and one in summer (June to September 2015), to compare seasonal influences and differences regarding mobility behaviour and perceived barriers. Main criteria for the participants were gender, age and district. The sample had to be N>50 and representative regarding age, gender and district. According to statistics, women are a much bigger group in higher age groups (Statistik Austria 2014).

„Age“ was used as a statistical factor to identify a person who already retired, so the minimum age for participants was 65 years. According to demographic patterns, older people (80+ years) are only 10% of all participants. The criterion „district“ was not defined precisely, it was important though to cover different settlement structures all over the city of Vienna². In the sample nearly all the districts and therefore different densities of settlements are represented.

² In Vienna, there are 23 districts („Bezirke“). They are city sections with their own postal code, but not administrative units. The inner (1-9) and outer (10-23) districts are different. Inner districts are often historical, compact, well-connected by public transport and mainly mixture of housing and offices/services. Outer districts are characterized by large spatial extensions, big housing units and rather car-oriented infrastructure.

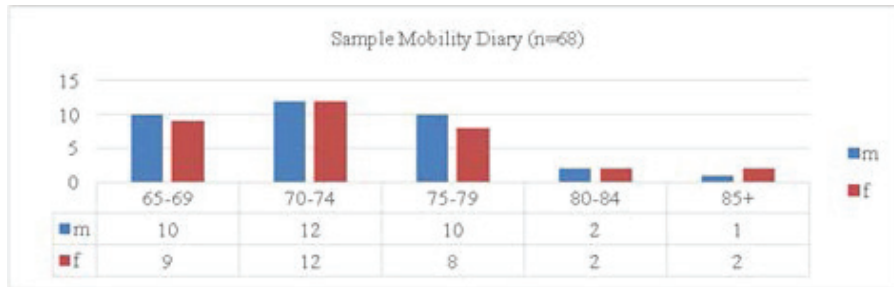


Fig. 2. Sample by Age and Gender.

The share of participants who are depending on different kinds of mobility aids is 7 persons (10.3%). Mobility restrictions influence the mobility on different levels: whereas a wheelchair is a permanent aid (1 participant), especially the use of rollator (3 participants), walking stick (1 participant) and crutches (1 participant) or help of an assistant (1 participant) is rather flexible. They are used rather frequently (at least once a week) or also seldom.

Table 1. Mobility Aids within the group of participants.

Mobility aids	male	female	total
assistant	0,0%	1,5%	1,5%
walking stick	0,0%	1,5%	1,5%
crutches	0,0%	1,5%	1,5%
rollator	0,0%	4,4%	4,4%
wheelchair	1,5%	0,0%	1,5%
total	1,5%	8,8%	10,3%

Participants were asked to start Monday and complete the diary on the following Sunday as well as to complete each day of the week. Daily trips and perceived barriers are documented. The week was to be chosen by the participant himself/herself.

Table 2. Structure of the Mobility Diary.

Data	Detailed Information
1) Statistical Data	gender, age, persons per household, education, access to transport supply (driving license, car, bike, annual ticket), district, need for mobility aids.
2) Data on Mobility Behaviour	<ul style="list-style-type: none"> • Did you make any trips outside the house or stay home. • Did you find barriers? Did you feel insecure? • Table of Trips: Time of the day; length of trip [minutes]; distance of trip [kilometers]; means of transport [walking, biking, public transport, car, car passenger, cab, other]; Purpose [supply/shopping, leisure, health care, walking, meeting, work/volunteering, cultural activities, walk the dog, cemetery, other, bring/fetch, back home].

Additionally, personal interviews were conducted with persons of the sample, who agreed to answer a further questionnaire. It contained detailed questions to discuss health condition and activity level as well as the perception of barriers and age-friendly measures in Vienna. The reason that not all participants could be interviewed are two. Some were not interested and/or available for further questionnaires and some didn't participate because of the lack of time.

2.2. Evaluation Tool for Walkability

After collecting and analysing mobility data, barriers and difficulties on a very individual level, one measure that evaluates and improves existing infrastructure will be described in detail. This tool to evaluate the walkability and

age-friendliness of streets and public spaces is based on main findings from the survey and literature. Selected checklists with reference to mobility-impaired users had to contain the following aspects: applicable for public spaces (public pavements), costs, focus on pedestrians and user-friendliness. Various checklists will be assessed by content, applicability and implementation. In a first step, various checklists had been compared.

A combination of the most important factors was merged to a new checklist.

3. Results

The presented results are preliminary since data collection will not be completed before October 2015. Furthermore, the described data refers to the winter period (December to February 2014/15) only. As the described study is not yet completed, this paper contains the theoretical approach and first results.

3.1. Data Collection with Mobility Diaries

The descriptive analysis of collected data focuses on information about realised trips, general mobility patterns and barriers. The second step of the analysis is a more detailed classification of perceived barriers according to mode of transport (Lamnek 1995).

In Winter 2014/2015, 1.915 trips of 476 days were accumulated. The total number of trips (share of trips) per age-group was compared to the share of the age groups in the sample, as shown in Figure 3. This correlation shows that the average number of daily trips is decreasing slightly with higher age. Only the age-groups 80-84 and 85+ years showed a fewer share of trips than their share within the sample was.

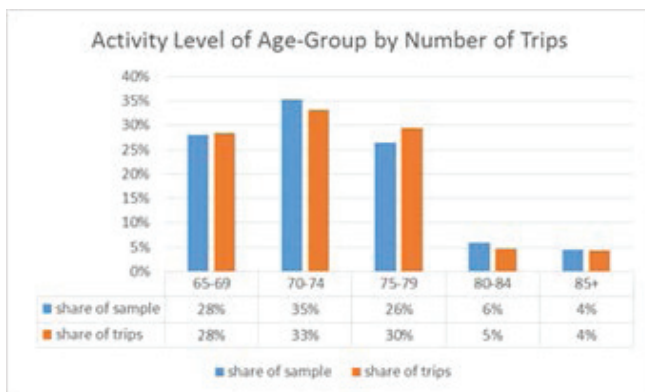


Fig. 3. Activity level of age-group by comparing share of trips and share of sample.

The distribution of trips by age, gender and modes of transport showed a difference between men and women: men are predominantly walking (18.67%) and driving the car (18.09%), in third place, using public transport (14.74%). Women consider walking as the most important mode to move (17.78%), followed by public transport (15.94%) and a third of the trips is realised by car (6.71%). This result is also the basis for the second step, for analysing barriers from different point of views. Different road users are distinguished into pedestrian (including user of mobility aids), user of public transport, driver or cyclists.

Only 29 documented days out of a total of 476 days are home-stay-days. Causes not to leave the house is the missing reason, which was documented by persons of all age-groups (10 days). Similar was the cause „no detailed information“ (10 days), which also appeared among persons of all age-groups apart from 85+. Also illness was named for 5 of the home-stay-days. Other categories of the questionnaire were „not fit“ or „had work at home to do“. Since there is no regular occupation in these age-groups, it is rather common that reasons for leaving the house are changing or rather missing. Home and neighbourhood are the focal point of senior citizens.

Four categories of problems and barriers for pedestrians were identified by Sammer et al. 2012: problems caused by other road users, problems caused by insufficient and unsuitable transport supply, problems with physical environment as well as problems with quality and availability of information. This general approach was the basis to sort the data set. Categories shown in Table 3 had been added and specified, including examples. Main categories are grouped by different spheres of life, which are then further distinguished by specifications.

Table 3. Classification of Barriers grouped into Spheres of Life and Examples from Data Collection.

Transportation	Public Transport	Bus	„Bus stops too far away from pavement, getting off the bus is only possible with help of others“
		Tram	„I can only get on low-floor-trams“
		Train	„Gap too big between platform and train“
		Waiting Area	„Seats are very dirty, so they are not usable“
		Schedule	„Harmonization of schedules (train, tram, bus) would help to make public transport more attractive“
	Car	Accessibility	„Only stairs to access the metro-station, elevator only on one side of the station“
		Congestion	„Bad driving conditions due to smog and too much traffic“
	Pedestrian ³	Parking	„Parking in the inner city is very difficult“
		Speed	„Cars are driving by too fast, so I am not sure, if they brake, when I want to cross“
Interaction	Conflicts	Green Phase	„Crossing the street, I only walk until the center island because the phases of green light is too short to cross the whole street in a time“
		Crowd	„A lot of people going upstairs, but nobody stays right and they are blocking everybody“
	Other	Heedlessness	„Only few times someone offers a seat. People are rude and selfish“
		Pedestrian-Car	„Cars parked on the pavement make it impossible for me to cross“
		Pedestrian-Bike	„Bikes on the pavement make me feel unsafe because they are passing very fast“
	Car-Bike	„Cyclists coming along one-way-streets ⁴ are disturbing“	
Information	As road user	Near Accident	„Car only stopped in the middle of the crossing, shouting at me. But I was crossing with green light“
		Missing	„Screens in all stops of public transport would be great, they are helping a lot to orientate“
		Insufficient	„Street sign cannot be seen and recognized easily, the colour is almost gone“
	As Citizen	Misleading	„Stepping out of the metro-station, I don't know where to walk, only cycling-lanes“
Participation		„Age-friendly planning needs to focus on more than just building senior residences. A dialogue between generations, but also inter-generational activities could help“	
Environment	Weather	Rain	„Leaves are making the pavement very slippery when it rains“
		Snow	„Paths are not cleared, they are icy and very slippery“
		Fog/ Smog	„I have problem with my lungs and when the air is smoggy, I cannot leave the house“
Personal	Safety/ Security	Fear	„I am afraid of assault or theft“
		Insecurity	„When it's dark I cannot see everything, but also I don't feel as if I'm seen by other road users“
		Darkness	„Streets are not well-lit, so I don't feel very secure“
	Capacities	Physical	„I feel unsafe when I have to climb the stairs“
Cognitive		„When a lot of information comes at the same time, I cannot recognize and read everything“	
Built Environment/ Infrastructure	Road Design	Inside Areas	„Missing colour coding at the end of a staircase made me miss the last stair & stumble upon it“
		Traffic Areas	„Pavement is too narrow to sidestep“
		Construction Site	„Street is closed and I had to change street side“
		Road Network	„and suddenly the pathway ends in a parking lot“
		Crossing	„Not enough crossings in my living environment, I have to walk more than half a kilometer“

According to mobility diaries, most barriers were found in the sphere of life of mobility (32% of all barriers). Especially the schedules of public transport (12.5%) and too short phases of green light when crossing (12.5%) were listed. Access to public transport was unattractive as well: 10.94% mentioned problems of mobility barriers with accessing trams and another 10.94% of mobility barriers were waiting areas that are not well-maintained (dirty, no seats e.g.) or not existing at all. Common barriers are high speed and the lack of crossings for pedestrians within

³ Pedestrians include persons with crutches, cane/walking stick, rollator, assistant and wheelchair-user.

⁴ In Vienna, a lot of cycling routes are leading against a one-way-route.

walkable distance. Barriers for pedestrians include the quality of pathways, which accounts for 7.94% of mobility barriers.

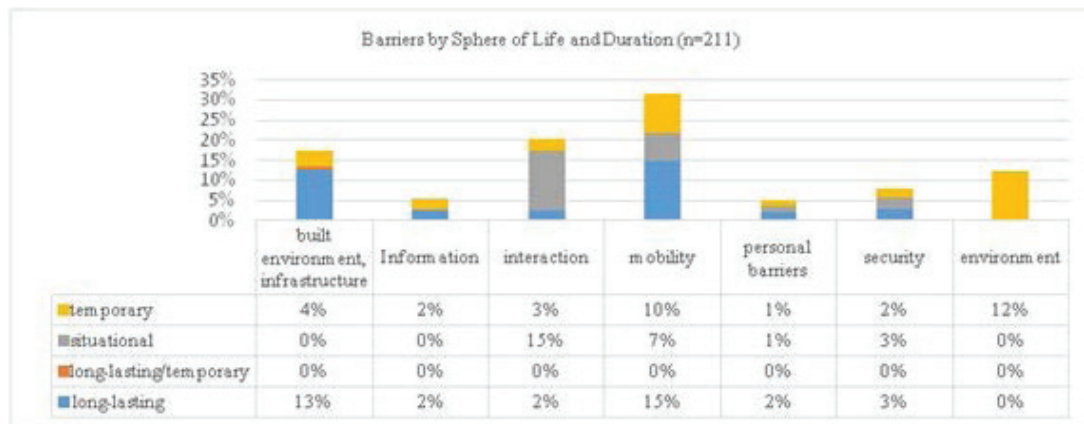


Fig. 4. Barriers by Sphere of Life and Duration.

Perceived barriers had further been distinguished by their duration, see Figure 4. They are distinguished into temporary, situational and long-lasting depending on their impact. For example, environment has the biggest share of temporary barriers such as rain, snow or ice. Interactions but also road use has mainly situational barriers. Built environment as well as mobility show the biggest share of long-lasting barriers.

Different common barriers according to literature analysis (see Sammer et al. 2012, Bundesministerium für Verkehr, Bau und Stadtentwicklung 2012, Hieber et al. 2006, data collection winter 2014/15) have been evaluated in 31 personal interviews to find out more about their influence. The list includes barriers such as pavement curbs; traffic lights: short green phase; uneven walking paths (like cobblestone pavement); missing cross-walks within reasonable walking distance; missing lights; narrow pavements; pedestrians and cyclists on a mixed lane; crowded streets; missing signage; bad and/or insufficient snow clearing; no barrier-free access to stops of public transport and no Ultra-Low-Floor-trams (Bundesministerium für Verkehr, Bau und Stadtentwicklung 2012). Multiple responses were possible, a total of 102 barriers was documented. 17 named the conflict-situations between pedestrians and cyclists as the most important barrier. Mostly, because pedestrians do not feel safe on mixed lanes or also because cyclists use sometimes pathways. 15 persons mentioned dimensions (width) of pathways as mobility barrier. Narrow pathways are perceived as very disturbing because older people felt insecure. Uneven surface was mentioned as a problem especially by rollator-users, including rails of tram and street curbs.

3.2. Evaluation Tool for Walkability

In order to improve the walkability of streets and urban spaces, and to design accessible and age-friendly mobility services, it is important that urban and traffic planners are aware of and consider different kinds of barriers and to understand their influence on mobility (detours, avoidance, less mobility, etc.). But not only visible obstacles are barriers, as described before. As tools to evaluate traffic zones, from technically detailed checklists like audits (road safety audit) to „softer“ evaluation tools like the essential features of age-friendly cities that already exist work on different levels, they will be analysed in a first step. They will not be described in detail, the focus is a more general (involved topics, evaluation, implementation) as seen in Table 4.

The adapted checklist comprises not only technical requirements, but gives recommendations for the implementation. The walkability-evaluation-tool therefore includes following workflow:

- Define involved stakeholders to improve walkability
- Invite them to share ideas for local improvements (collect and elaborate needs and wishes)

- Define objectives and possible indicators for walkability
- Invite experts to develop a checklist suiting to local needs and resources
- Specified Topics for Walkability (see Table 5)
- Apply and evaluate checklist by impact on different levels (organisation, information, participation)
- Invite neighbouring areas/districts to cooperate, share or exchange checklists

Table 4. Comparison of different checklists including main factors for walkability (adapted from WHO 2002, Simon 2009, walk-space. at 2015, ASTRA, ARE, BBW 2005).

Checklist	Content: Involved Topics	Evaluation Process	Implementation
WHO (2002): Checklist of essential features of age-friendly cities	Outdoor Spaces, Transportation, Housing, Social Participation, Respect & Social Inclusion, Civic Participation, Information, Community & Health Services.	Tool for Self-Assessment, older people need to be involved in process of assessment. Monitoring will be an important part	There are no indicators, definition of criteria is very general. Different important aspects are only described.
Simon (2009): is our community an „age-friendly“ community?	Public Spaces, Infrastructure, Mobility, local supply and services, housing, health care, culture & leisure, activities & social inclusion	Tool for Self-Assessment, especially for communities to analyse their current situation and to give input for improvement.	Tool to raise awareness and show level of accessibility of a community.
walk-space.at (2015): Road Safety Audit	road and path network; technical support (traffic lights, design of crossing); quality of walking (space, sight, conflict uses like parking, security and safety, etc.); maintenance of pathways;	No evaluation is mentioned. Solutions will then be elaborated by experts.	Cooperation between experts, stakeholders and planners: walking and auditing is a process of participation.
ASTRA, ARE, BBW (2005): Recommendation of Measures and Solutions to Reinforce Walking in Cities	16 topics including quality of spaces for pedestrians, access to public transport, reduction of detours, short distances and direct connections, improving infrastructure for PRMs, etc.	No evaluation is mentioned. Clear focus on mobility means a very detailed description of planning strategies and measures.	It shows the responsible stakeholder for different topics. Missing point of contact with other disciplines like social participation.

4. Discussion

Reinforcing non-motorized means of transport, especially walking, is a possibility to create mobility offers for different sociodemographic groups independent of financial and social background (VCÖ 2015). The additional benefit is that a healthy and active lifestyle is promoted. Walking means exercise and satisfying mobility needs by realising trips at the same time.

Mobility is an important premise for participation in social life and satisfaction of basic human needs. It is a key factor for independence, activity level and inclusion. Access to mobility itself and choice within the different means of transportation means quality of life (Sammer et al. 2012). Mobility impairments may detain someone from participating in social life or lead to missing opportunities to fulfill daily needs. In this study, the majority of participants who considered themselves as „active“ and „(rather) healthy“ noticed barriers, which didn't influence them in their mobility. Persons with physical restrictions documented barriers in a similar proportion to realised trips, which either detained them from making trips or they found a coping strategy (like avoidance of unsafe areas; asking for help in critical situations). Very important for them is to be prepared and to have already defined a strategy for overcoming barriers (like not leaving the house in certain weather conditions; like not leaving the house in peak hours), see also Hieber et al. 2006. Barriers perceived by pedestrians were often social interaction (high speeds by passing cars, cyclist-pedestrian-conflict) which have less obvious underlying causes than built environment (design of crossings, surface, dimension).

This means, that temporary conditions like social aspects (conflicts, interaction) need to be evaluated and included in measures to improve walkability. To promote active and safe mobility the walking environment on different levels (built, social, individual level). A compact city seems to be the right environment to walk, because one can exercise, stroll or just look around. Supply, services and public transport are in walkable distance, like described by Egarter et al. 2008. Walking has to become a more important issue for urban and traffic planner. It has a wide range of advantages to design our cities more walkable.

Accessible areas don't necessarily need to be plain and standardized because up to a certain extent an environment that challenges us, keeps us active. Therefore, rather than being 100% accessible, they should offer possibilities for different level of physical conditions to move. Accessible areas and design can include innovative but still simple solutions, by being safe, secure, supportive and creative, heterogeneous as people are, regarding interests, resources and needs. Sometimes, also small adaptations can have big impact. For example, a measure to make the pathways easier and safer to use doesn't necessarily need a lot of financial resources. It might be enough to cut a tree regularly and organise a responsible unit for maintenance of this pathway.

Planning accessibility needs to involve various stakeholders, but most importantly is the establishment of a representative body (that might be a stakeholder like an organisational unit or official responsible coordination partner) and a national strategy. For example, a legal document for rights and concerns of senior citizens („Bundesplan für SeniorInnen“) exists in Austria, including measures on social, societal, healthcare, housing and cultural level. But still, there is no representing stakeholder to participate for example as member of a technical committee. No further details on age-friendly planning strategies, it is not mentioned in Vienna's Urban Development Plan (Stadtentwicklungsplan STEP 2025).

5. Conclusion and Outlook

Accessibility is a very emotional topic, especially for persons concerned. In many cases barrier-free, accessible cities cannot be realised because historically grown cities preserve their historic centers and its cultural heritage. Especially built environments of city centers often do not correspond to standards of accessibility and need small adaptations and solutions on a bigger scale. Urban environments have been developing over a long time and cannot be changed suddenly but step by step.

Following the principles of design for all (Centre for Excellence in Universal Design 2014), not only objects of daily use (like assisting technologies) and information (like maps) can be easily adapted, but also urban areas. An advantage of Design for All is that it already incorporates needs and capacities of different user groups and therefore has a great potential for age-friendly design (Frye and Golden 2010). Creative solutions can be incentives as well as motivation for walking, establish livelier neighbourhoods and attractive public spaces.

Age-friendly design has to be implemented on various organisational levels simultaneously. But first of all, it needs to be included in a general city planning strategy respectively an institutional unit that merges relevant topics like transport systems, housing, public spaces, local supply and services, health care, social and intergenerational activities but also participation (The SIZE Consortium 2005).

But „barrier-free“ doesn't describe a static state, it is rather a holistic concept. Spaces and services in the city are used by a wide range of different groups, therefore the user requirements only represent a compromise of different points of view. For this reason, an overall target group doesn't exist: specific solutions have to be developed, that are fitting in the urban setting. A sensitive approach, that combines technical specifications on a human scale with functional needs is needed (COST 358 2010).

A checklist seems to be an appropriate evaluation tool, but a not planning tool itself. Standardized solutions tend to create more problems than solutions, if they miss to consider surrounding side-effects and the embedment of one site into the complex system of the city („local effects“). The defined evaluation criteria will be useful up to a certain extent, to define need for action. The checklist may be rather used as recommendation for action and overview of various measures, for example to improve certain areas of a city, to define a minimum level of user requirements and to raise the awareness for improvements. Awareness is always the first step of implementing inclusive environments, not only among planners but among citizens.

As working report of this study, a guideline for accessible city planning-strategies will be published 2016, that focusses on measures, evaluation of measures and implementation.

References

- ASTRA, ARE, BBW (2005): PROMPT New means to PROMote Pedestrian Traffic in cities. http://www.astra.admin.ch/themen/langsamverkehr/00483/index.html?download=NHZLpZeg7t,Inp6iONTU04212Z6ln1acy4Zn4Z2qZpnO2Y uq2Z6gpJCDdYF5fGym162epYbg2c_JjKbNoKSn6A--&lang=de (accessed 18.08.2015).
- Bundesministerium für Verkehr, Bau und Stadtentwicklung, BMVBS (2012): Barrieren in Stadtquartieren überwinden. <http://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/BMVBS/Sonderveroeffentlichungen/2012/BarrierenStadtquartiere.html?nn=395966> (accessed 18.08.2015).

- Bundesministerium für Verkehr, Innovation und Technologie, bmvit (2011) (a): Verkehr in Zahlen. Kapitel 6: Mobilität – Verkehrsverhalten. https://www.bmvit.gv.at/verkehr/gesamtverkehr/statistik/viz11/kap_6.html (accessed 17.08.2015).
- Bundesministerium für Verkehr, Innovation und Technologie, bmvit (2011) (b): Austrian Road Safety Programme 2011-2020. <http://www.bmvit.gv.at/en/service/publications/transport/downloads/rsp2020.pdf> (accessed 02.09.2015).
- Bundesministerium für Verkehr, Innovation und Technologie, bmvit (Hrsg.)(2013): Mobilität im Alter. Ein Handbuch für PlanerInnen, EntscheidungsträgerInnen und InteressensvertreterInnen.
- Bundesministerium für Verkehr, Innovation und Technologie - BMVIT, Walk-space.at – der Österr.Verein für FußgängerInnen, Schwab D., Strasser M., et al. (2012): Fußverkehr in Zahlen, Wien.
- Centre for Excellence in Universal Design (2014): What is Universal Design. The 7 Principles. <http://universaldesign.ie/What-is-Universal-Design/The-7-Principles/> (accessed 02.09.2015).
- Chaloupka-Risser, C.; Risser, R.; Zuzan, W.-D. (2011): Verkehrspsychologie-Grundlagen und Anwendungen. Facultas Verlags- und Buchhandels AG: Wien.
- COST 358 (2010): Pedestrians' Quality Needs PQN Final Report. http://www.walkeurope.org/final_report/default.asp (accessed 17.08.2015).
- Council of the European Union (2012): Council Declaration on the European Year for Active Ageing and Solidarity between Generations: The Way Forward. <http://europa.eu/ey2012/BlobServlet?docId=9231&langId=en> (accessed 17.08.2015).
- Die Armutskonferenz (2015): Alter. http://www.armutskonferenz.at/index.php?option=com_content&task=view&id=27&Itemid=94 (accessed 18.08.2015).
- Egartner, S.; Fischer, T.; Maißer, M.; Meth, D.; Steinbichler, M.; Wächter, P.; Voigt, A. (2008): Stadt der kurzen Wege aus ökosozialer Sicht. Nahversorgung und Naherholung in Wien vor dem Hintergrund der Alterung.
- Frye, A. and Golden, S. (2010): Mediate – Methodology for Describing the Accessibility of Transport in Europe. Good practice guide. <http://www.mediate-project.eu/> (accessed 18.08.2015).
- Glascocock, A.P. and Feinman, S.L. (1980): A holocultural analysis of old age. Comparative Social Research. 1980; 3: 311-32.
- GOAL Consortium (2012): Transport needs for an ageing society – action plan. <http://www.goal-project.eu/images/goal-action-plan.pdf> (accessed 02.09.2015).
- Haustein, S. and Siren, A. (2015): Older People's Mobility: Segments, Factors, Trends. Transport Reviews: Vol. 35, No.4, 466-487.
- HERRY Consult and Bundesministerium für Verkehr, Innovation und Technologie, bmvit (2011): Verkehr in Zahlen. http://www.bmvit.gv.at/verkehr/gesamtverkehr/statistik/downloads/viz07_kap6.pdf (accessed 02.09.2015).
- Hieber, A.; Mollenkopf, H.; Kloé, U.; Wahl, H.W. (2006): Mobilität und Alter. Band 02: Kontinuität und Veränderung in der alltäglichen Mobilität älterer Menschen. TÜV Media GmbH, Köln.
- Interoperability Unit European Union Rail System (2013): TSI Technical Specification for Interoperability "Persons with reduced mobility". http://www.era.europa.eu/Document-Register/Documents/Draft_PRM_TSI_version_2.0.pdf (accessed 07.07.2015).
- Lamnek, S. (1995): Qualitative Sozialforschung. Band 1, Methodologie. 3., korrigierte Auflage. Psychologie Verlagsunion, Weinheim.
- MA 18 Stadtentwicklung und Stadtplanung (2013): Gehen in Wien-NutzerInnenbefragung: Was gefällt am Gehen und was hält davon ab? <https://www.wien.gv.at/stadtentwicklung/studien/b008356.html> (accessed 02.09.2015).
- Mollenkopf, H. and Engeln, A. (2008): Gesellschaftlicher Kontext und motivationale Veränderungen der Mobilität im Alter. In: Schlag B. ed. Leistungsfähigkeit und Mobilität im Alter S.239-254. Köln: TÜV Media GmbH (Schriftenreihe Mobilität und Alter der Eugen-Otto-Butz-Stiftung, Band 03).
- OECD (2015): Ageing in Cities. OECD Publishing, Paris.
- Sammer, G., Uhlmann, T., Unbehaun, W., Millonig, A., Mandl, B., Dangschat, J. and Mayr, R. (2012): Identification of mobility-impaired persons and analysis of their travel behaviour and needs. Transportation Research Record: Journal of Transportation Research Board, No. 2320, Transportation Research Board of the National Academies, Washington. pp 46-54.
- Shergold, I.; Lyons, G.; Hubers, C. (2014): Future mobility in an ageing society – where are we heading? Journal of Transport & Health (2014), <http://dx.doi.org/10.1016/j.jth.2014.10.005> (accessed 02.09.2015).
- Simon, G. (2009): Handbuch Seniorenfreundliche Gemeinde. In Volkshilfe Österreich und Pensionistenverband Österreichs (Hrsg.) https://www.volkshilfe.at/images/content/files/sfg/Handbuch_SeniorenfreundlicheGemeinde2009-WEB.pdf (accessed 17.08.2015).
- Statistik Austria (2007): Gesundheitsbericht. http://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/gesundheit/gesundheitszustand/gesundheitliche_beeintraechtigungen/index.html (accessed 17.08.2015).
- Statistik Austria (2014): Bevölkerungsprognosen. http://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/bevoelkerung/demographische_prognosen/bevoelkerungsprognosen/index.html (accessed 17.08.2015).
- The SIZE Consortium (2005): Summary of the results of area 3. http://www.size-project.at/results/D14_D16_final.pdf (accessed 02.09.2015).
- VCO (2015): Selbstbestimmte Mobilität älterer Menschen fördern. <http://www.vcoe.at/de/publikationen/vcoe-factsheets/details/items/selbstbestimmte-mobilitaet-aelterer-menschen-foerdern> (accessed 17.08.2015).
- Walk-space.at – der österreichische Verein für FußgängerInnen (2015): Fussgaengercheck. <http://www.walk-space.at/index.php/fussgaengercheck/beschreibung> (accessed 02.09.2015).
- WHO (2002): Aktiv Altern: Rahmenbedingungen und Vorschläge für politisches Handeln. http://whqlibdoc.who.int/hq/2002/WHO_NMH_NPH_02.8_ger.pdf (accessed 18.08.2015).