Appendix 1

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Appendix 2. Details of Included Studies

Reference	1. Method	2. Participants	3. Procedure/Tests	4. Key Findings	5. Region
Description of Users/Activities/Accidents					
1. Australian Competition and Consumer Commission (ACCC) 2012 [5]	S	*N* = 515 scooter users Mean age (range): 60 (not reported) Scooter users	1) Telephone survey involving 2,406 individuals >18 yr to represent the adult population. 2) Online/paper-based survey with 515 self-selected scooter users.	Scooter users had a lower socioeconomic profile than the general adult population. 51% sought advice or assessment from mobility specialists when purchasing their scooter. Top benefit of scooter use was independence (93%). An incidents rate per trip of 5% was reported (e.g., tipping, collisions, falls). Factors outside user control were identified as the cause of most of these incidents.	AUS
2. Blais et al. 2012 [15]	MM	*N* = 26 (public forum attendees); 7 scooter users in stakeholder forum *N* = 3 scooter users/associations returned survey Age (range): not reported	Stakeholder forum and survey.	Recommendation: mobility scooters should be defined in terms of their speed and transportability and they should not be registered as “vehicles.” Recommended standardized scooter dimensions should be developed to facilitate transportation.	NA
3. Brandt et al. 2004 [1]	QI	*N* = 84 scooter users: 75.7% of sample Mean age (range): 76 (65–92) Individuals who owned a scooter or wheelchair for at least 1 yr	Study-specific questionnaire used during structured interviews, which related to the person, assistive technology, activities, barriers, outcome dimensions.	Nearly all regarded their mobility device as very important and asserted that it increased their independence. Top activities were shopping (78%), leisurely rides (83%) and visiting friends/family (57%). Top barriers were limited distances (17%) and stairs/doorsteps (16%).	EUR
4. Brownsdon & Marcar, 2002 [16]	MM	*N* = 38 (Public forum with stakeholders) Mean age (range):	Scooter Safe project used a combination of literature reviews,	During the public forum, most scooter users reported feeling unsafe.	AUS

		not reported Scooter users and stakeholders	public forums, stakeholder consultations, development of pilot programs, and evaluation of outcomes.	They identified issues with environmental access, and confusion around insurance and registration of their scooters.	
5. Edwards & McCluskey. 2010 [17]	S	*N* = 150 scooter users: 74.3% of the sample Mean age (range): 81 (not reported) Scooter and wheelchair users	Surveys mailed, email, or in person. Study specific with 35 items on demographics, use of the device, related incidents, and experience.	<10% of scooter users received government funding assistance and 57% received prepurchase advice. Of entire sample, arthritis was most common condition affecting mobility. 33% sought health professional advice prior to purchase. A variety of environmental barriers to scooter use were identified.	AUS
6. Hubbard et al. 2007 [18]	RR	*N* = 14,721 scooter users: 100% of the sub-sample Mean age (range): 68 (not reported) Valid records of veterans who received scooters or wheelchairs from the VHA	Data of veterans who received wheelchairs and scooters from the VHA extracted from the National Prosthetic Patient Database from 1999 until 2001	The majority of veterans who were prescribed scooters were white (65%). Their primary diagnoses were COPD/CHF (23%) followed by stroke (15%). The percent of scooters provided each year ranged between 9 and 13. The average national cost of scooters was $1,935 (range: $900–$17,883).	NA
7. Hubbard et al. 2006 [12]	RR	*N* = 19, 328 scooter users: 100% of the subsample Mean age (range): 65.5 (not reported) Individuals prescribed scooters or wheelchairs from the VHA	Retrospective data review from two VHA databases between 1999 and 2001.	Caucasians (14%) were more likely to receive scooters than other ethnicities (5%).	NA
8. Steyn & Chan, 2008 [14]	S	*N* = 53 scooter users Mean age (range): Not reported (45–85) Scooter users and stakeholders	Scooter users mailed study-specific survey on where and why they use their scooter. Stakeholders were interviewed regarding	Scooters viewed as important for users' quality of life. A lack of sidewalks and insufficient curb cuts caused users to drive on	NA

			classification systems for scooters, regulations, training, scooter registration, and insurance.	roads. Top activities include shopping and going for a ride. Stakeholders recommend scooter users be viewed as pedestrians and further research be done on scooter education programs.	
9. Sullivan et al. 2014 [13]	S	*N* = 30 scooter users Mean age (range): 78.2 (65–90) Scooter users	Study-specific survey (completed in person) developed based on established questionnaires; 30 items on demographics, mobility status, reason for scooter purchase, how users used the scooter, and barriers to use.	40% lived alone, 60% had ≥ 2 chronic health conditions, 57% also used a cane. Top reason for purchase was difficulty walking (80%). Top activities were shopping (90%) or visiting the doctor (77%). Top barriers were uneven footpaths (73%), curb height (70%) and pedestrians (70%).	AUS
10. Zagol & Krasuski. 2010 [19]	S	*N* = 102 scooter users Mean age (range): 68 (49–87) Individuals who received medical approval for a scooter during a 6-yr period	11-item survey assessing different facets of quality of life mailed to each patient (28% returned). Electronic and paper medical record review from 12-mo period before and 12-mo period after the date the patient received a scooter. Cardiovascular data collected.	Patients used scooter for a median of 4 h/d. Patients walked 30 min/day. Physical and psychological improvements in all quality of life categories. Note, however, fasting blood glucose increased and 18.7% of patients developed diabetes during the follow-up period. Scooter use may potentially increase cardiovascular risk.	NA
Accident Statistics					
11. ACCC et al., Monash University. 2011 [20]	RR	*N* = 20 key informants (prescribers/vendors), 33 scooter users and 1,551 hospitalization records Mean age (range): not reported (60–90 yr)	Retrospective data on scooter-related injuries (four different databases) and fatalities (July 2000–August 2010). Telephone interviews with key informants and scooter users to obtain community perceptions on scooter use and scooter safety.	442 injury hospitalizations between July 2006 and June 2008 for lower limb fractures (53%), open wounds (13%). Frequency of injuries increased annually at 13.5% (based on “fall” data). 62 reported fatalities from collisions with motor vehicles (48%) or falls	AUS

				(44%) resulting in head injury (37%) or cardiac failure (18%). Injuries and fatalities most commonly occurred on the street/road. Informants recommended the development of standardized training and design of scooters.	
12. Cassell & Clapperton. 2006 [21]	RR	*N* = 157 scooter users Mean age (range): not reported Individuals with scooter-related injuries	Retrospective data on scooter-related injuries and fatalities from (July 2000–June 2005).	Total of 6 deaths reported, all from fall injuries. There were 151 hospital-treated cases; number doubled over 5-yr period. Most common cause of injury was falls (53%). Persons aged >80 were overrepresented among the entire sample.	AUS
13. Murphy et al. 2014 [22]	CS	*N* = 3 scooter users Mean age (range): 76 (68–92) Individuals with scooter fall–related upper limb injuries	Scooter fall–related injuries are summarized and subsequent treatments are discussed.	All individuals were new scooter users (<6 wk) and none received any formal training. All fall-related injuries occurred outside the individual's home and resulted in at least 2 d in the hospital. Education, support, and training of basic skills were recommended for all new scooter users.	EUR
14. Paparone. 2013 [23]	CS	*N* = 5 scooter users Mean age (range): 69 (59–82) Individuals with scooter-related lower limb ulcerations	The history of the incidents resulting in the ulceration and subsequent treatments summarized.	Recommendations include: wearing shoes while using scooter; examining vision, motor skills, and cognitive function before provision of a scooter; consideration of decreased walking on patient's physical well-being.	NA
Scooter Training					
15. Jannink et al. 2008 [31]	I	*N* = 10 scooter users: Mean age (range): 58 (control group) (not reported), 61.8 (experimental group)	A control group (*n* = 5) received conventional training, and the experimental group (*n* = 5) received an electric	After 5 wk of training, both groups improved (control: 6.9%, experimental: 7.2%). No significant difference in	NA

		(not reported) Stroke survivors who are new scooter users	simulation intervention training. Data on driving ability (FERS) and subjective experience were collected at baseline and 5 wk after training.	subjective experience of the training.	
16. Mortenson et al. 2016 [30]	S	*N* = 126 respondents (Scooter users and other stakeholders [e.g., prescribers, vendors, caregivers]) Mean age (range): 41 (not reported)	A survey was completed online or via paper (mail/fax). The survey included demographics, stakeholder specific questions, and other open-ended questions on existing training programs.	A quarter of scooter users reported receiving training; of those, 80% only had one session. Training on driving indoors and accessing public transit was lacking. Strong agreement among stakeholders for importance of scooter training; respondents recommended training be broken into different difficulty levels and provided in situ.	NA
17. Nitz. 2008 [33]	I	*N* = 50 scooter users: Mean age (range): 34 (not reported) New scooter users	Each individual took a driver's competency test (inside and outside) with no instructions given. The test had 13 tasks and an assessor rated each task as 1 = safe or 2 = failure. 10 participants took the test 3 separate times to determine the effect of practice on proficiency.	66% failed at least one item on the first test. The most failed items were weaving (100%), zigzag (40%), and avoiding unexpected pedestrians (40%). Of the participants that repeated the test, there was an improvement by the third assessment, but weaving and zigzag tasks were identified as needing more training.	AUS
18. Niv et al. 2008 [32]	I	*N* = 22 scooter users Mean age (range): not reported (60+) Scooter users	Demographic variables and cognitive tests examined prior to intervention. The sample was randomly divided into a control group or intervention group; both received computerized cognitive training, and the intervention group also received on-road practice with	Computer training improved some cognitive factors, but the combination of on-road occupational intervention with the computer training showed significant improvement in driving performance. Age was found to affect the extent of driving improvement.	AS

			occupational intervention.		
Other Intervention Outcomes					
19. Hagberg et al. 2015 [27]	I	*N* = 45 scooter users Mean age (range): 78 (66–88) New scooter users	Pre- and post-intervention study with a follow-up at 4 mo. Cost-utility analysis using costs per quality adjusted life year as incremental cost-effectiveness ratio by calculating costs of intervention, savings, and quality of life (EQ-5D, SF-36; compared with IPPA and WHODAS2.0).	Two main cost benefits from power scooter use were identified: decreased cost of transport and time provided by relatives. Some dimensions of quality of life were also improved, but this was not significant overall. The cost for first year was USD1,395 and then USD592 per subsequent year.	EUR
20. Hoenig et al. 2007 [24]	I	*N* = 53 participants enrolled. 27 scooter users at baseline. Mean age (range): 63 (not reported) Ambulatory outpatients with primary diagnosis of rheumatoid or osteoarthritis of the knee	Patients randomized to usual care or scooter provision for 3 mo. Measures include 6MWD, self-reported mobility questionnaire, accidents, and satisfaction at baseline, 1 mo and 3 mo.	6MWD did not vary significantly between two groups, i.e., scooter provision did not contribute to participant deconditioning. Accidents were reported by 4 subjects (18.1%). Generally positive satisfaction with scooter use.	NA
21. Löfqvist et al. 2012 [28]	I	*N* = 27 scooter users: 79.4% of the total sample Mean age (range): 69 (not reported) Scooter and wheelchair users	Participants interviewed about mobility-related participation using Nordic mobility-related participation outcome evaluation of assistive device intervention at baseline, and after 4 mo and 1 yr use.	Participants needed less assistance moving around outdoors and some activities became easier (shopping, pharmacy, going for a walk, etc.). Scooter intervention did not result in changes in participants' repertoire of activities. Outcomes occurred within 4 mo and remained stable for 1 yr.	EUR
22. Samuelsson & Wressle, 2014 [25]	I	*N* = 20 scooter users: 83.3% of total sample Mean age (range): 67 (32–86) New scooter and wheelchair users	Mailed self-completion questionnaire before delivery of participants' scooter or wheelchair and another questionnaire 4 mo postdelivery. From initial assessment to	Need for outdoor assistance decreased significantly and there was a positive change in activity participation and social participation. No significant difference in general health scores or	EUR

			follow-up, the monthly rental costs for each device were collected.	overall life satisfaction before and after delivery. Societal savings based on total cost for assistive device minus decrease in costs for personal assistance was €6227/yr/user. 83% satisfied with service delivery process.	
23. Sund et al. 2015 [26]	I	*N* = 149 scooter users: 82.7% of total sample Mean age (range): 68.7 (39.9–97.5) Scooter and wheelchair users	Two interviews about mobility and mobility-related participation: 1. Shortly after receiving the power mobility device. 2. 1 yr following the first interview.	Mean age of power wheelchair users was younger than scooter users. Frequency of grocery shopping and going for a walk/ride increased. 8 activities (e.g., going shopping, going to the bank) became easier to perform. Male users with poor self-reported health benefited most from the intervention.	EUR
24. Sund et al. 2013 [29]	I	*N* = 136 scooter users Mean age (range): 73.8 (not reported) New scooter users	Scooter users who were >18, lived in ordinary housing, and had sufficient cognitive/verbal skills recruited from Norway and Denmark. Two interviews; in person before receiving scooter and telephone interview after scooter delivered. Mailed questionnaire on satisfaction with the SDP.	Most common self-reported diagnosis was osteoarthritis. Median total time spent for SDP at assistive technology centers was 3.5h (Norwegian) and 6h (Danish) for assessments, admin work, and follow-up services (71.7% of total time). Half the participants were very satisfied with the SDP, <6% were dissatisfied.	EUR
User Experiences					
25. Fomiatti et al. 2014 [34]	QI	*N* = 14 scooters users Mean age (range): not reported Scooter users	Semistructured interviews with 3 categories of questions: activities, participation, and environmental factors.	3 themes emerged: 1. Knowledge: limited information regarding use and maintenance of scooter is available. 2. Engagement: scooters used as a means for shopping, social engagement, and improved quality of life.	AUS

				3. Environments: many barriers in built and natural environments exist. An increased need for awareness around people and children was identified.	
26. May et al. 2010 [35]	MM	*N* = 66 scooter users Mean age (range): not reported (65–80) Scooter users	Mailed self-completion surveys (reasons for use, benefits of use, and problems experienced). Focus group interview with 15 members from scooter support groups (~75 min.).	Major themes: 1. Obtaining a scooter: many acquired a scooter because of a decline in health; many viewed scooters as "belittling." 2. Meaning of mobility: scooter perceived to promote independence, health and well-being, and individual control over activities. 3. Issues around knowing the rules: inconsistency in education, and barriers to accessing the community.	AUS
Prescription/Service Delivery/Provision					
27. Jörg et al. 2005 [36]	QI	*N* = 8 scooter prescribers Years of experience with organization (range): 1.75 (0.5 - 3) Needs assessors involved in granting scooter requests	House call interviews (*N* = 12) between needs assessors and clients were recorded and transcribed. Following each house call, a semistructured interview was held with the needs assessor regarding regulations and discretion, preferences for services, and attitudes toward clients.	When needs assessors faced a conflict between following eligibility criteria and acting in the clients' best interests, they either: i) deviated from the rules/regulations, concealed information, and/or added completely new criteria if they understood the clients' feelings and personal reasons for requiring a scooter, or ii) used the formal eligibility criteria to refuse requests when they were unconvinced by clients' needs.	EUR
28. Lukersmith et al. 2013 [41]	EP	*N* = 16 participants in working party Mean age (range): not reported	A working group developed a set of guidelines to help therapists prescribe the	Prescription guidelines were developed in addition to resources to facilitate their use. These	AUS

		Working party and expert panel (specialist brain and SCI therapists, consumer reps, researchers, etc.)	most appropriate seated wheelchair or mobility scooter for people with brain injury or SCI by identifying and grading research evidence.	include a long-term need checklist, and a client goals checklist. Concerns with scooter prescription include transport use, seating system, portability, lack of adjustability, the environment, weight, and limitations in distances for travel.	
29. Maywald & Stanley 2015 [37]	QI	*N* = 18 scooter prescribers Years of Experience (range): 15.8 (1–38) Occupational therapists (OTs) involved in scooter assessment and prescription to individuals >65 yr	OT's were interviewed about their past experiences with prescribing mobility scooters.	The prescription process is very complex and varies depending on the cognitive and physical abilities of each client, road assessment findings, therapists' judgment of the clients' safety, and influence of the clients' family and other health professionals.	AUS
Environmental Issues					
30. Dutta et al. 2011 [39]	PT	*N* = 5 scooters evaluated scooters selected by Shoppers Home Health Care as best combinations of indoor and outdoor mobility	An expert scooter user tested maneuverability of each scooter 4 times based on existing indoor environment design standards.	No scooters could perform a 90° turn out of a door or a side approach to a counter within space provided by current building standards. 3-wheeled scooters required less space than 4-wheeled scooters. Some scooter manufacturers provided turning diameter values that were an underestimate of those found in the study. No scooter was able to perform all maneuvers within the existing U.S. or Canadian standards.	NA
31. King et al. 2011 [38]	PT	*N* = 2 scooter models were evaluated that offered the best maneuverability or performance based on previous study [39]	An expert scooter user tested the maneuverability of 2 scooter models to determine the minimum area required to do a 3-point turn. The driver	The "Celebrity X" required an increase of 56% over the area required for current indoor built environment accessibility standards, and the "Fortress 1700"	NA

			was allowed 3–4 attempts for each scooter.	required an increase of 173% over current standards.	
32. Souza et al. 2013 [40]	PT	*N* = 12 3-wheeled scooters selected from 2 scooter manufacturers	Scooters were tested according to the American National Standards Institute/Rehabilitation Engineering and Assistive Technology Society of North America wheelchair standards. Scooter models included the Victory, Gogo, Golden Companion (GC) I, and GC II.	Victory and GC II were the most stable, and the Gogo was the least dynamically stable. Five scooters (3 Gogo, 1 GC I, and 1 GC II) failed environmental tests. All GC I and II scooters failed parts of the power and control system tests. All scooters passed static and impact tests, but all Gogo scooters and 1 GC II had structural or motor failure. An average of 1,483 N caused tiller failures.	NA

List of Abbreviations: AS = Asia, AUS = Australia, COPD/CHF = chronic obstructive pulmonary disease/chronic heart failure, CS = case studies, EP = expert panel, EQ-5D = EuroQol-5-Dimensions, EUR = Europe, I = intervention study, FERS = Functional Evaluation Rating Scale, IPPA = individual prioritized problem assessment, MM = mixed methods, MWD = minute walking distance, NA = North America, NR = not reported, PT = product testing, QI = qualitative interviews, R = review, RR = retrospective review, S = survey, SCI = spinal cord injury, SDP = service delivery process, SF-36 = Short form-36, VHA = Veterans Health Administration, WHODAS = World Health Organization disability assessment schedule