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**Healthy ageing and active travel:
Identifying age-related barriers to
walking and cycling**

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ABSTRACT:

In a period of increasing mobility technologies, sustainable transport options, and healthy ageing concerns it is timely to better understand the barriers to active travel, particularly for older adults. Drawing from a survey of 1,522 Sydney residents, we compare travel patterns and perceived barriers to walking and cycling for older adults (60+) and younger adults (18-59). Car/motorbike/Uber use and walking have frequent and consistent use across both age groups. In contrast, public transport and bicycle/e-bicycle use both decline with age. Perceived barriers to walking and cycling are analysed across age groups using logistic regression. Relative to younger adults, older adults are more likely to identify an injury or disability (OR 1.45, 95% CI 1.02 to 2.04) and the convenience of driving (OR 1.35, 95% CI 1.05 to 1.73) as barriers to walking/walking more. Conversely, older adults are less likely to identify no-one to walk with (OR 0.47, 95% CI 0.33 to 0.68), personal safety (OR, 0.28, 95% 0.17 to 0.45), traffic (OR 0.26, 95% CI 0.17 to 0.41), inadequate street lighting (OR 0.50, 95% CI 0.27 to 0.90), no footpaths (OR 0.41, 95% CI 0.24 to 0.70), and distance (OR 0.74, 95% CI 0.58 to 0.96) as barriers to walking/walking more. For cycling, lack of access to a bicycle (OR 2.74, 95% CI 2.15 to 3.48), and insufficient skills (OR 2.9, 95% CI 2.1 to 3.99) are key issues for older adults, while sociocultural and built environment barriers are again perceived as less of a barrier. Practical issues (distance, transport availability, skills development), personal limitations, and potentially the nature/purpose of travel are key factors associated with active travel among older adults in Sydney. Policymakers need to ensure sociocultural and built environment barriers are lowered to ensure those already walking and cycling maintain this into old age.

KEY WORDS:

active travel, walking, cycling, older adults, physical activity, built environment.

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1 Introduction/Background

Ageing populations are a demographic reality. By 2030, 1 in 6 people in the world will be 60 years or older (World Health Organization, 2022). In Australia, 4.2 million people were aged 65 and over in 2020 (16% of the population), a number projected to rise to between 7.9 and 11.3 million people (21-23% of the population) by 2066 (Australian Institute of Health and Welfare, 2024b). Physical activity is associated with positive health outcomes for older adults, including reducing risk of cardiac disease, diabetes, hypertension, dementia, and other cognitive impairments (Jackson et al., 2016). Despite its benefits, many older adults struggle to reach sufficient levels of physical activity (Strain et al., 2024). Even a modest increase in physical activity has proportionally greater health benefits for older adults, compared to younger adults (Reiner et al., 2013; Saint-Maurice et al., 2022). Low-intensity physical activity has benefits for physical and mental well-being in older adults, and may encourage sustainable participation (Tse et al., 2015).

As such, active travel options (e.g., walking, cycling) providing incidental physical activity, have a potential role to play in improving the mobility and combating low physical activity of older adults (Barnett et al., 2017; Voorheis et al., 2023). The World Health Organization's (WHO) Global Action Plan on Physical Activity also identified active travel for older adults as a key goal to promote healthy ageing (World Health Organization, 2018a). Additionally, participation in active travel can also increase independence, social connection, and help maintain activities of daily living for older adults (Winters et al., 2015). However, for older adults to participate more in active travel the design of cities and built environment needs greater consideration (World Health Organization, 2018b). Older adults are more vulnerable to poor neighbourhood design than younger adults, due to declining health and risk of injury associated with falls and collisions (Yen & Anderson, 2012; Zhang et al., 2024). Previously reported barriers to active travel for older adults include 1) inadequate infrastructure, such as uneven footpaths and lack of seating, 2) hills and distance to locations of interest, and 3) poor self-efficacy (Jessiman et al., 2023; Mitra et al., 2015). Built environment factors identified as being positively associated with active travel for older adults have included higher residential density, walkability, street connectivity, pedestrian-friendly features, and availability of destinations (Barnett et al., 2017; Portegijs et al., 2020).

Limited research has explored perceived barriers to active travel use among older adults in Australia. A walking study in Melbourne revealed that poor infrastructure and the behaviour of other path/road users, including drivers not yielding to pedestrians, off-leash dogs, and shared use with cyclists, as the most frequently reported barriers to walking for older adults (Garrard, 2013). A self-reported survey of 1335 older cyclists across Sydney reported the main barriers were related to safety from drivers and the need for more connected bicycle networks (Boufous et al., 2021). In Sydney, a randomised control trial on inactive adults aged over 65 found that poor health and fall-related risk factors were associated with perceptions of low neighbourhood walkability, but these perceptions did not decrease walking propensity (Merom et al., 2015). However, there is a paucity of recent evidence on how current barriers influence active transport use and associated physical activity.

The last decade has seen many urban changes including greater government commitment to walkability through active and public transport development. This trend has been seen throughout car-centric Australian cities (Newman et al., 2008). To enhance the use of transport networks, technological and affordability maturation of electric bicycles and scooters has also begun to provide greater options for older people to increase their transport mobility by active transport modes (Abduljabbar et al., 2021).

This study seeks to expand understanding of older adults' engagement in active travel in Australia. The primary aim of this research is to investigate to what extent older adults in a sample of Sydney residents are currently using active travel; to identify the perceived barriers

to active travel, and to determine the impact these barriers may have on active travel behaviors. The research questions posed by this study are:

- (1) Is there a difference between the use of travel modes by older and younger adults?
- (2) What are the perceived barriers to active travel for older adults and do these differ from younger adults?

2 Materials and methods

2.1 Study design and data collection

This study uses survey data obtained from the 2023 wave of a broader longitudinal survey investigation of travel and health in Greater Sydney, referred to as the Sydney Travel and Health Study - STAHS (Greaves et al., 2024). A cross-sectional design was employed using an online survey to capture self-reported travel, health, local neighborhood perceptions and perceived barriers to using active travel. Participants were recruited through a market research online consumer panel who provided compensation. Eligible participants resided in the Greater Sydney Area and were at least 18 years old. The study aimed to recruit 1500 participants, with predefined quotas to match the age and gender distribution of Australian census data from 2021. Spatial quotas were implemented to ensure reasonable representation from the city, inner, middle, northern, and outer suburbs of Greater Sydney, where transport and built environment contexts varied. The survey was conducted between November 1st and 24th, 2023, which marks the end of spring and early summer in Sydney and was designed to take 10-15 minutes to complete. Human ethics approval was granted by University of Sydney Ethics Committee #2019/217.

2.2 Variables

Participants reported their travel behaviour for a typical week by indicating how often they used 1) motor vehicles, 2) public transport, 3) bicycles, and 4) walk only, ranging from never to every day. Participants were asked to indicate what, if anything, prevents them from walking/walking more and cycling/cycling more in their local area from a list of known barriers informed from the literature (Panter et al., 2011). Walking barriers included individual/practical (an injury or disability, not fit enough, too far to get places by walking), sociocultural (no-one to walk with, personal safety concerns, convenience of driving), and built environment barriers (too many hills, no footpaths, uneven footpaths, lack of resting places, lack of trees/cover from weather, inadequate street lighting, too much/dangerous traffic, too many bicycles on shared paths). Likewise cycling barriers included individual/practical (don't own/have access to a bicycle, an injury or disability, not fit enough, lack skills to ride a bicycle safely), sociocultural (concern a bicycle might be stolen, no one to cycle with, personal safety concerns, convenience of driving), and built environment barriers (too many hills, no bicycle paths, too much/dangerous traffic).

Self-reported physical activity behaviour was measured by the Active Australia Survey, a validated survey instrument (Brown et al., 2004; Freene et al., 2014), which asks participants to record the frequency and duration of their physical activity in the last seven days (Australian Institute of Health and Welfare, 2003). Instances of walking, moderate, and vigorous physical activity are logged independently, with a weekly limit of 14 hours imposed on each intensity level, to mitigate potential over-reporting. Sufficient physical activity was classified as engaging in at least 150 minutes of total physical activity in the previous week across at least five sessions. Under this definition, minutes of vigorous physical activity were weighted at double their recorded value, as per WHO recommendations (World Health Organization, 2020). Participant sociodemographic information included age, gender (male, female, other), level of education, disability status (yes/no) and whether they had difficulty walking 800m. Geographic location was recorded by postcode within each of the five aforementioned spatial strata (city, inner, middle, northern, and outer suburbs).

To identify differences between older and younger adults, we compared adults aged 60 and over living in the community (i.e., not in care facilities) to those aged under 60. Although defining 'older' adults is subject to debate, we used several key benchmarks including eligibility for a concession card due to age¹ and the ability to retire and access superannuation². We acknowledge that 18-59-year-olds likely encompass a wide range of travel differences. However, our primary focus was on the older cohort, where physical and mental capabilities typically decline more rapidly after age 60 (Demirci & Toptaş, 2021; Salthouse, 2009; Santoni et al., 2015).

2.3 Analysis

Descriptive statistics were used to examine the sociodemographic and health characteristics of the sample and chi-squared tests for independence assessed differences between older and younger adults. Chi-squared tests for independence were also used to explore differences in the frequency of transportation modes between older and younger adults. Perceived barriers to walking were grouped into individual, built environment, and sociocultural barriers (Sallis et al., 2012). Differences in travel modes were compared across both age groups using mean frequencies. Differences were further explored by converting the frequency of travel usage into a dichotomous variable: at least weekly or less than weekly usage, as this distinction was broadly indicative of a frequent and non-frequent user. Chi-squared tests for independence were then used to assess differences in transport weekly usage among older and younger adults.

Univariate associations between reported barriers among older and younger adults were assessed using Chi-squared tests for independence. Subsequently, we examined the influence of gender, level of education, geographic location, disability status³, and difficulty walking 800m, in a multivariable model. We included these covariates in our logistic regression model to adjust for gender discrepancies, impact of education, transport network differences across Sydney, and impact of reduced mobility (Handy et al., 2014). Since disability status was significantly correlated with difficulty walking 800m ($\chi^2 = 536$, $df = 2$, $p = <.001$), we only included difficulty walking 800m in our regression model as we deemed this most relevant to the study of active travel. All analyses were conducted in Jamovi 2.3.21 or SAS Enterprise Guide 9.4.

3 Results

3.1 Sample characteristics

A sample of 1,522 unique participants were used for this study. Of these, 426 (28%) were aged 60+ (Table 1). Overall, 51% of the sample were female with significantly more in the under 60 age-group (55%) and less in the 60+ age-group (41%). The sample was highly educated, with three-quarters of participants having a tertiary level education or higher (78%). Overall, 73% of the sample population met sufficient physical activity guidelines for minutes of activity (150 minutes/week or more), with 61% of those in the 60+ age-group achieving sufficient minutes. This suggests a more active sample of older adults than the wider population - 43% of 65+ year olds in the Australian population met physical activity guidelines in 2022 (Australian Institute of Health and Welfare, 2024a).

¹ Transport for NSW. (2024). *Seniors*. Transport for NSW. <https://transportnsw.info/tickets-opal/ticket-eligibility-concessions/seniors#:~:text=To%20be%20eligible%20for%20a>

² Australian Taxation Office. (2023, August 2). *Super withdrawal options*. Australian Taxation Office. <https://www.ato.gov.au/individuals-and-families/super-for-individuals-and-families/super/withdrawing-and-using-your-super/super-withdrawal-options#Preservationage>

³ We only asked if people had a disability (Yes, No, Rather not say) without asking for specifics as this was not a primary aim of the study

Table 1. Participant demographics by age group (n= 1522).

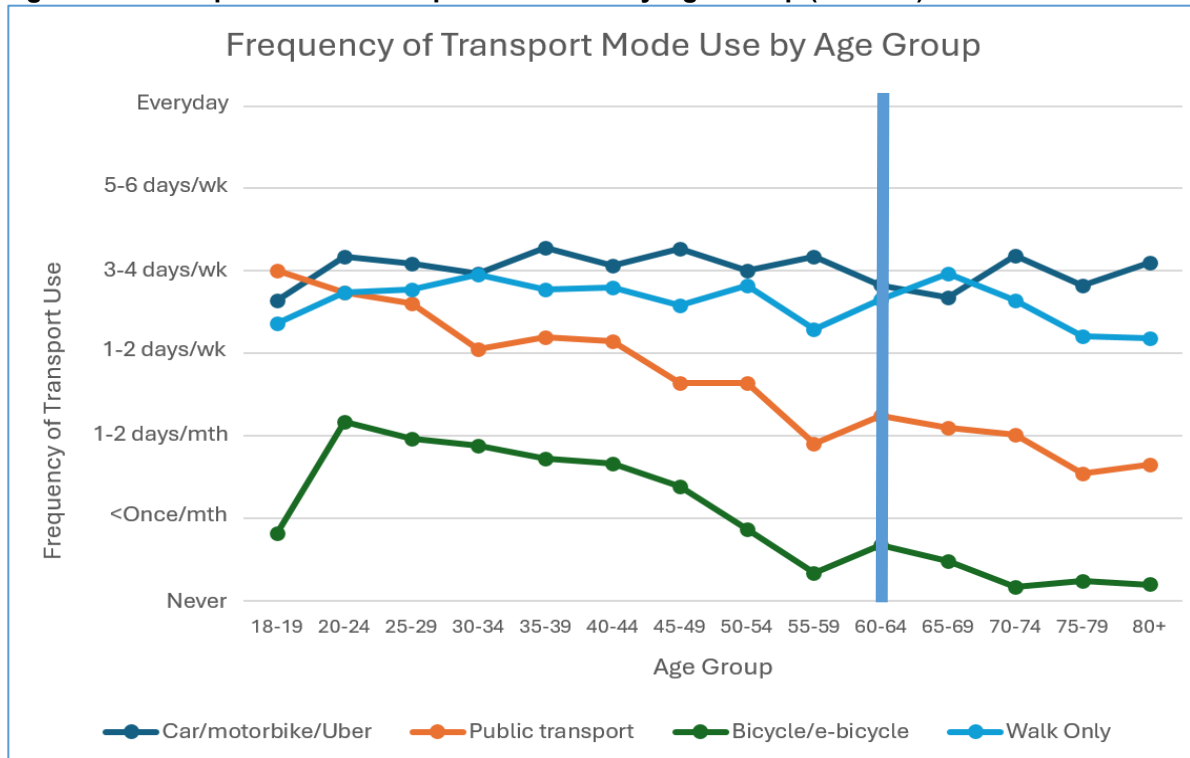
	Age Groups				χ ²	p-value
	<60 (n= 1096) N	(%)	60+ (n= 426) n	(%)		
Gender						
Female	606	55.3%	174	40.8%	27.8	<0.001
Male	490	44.7%	251	58.9%		
Other*	0	0	1	0.2%		
Highest education qualification						
Less than tertiary	216	19.7%	111	26.1%	10.6	0.01
Tertiary or higher	867	79.1%	314	73.7%		
Other*	4	0.4	1	0.2%		
Don't know/prefer not to answer*	9	0.8	0	0		
Frequency of transport modes#						
Car/Motorbike/Uber						
Frequently (at least weekly)	886	80.8%	352	82.6%	0.65	0.4
Non-frequently (less than weekly)	210	19.2%	74	17.4%		
Public transport						
Frequently	670	61.1%	134	31.5%	108	<0.001
Non-frequently/Never	426	38.9%	292	68.5%		
Bicycle/E-bicycle						
Frequently	320	29.2%	32	7.5%	81.1	<0.001
Non-frequently/Never	776	70.8%	394	92.5%		
Walk only						
Frequently	829	75.6%	309	72.5%	1.57	0.21
Non-frequently/Never	267	24.4%	117	27.5%		
Geographic location						
City and Inner South	260	23.7%	43	10.1%	46.1	<0.001
Inner West & Eastern Suburbs	206	18.8%	73	17.1%		
Northern Sydney (North Sydney, Hornsby, Northern Beaches)	139	12.7%	87	20.4%		
Middle Ring (Parramatta, Ryde, Inner Southwest)	261	23.8%	127	29.8%		
Outer Suburban	230	21%	96	22.5%		
Physical activity						
150 minutes/week or more	848	77.4%	260	61.0%	41.4	<0.001
less than 150 minutes/week	248	22.6%	166	39.0%		
Difficulty walking 800m						
Yes	126	11.5%	90	21.1%	23.4	<0.001
No	970	88.5%	336	78.9%		

*Note, we excluded these 15 participants from the multivariate analysis, leaving 1,507 participants.

3.2 Differences in frequency of transport mode use: <60 vs 60+

Table 1 shows that the two age groups had similar levels of frequent car use and walking. In terms of public transport, roughly half as many participants in the 60+ age group (31.5%) were frequent users compared to the <60 age group (61.1%). For cycling, this proportion dropped to one quarter with only 7.5% of participants in the 60+ age group frequent cyclists, compared to 29.2% in the <60 age group. Looking into this in more detail, Figure 1 shows the highest average frequency of transport mode use over the week across all age groups was by car/motorbike/uber, except for 18-19 and 65–69-year-olds. Walk only was also frequently used across the week, with notable declines in the 75+ age groups. Public transport shows a clear downward trend in usage with age, although this is the highest frequency of use of any mode for the 18-19 age group. Bicycles/e-bicycles were the least used transport mode across all age groups and decreased with age, following peak usage in the 20–24-year-olds.

Fig. 1. Mean Frequencies of Transport Mode Use by Age Group (n= 1522)



3.3 Differences in perceived barriers to walking: <60 vs 60+

3.3.1 Individual/practical barriers

Table 2 shows the results of the univariate and multivariate logistic regression models for examining walking barriers, which as previously explained, adjust for gender, level of education, geographic location, and difficulty walking 800m. The biggest practical barrier across the sample was that of destinations being perceived as too far to get to by walking with the 60+ age group marginally less likely to report this as a barrier compared to the <60 age group (odds ratio (OR) 0.74, 95% CI 0.58 to 0.96). Individual barriers were clearly important with the 60+ age group almost 1.45 times more likely to report an injury or disability as a barrier to walking (OR 1.45, 95% CI 1.02 to 2.04). Evidently, there was no significant difference in reporting feeling not fit enough for walking between the age groups.

3.3.2 Sociocultural barriers

The biggest sociocultural barrier across the sample was the convenience of driving, with the 60+ age group 35% more likely to report the convenience of driving as a barrier to walking (OR 1.35, 95% CI 1.05 to 1.73). Conversely, this age group were about half as likely to report no-one to walk with as a barrier to walking (OR 0.47, 95% CI 0.33 to 0.68) and around a quarter as likely to cite personal safety concerns as a barrier to walking (OR 0.28, 95% 0.17 to 0.45).

3.3.3 Built environment barriers

The main built environment barriers cited were too many hills, uneven footpaths, and lack of resting places, although there were no statistical differences across the age groups. The 60+ age group were evidently less likely to raise issues around barriers to walking presented by too much/dangerous traffic (OR 0.26, 95% CI 0.17 to 0.41), no footpaths (OR 0.41, 95% CI 0.24 to 0.70) or inadequate street lighting (OR 0.50, 95% CI 0.27 to 0.90). Evidently, there was no significant difference in reporting a lack of trees/cover from weather as a barrier or the presence of bicycles on shared paths.

Table 2. Perceived barriers to walking for those under and over 60 years old (n= 1507).

	Age <60 (n = 1083)		Age 60+ (n = 424)		Univariate OR (95% CI)	Multivariate OR (95% CI)*
	n	(%)	n	(%)		
Individual/practical barriers						
<i>Too far to get places by walking</i>	365	33.7	126	29.7	0.83 (0.65, 1.06)	0.74 (0.58, 0.96)
<i>An injury or disability</i>	143	13.2	97	22.9	1.95 (1.46, 2.60)	1.45 (1.02, 2.04)
<i>I am not fit enough</i>	153	14.1	66	15.6	1.12 (0.82, 1.53)	0.91 (0.65, 1.27)
Sociocultural barriers						
<i>More convenient to drive</i>	313	28.9	153	36.1	1.39 (1.09, 1.76)	1.35 (1.05, 1.73)
<i>No one to walk with</i>	199	18.4	42	9.9	0.49 (0.34, 0.70)	0.47 (0.33, 0.68)
<i>Personal safety concerns</i>	171	15.8	20	4.7	0.26 (0.16, 0.43)	0.28 (0.17, 0.45)
Built environment barriers						
<i>Too many hills</i>	136	12.6	54	12.7	1.02 (0.73, 1.42)	0.87 (0.61, 1.24)
<i>Footpaths are uneven</i>	108	9.9	45	10.6	1.07 (0.74, 1.55)	1.11 (0.76, 1.62)
<i>Lack of resting places</i>	82	7.6	45	10.6	1.45 (0.99, 2.12)	1.33 (0.89, 1.99)
<i>Too much/dangerous traffic</i>	186	17.2	24	5.7	0.29 (0.19, 0.45)	0.26 (0.17, 0.41)
<i>Lack of trees/cover from weather</i>	117	10.8	31	7.3	0.65 (0.43, 0.98)	0.73 (0.48, 1.12)
<i>There are no footpaths</i>	96	8.9	18	4.2	0.46 (0.27, 0.76)	0.41 (0.24, 0.70)
<i>Inadequate street lighting</i>	75	6.9	14	3.3	0.46 (0.26, 0.82)	0.50 (0.27, 0.90)
<i>Too many bicycles on shared paths</i>	47	4.3	13	3.1	0.70 (0.37, 1.30)	0.91 (0.47, 1.75)

*Multivariate model includes gender, level of education, geographic location, and difficulty walking 800m. Estimated the odds of 60+ participants reporting “yes” to the barrier compared to “no”.

3.4 Differences in perceived barriers to cycling: <60 vs 60+

3.4.1 Individual barriers

Table 3 shows the results of the univariate and multivariate logistic regression models for examining cycling barriers. The biggest practical barrier across the sample was that of access to a bicycle with the 60+ age group 2.74 times more likely to report this as a barrier compared to the <60 age group (OR 2.74, 95% CI 2.15 to 3.48). Differences in self-assessment around lacking the skills to ride a bicycle safely were equally pronounced with the 60+ age group 2.9 times as likely to cite this as a barrier (OR 2.9, 95% CI 2.1 to 3.99). Unlike walking, physical limitations were not a significant discriminator across the age groups once the impacts of gender, level of education, geographic location, and difficulty walking 800m were included.

3.4.2 Sociocultural barriers

The biggest sociocultural barrier across the sample was again the convenience of driving, but there was no significant difference across the age groups and around half as many of the 60+ participants cited this as a barrier to cycling compared to walking. The 60+ age group were around half as likely to cite personal safety concerns as a barrier to cycling (OR 0.50, 95% 0.35 to 0.73), and even less likely to cite having no one to cycle with (OR 0.39, 95% 0.21 to 0.71) or concern over a stolen bicycle (OR 0.14, 95% 0.07 to 0.28) as barriers.

3.4.3 Built environment barriers

Concerns around traffic were the main issue cited, with one quarter of the <60 age group citing this as a barrier. The 60+ age group were around half as likely to cite issues of dangerous traffic (OR 0.50, 95% 0.37 to 0.69), too many hills (OR 0.44, 95% 0.29 to 0.68), or lack of bicycle paths (OR 0.57, 95% 0.36 to 0.91).

Table 3. Perceived barriers to cycling for those under and over 60 years old (n= 1507).

	<60 (n = 1083)		60+ (n = 424)		Univariate OR (95% CI)	Multivariate OR (95% CI)*
	n	%	n	%		
Individual/practical barriers						
<i>Do not own/have access to a bicycle</i>	368	34.0	247	58.2	2.71 (2.15, 3.41)	2.74 (2.15, 3.48)
<i>Lack skills to ride a bike safely</i>	116	10.7	96	22.6	2.44 (1.81, 3.29)	2.9 (2.1, 3.99)
<i>An injury or disability</i>	88	8.1	61	14.4	1.90 (1.34, 2.69)	1.23 (0.83, 1.84)
<i>Not fit enough</i>	120	11.1	56	13.2	1.22 (0.87, 1.71)	1.13 (0.79, 1.61)
Sociocultural barriers						
<i>More convenient to drive</i>	192	17.7	72	17.0	0.95 (0.71, 1.28)	0.87 (0.64, 1.18)
<i>Personal safety concerns</i>	180	16.6	40	9.4	0.52 (0.36, 0.75)	0.50 (0.35, 0.73)
<i>No one to cycle with</i>	80	7.4	13	3.1	0.4 (0.22, 0.72)	0.39 (0.21, 0.71)
<i>Concern a bicycle might be stolen</i>	159	14.7	10	2.4	0.14 (0.07, 0.27)	0.14 (0.07, 0.28)
Built environment barriers						
<i>Too much traffic/dangerous traffic</i>	270	24.9	58	13.7	0.48 (0.35, 0.65)	0.50 (0.37, 0.69)
<i>Too many hills</i>	142	13.1	28	6.6	0.47 (0.31, 0.72)	0.44 (0.29, 0.68)
<i>No bicycle paths</i>	106	9.8	24	5.7	0.55 (0.35, 0.87)	0.57 (0.36, 0.91)

Note. Multivariate model includes gender, level of education, geographic location, and difficulty walking 800m. Estimated the odds of 60+ participants reporting “yes” to the barrier compared to “no”.

4 Discussion

4.1 Key findings

This study investigates transport usage patterns and perceived barriers to walking and cycling for older adults (60+) compared to younger adults living in Greater Sydney. Results suggest that the availability and convenience of the car together with personal/practical limitations are critical issues impacting active travel of older adults and indeed the general population in Greater Sydney. Sociocultural concerns, particularly personal safety concerns (both when walking or cycling) and not having someone to walk with are clearly important, but it is perhaps surprising that this is less of an issue for the 60+ age group. Likewise, built environment barriers, such as hills, uneven footpaths, lack of resting places, and the impacts of traffic on both walking and cycling were frequently cited, but again were less cited as an issue by the 60+ age group.

Higher reporting of built environment barriers among younger adults is not congruent with existing literature (Jessiman et al., 2023; Mitra et al., 2015). It is possible that younger adults in this sample reported built environment barriers more often than older adults due to the nature and purpose of their travel. Generally, older adults can be more selective about where and when they walk, as compared to younger, utilitarian walkers (Garrard, 2013). As such, if younger people have a greater walking volume than older people, this may explain their higher reporting of built environment concerns. Younger adults in this sample also more frequently reported safety concerns as a barrier to walking, such as inadequate lighting and personal safety concerns. Again, this could be an artefact of the purpose and volume of their travel. It is plausible that younger adults in this sample walk more frequently in the dark due to peak hour commuting (Garrard, 2013). Older adults in this sample were also more physically active than the general population (Table 1), which may have decreased reporting of built

environment barriers, perceiving them as less of an obstacle compared to their more sedentary counterparts.

Further support and explanation for our findings is provided by a recent meta-review of built environment correlates for physical activity among over 65s, which concluded that regular walkers (and presumably cyclists) have different and (arguably) more accurate perceptions of their local environments than non-regular walkers (Barnett et al., 2017). Interestingly, the same meta-review also concludes that while there are many aspects of the built environment that provide important correlates for physical activity among over 65s, there were no consistent moderating effects on their association with physical activity. One reason postulated for this relates to measurement issues, particularly around subjective terms, such as those used in our study (e.g., 'local neighbourhood', 'inadequate street lighting'). While this interpretation could impact on the outcomes, the fact we were comparing within sample suggests this is less likely an issue and more probably due to the familiarity reason.

In this study, we also found that car/motorbike/Uber use and walking, as an active travel mode, were frequently and consistently used across age groups. This is consistent with population data from across the state of New South Wales, suggesting rates of walking have increased since the turn of the millennium (Gugusheff et al., 2020). In contrast, public transport and bicycle/e-bicycle use both declined with age. Given our data show that older adults continue to engage in walking, there is an opportunity to increase their physical activity by addressing individual, sociocultural, and built environment barriers, as they already demonstrate a propensity for walking.

4.2 Implications

At the population level, poor health and limited mobility are more common in older age (Santoni et al., 2015). Increased physical activity in older age can reduce the rate and magnitude of declining health (Reiner et al., 2013). As such, promoting healthy ageing through increased incidental physical activity, like active travel, marks an important opportunity (Barnett et al., 2017). This study built on existing research to reveal the most important age-related barriers facing older adults in Sydney. Despite discrepancies in built environment barriers, our research broadly echoes previous results in finding that personal limitations, practical barriers, and low-quality infrastructure are the most concerning barriers to walking and cycling for older adults in Sydney.

Encouraging participation of older Australians in active travel, by addressing the unique barriers they face, may help promote their independence, longevity, and quality of life. Policies aimed to improve active travel are most likely to be effective if they target both individual level behaviour change and infrastructure reform (Jessiman et al., 2023). This research may justify local or state governments to engage in health promotion campaigns aimed at fostering behaviour change to increase active travel for older adults. This research may also influence urban planning decision-makers in Sydney to improve built environments to promote active travel for older adults. Improving neighbourhood walkability will generally benefit the health of all users, irrespective of age (Voorheis et al., 2023).

Perhaps unsurprisingly, the barriers to cycling were more pronounced, a reflection of Sydney's unfortunate perception as a hostile city in which to cycle (Pucher et al., 2010). The reality is that pockets of the city, particularly the City of Sydney, have invested heavily in cycling infrastructure creating a pleasant and generally safe place to cycle (The City of Sydney, 2024). However, while there are many cycling trails with more of a recreational focus (e.g., Cooks River Cycleway), the current cycling network is best described as a 'patchwork quilt'. Additionally, while it has been a long, uphill battle, the city is now slowly embracing the opportunities provided by e-mobility, primarily e-bicycles and e-scooters, which are set to be legalized under forthcoming legislation (Parliament of New South Wales, 2025). It is conceivable that with the right rules, regulations and infrastructure, e-mobility could provide a key piece of the jigsaw for maintaining independence and mobility for older Australians.

4.3 Strengths and limitations

Our study has several strengths and limitations. Strengths include the large sample size of adults from Sydney, with a significant proportion being older adults, our group of interest. Moreover, participants were recruited in equal proportions from the 5 regions of Greater Sydney to mitigate bias introduced by the urbanicity of their neighbourhoods. Another strength of our study is the use of a multivariable logistic regression model, which adjusted for covariates including gender, level of education, geographic location, and difficulty walking 800m.

This study used a market research company to recruit participants and administer the online survey, which may have contributed to some bias. In total, 1,652 participants completed the survey. Following data checking and cleaning, 130 participants (7.87%) were excluded for being out of the study area, completing the survey too quickly (less than 25% of median completion time), or straight lining (entering the same response) through two or more groups of attitudinal questions in the survey. This data cleaning approach reduced the potential for artificial intelligence responses and random survey completion.

While this study contributes meaningful insights into perceived barriers to walking for older adults, several opportunities for future research remain to be explored. First, investigating the association between perceived barriers to walking, as a mode of active travel, and walking time would more directly elucidate the impact of these barriers on physical activity. Second, it is clearly imperative to ascertain the purpose of walking, particularly whether it is utilitarian/necessary (e.g., getting to work, school etc) or recreational/optional as this is likely to be associated with quite different barriers and policy approaches as we have alluded to here. Additionally, exploring the walkability and connectivity of participants' local neighbourhoods in Sydney as a moderator of perceived barriers to walking may provide more nuanced results for local government areas. Third, while the rationale for the delineation of 'older adults' as 60+ was provided here, we acknowledge mobility and barriers to active travel may vary substantially as people age. Future studies could consider more segmentation within the 60+ cohort, say 60-69, 70-79 and 80+, keeping in mind this would likely require supplemental/targeted recruitment methods to those used for the current analysis to achieve required sample sizes.

5 Conclusion

This study found that practical barriers (distance, car availability), personal limitations and potentially the nature and purpose of travel are key factors associated with the use of active travel among older adults in Sydney. While the findings around built environment and sociocultural issues may initially appear counterintuitive, given we controlled for geographic location in the analysis, we attribute this to the changing nature of walking as we age from a more utilitarian/constrained purpose to a more recreational/freedom of choice purpose. This 'familiarity breeds contempt' syndrome describes a situation where people with less choice around where they walk/cycle are more likely to report barriers but conversely have less options to change. The critical issue for policymakers becomes one of ensuring these barriers are lowered to ensure those already walking and cycling maintain this into old age, when there is potentially more choice around not keeping active and personal limitations become more of an issue.

By understanding both the differences between age groups and the barriers for older adults in Sydney, policymakers can implement individual level policies and broader infrastructure improvements to improve population health. As the population continues to age, active travel options like walking, cycling and emerging e-mobility options have potential to be part of the solution to address low physical activity among older adults and promote healthy ageing.

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