Wheeled Walking Aids in the Spotlight

Queensland Government

Medical Aids Subsidy Scheme
20 March 2025

Learning outcomes

01

Be able to match assessment findings with feature selection for wheeled walking aids.

02

Know the range of wheeled walking aids available through MASS.

03

Understand MASS guidelines and processes for applying for a wheeled walking aid.

Emerging research

Jim Shen, Product Design Engineer
PhD Candidate

Queensland Government

PhD Research Insights

01

Review:

Design (106 Products)
Standards (ISO, EN)

02

Qualitative Study:

User and Health Professional

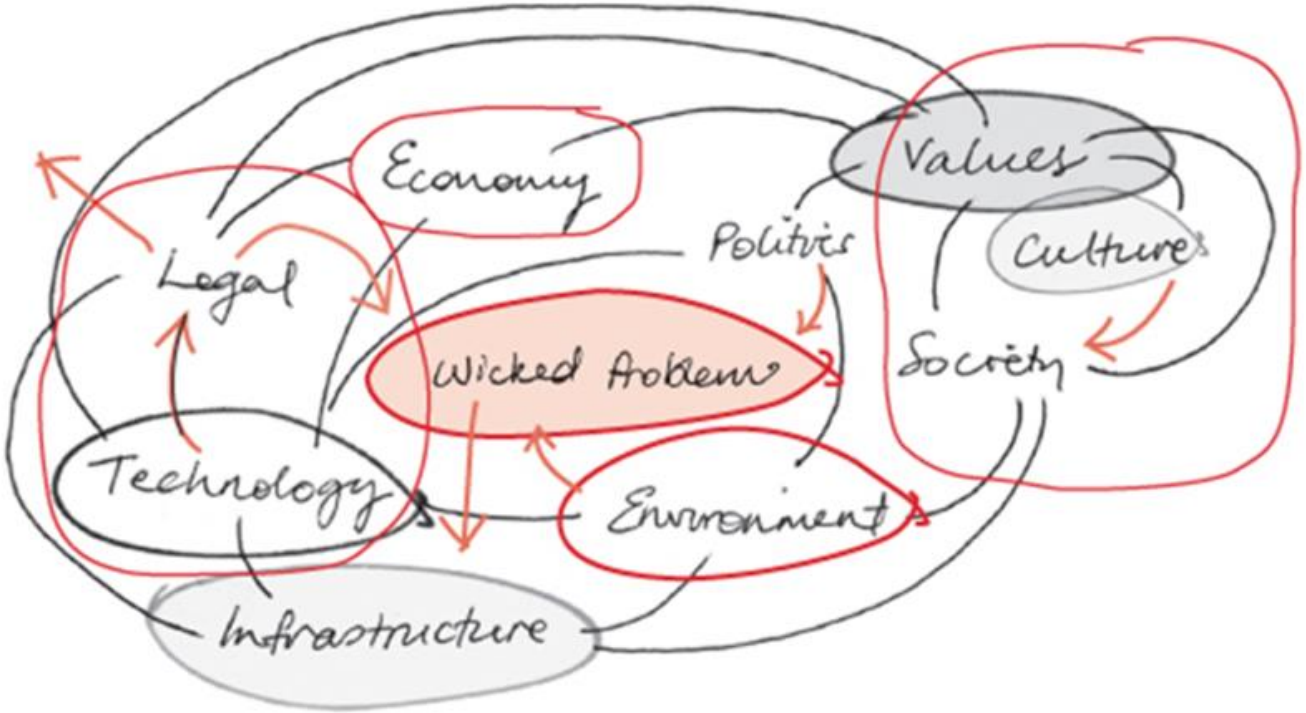
03

Research Implications:

Concepts, Future Product and Systems Design

Associated risks: Potential for **falls**
Severe injuries in certain settings (2).

Lack of consensus on the **safety, effectiveness**, and **implementation** of rollators (2).



Input needed:
User **needs** and **preferences**
Clinician **perspectives** (2)(4)

Effect of aging: Function, cognition and rollator use (3)

Psychological factors:
Self perception and dignity affecting efficacy (4)

1. Dalsgaard, P. (2010). Research In and Through Design - An interaction design research approach.
2. Carlsson, A., Lundälv, J., . (2022). Rollator related pedestrian single accidents and collision events in Sweden. Traffic Safety Research, 2, 1-20
3. ISO. (2021c). TR 22411: Ergonomics Data for Use in The Application of ISO/IEC Guide 71:2014. In.
4. WHO & UNICEF. (2022). Global report on assistive technology https://apps.who.int/iris/handle/10665/354357

Design Challenges

Inadequate Standardisation and Regulation[1,3,4]:

- Improvements for rollators standards
- Emerging commercial smart walkers lack standardisation and regulation

Design Flaws and Usability Issues[1,2]:

- Ergonomics, anthropometrics, locomotion, and braking.

Fragmented Research and Development [1,2,4]:

- Discrepancies between current **research, standards, features & specifications**

Health and Safety Risks[2,3,4]:

- Risks and serious injuries associated in certain settings
- Input needed from stakeholders

1. Schmucker, M., Küpper, A., Mahler, C., Elsbernd, A. (2024). The usability of rollators as part of the human-centred quality of mobility devices: a systematic narrative literature review. *Disability and Rehabilitation: Assistive Technology*, 1-18
2. Carlsson, A., Lundälv, J., . (2022). Rollator related pedestrian single accidents and collision events in Sweden. Traffic Safety Research, 2, 1-20
3. ISO. (2021c). TR 22411: Ergonomics Data for Use in The Application of ISO/IEC Guide 71:2014. In.
4. WHO & UNICEF. (2022). Global report on assistive technology https://apps.who.int/iris/handle/10665/354357

Approach

Shifting the Design Approach for Mobility in Aging Society

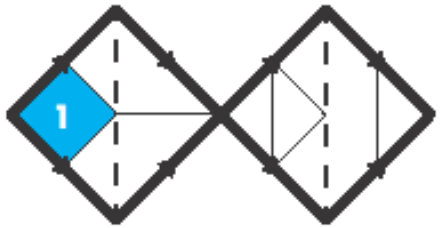
- Person Centred Design
- Better understanding of factors determining quality of life
- Address bio-psycho-social facets, health and well-being.

User Experience and Clinician Perspectives

- Individual needs, preferences, and context

Advancing Assistive Technology Design Process

- Address gaps in practical application of theoretical frameworks (iHAAT) and design principles in product development
- Balancing personalisation and universality



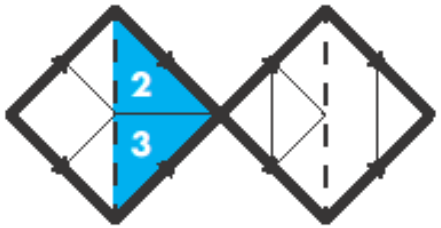
Submitted for publication

Included in the review: **98** commercially available rollators, smart-walkers, **70** product documents, **6 Standards** ISO, IEC, DIN, **3 Regulatory Bodies** AU, EU, US

Study 1

Benchmarking Standards, Regulations & Products

Inconsistency in Standards	Variations and inadequate testing processes (Eg, Plywood for testing surface)
Regulatory Variations	Variations across different regions, particularly traceability and user input mechanisms.
Insufficient Ergonomic Considerations	Ergonomic and safety factors such as handles, seating, leg clearance, braking, device weight and anthropometrics
Inadequate Smart Walker Standard	Only ISO TS exists
Maintenance and Safety Information	Product maintenance and safety information impacting user safety and product longevity
Improved Documentation and User Information	Inadequacy and inaccessibility tp product documentation and user information



Study 4
Design Outcome

Utilitarian Focus: Primary use driven by function—mobility, support, and carrying items.
Features: Weight, compactness, comfort (seats, handles, brakes), adjustability in small spaces.
Adaptability: Indoor and outdoor environments. Trade off light weight with stability.
Customisability: Improve adjustability for comfort and usability.
Emotional Response: Feelings of stigma or inconvenience.
Social Isolation: Needing to use walkers for rare social occasions.

User and Health Professional Feedback

Participant	Gender	Age	Years Using Rollator	Walkers Owned	Current Walker	Prefered Option	Why?
002U_24	M	81	6	1	Aspire?	Aspire	The bag is bigger. The front wheel big, the wheel where the back is smaller, which helps with steering. And it's also, I think the pushing area is much more prominent (envelope of the walker is big).
003U_24	F	68	3	3	Aspire	Trionic 9er	So you prefer this one to the other ones because it looks big and it's got a big bag.
004U_24	F	74	3	1	Aspire?	Rollz Flex	Likes it because it is like a trolley but allows you to use it like a walker
005U_24	F	93	7	1	Nitro	Aspire	The user is used to the one she is using. She is familiar with it and shes comfortable using her existing one.
006U_24	F	70	6	2	Nitro Aspire	Tronic 9er	It looks better than the other ones. The seat looks stable. The bag looks like is located at the good space and good height.
007U_24	F	76	18	1	Aspire	Rollz Flex By Acre	User only uses the walker to go Park Walking, so she prefers neater looking rollators

Assessment

Queensland Government

Weight + buffer
≤
device safe weight limit

Floor to greater trochanter
≈
device handle height (4ww)

Floor to olecranon
≈
device gutter height (forearm walker)

Widest trunk/hip width
≤
device width between arms

Comorbidity[1]

Falls history & fear of falling[2]

Walking distance / endurance

Gait parameters

Stance width
Stride
Toe clearance
Neurological symptoms (e.g., festination, ataxia, collapse)

Posture

Balance reactions

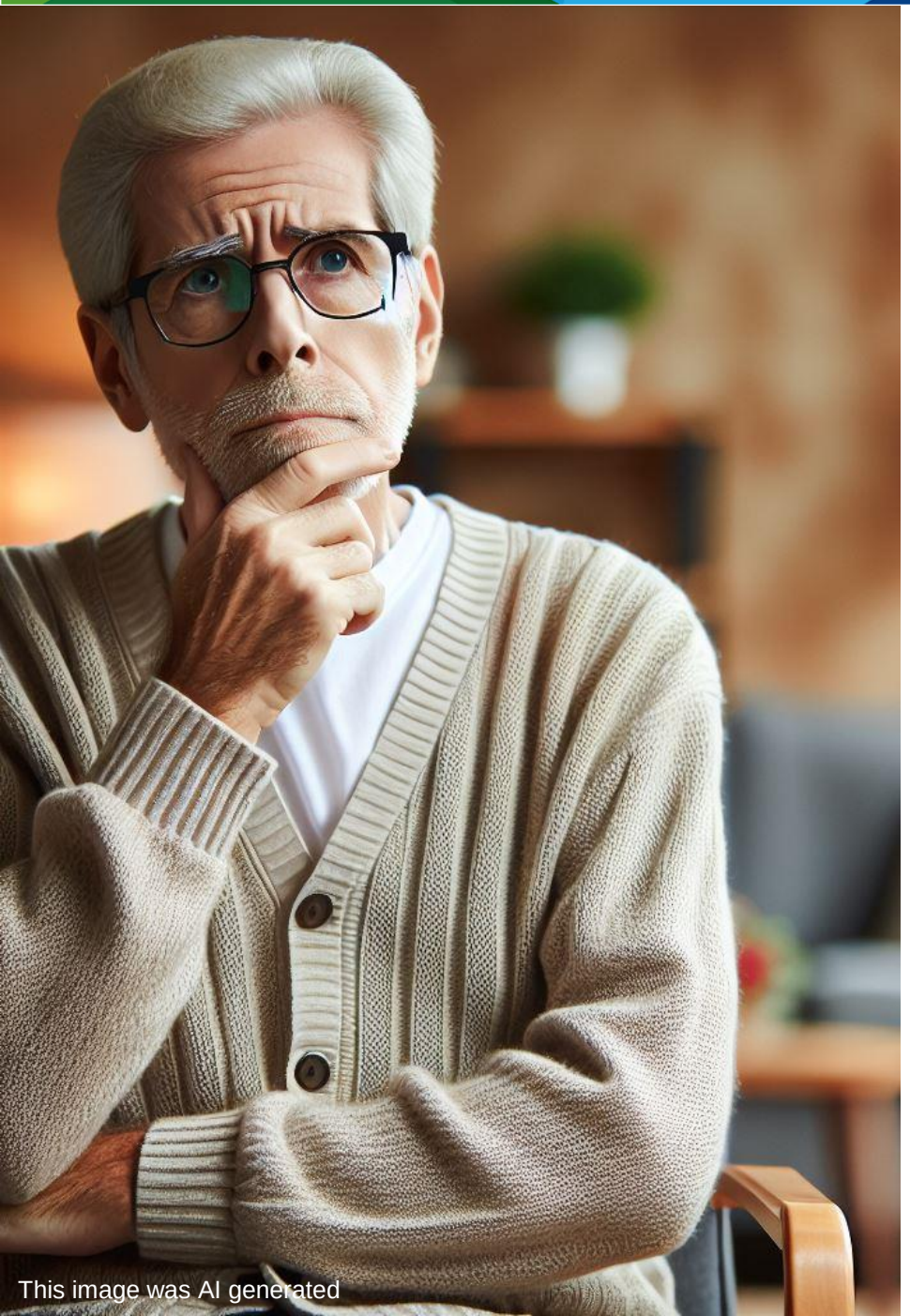
This image was AI generated

1. Solano, I.G., 2021, Determining Older-Adult Rollator Users' Characteristics, and the Effect or Rollator User on Mobility and Its Association with Falls, *Rehabilitation Science Institute, University of Toronto*
2. Shen, J. (2025). Research in progress.

Stability vs agility

- A lower height setting did not increase device loading and stability[1]
- Stability was reduced when walking with the ultra-narrow, as compared to standard-width frame[1]
- Some users preferred heavier walkers for stability (sacrificed lightweight portability)[2]
- Falls risk during transfer from furniture (seats, bed) onto walkers[2]
- Encouragement to transfer body weight onto the walking frame[1]
- For people who fall backwards, a heavier frame may provide more stability[1]

1. Theis, S. B. et.al (2020). An investigation of the effects of walking frame height and width on walking stability. *Gait and Posture* (82) 248–253
2. Shen, J. (2025). Research in progress.



Acceptability

Preferences[3]

Aesthetics & self-image[2]

Readiness for change

Weighing up the pros and cons[2,3]

Social engagement & motivation[3]

Cognition

Memory[2,3]

Decision-making

Using a professionally-prescribed walking aid can improve your walking[1].

People who fall are less likely to have a severe injury if they have a fall that requires surgery[2].

1. Joo, B., Marquez, J.L., & Osmotherly, P.G. (2024). An observational study of the impact of a professional walking aid prescription on gait parameters for individuals with suspected balance impairments. *Heliyon 49*(2), 96–108.
2. Luz, C., Bush, T., & Shen, X. (2015). Do canes or walkers make any difference? Nonuse and fall injuries. *The Gerontologist 57*(2), 211-218.
3. Shen, J. (2025). Research in progress.

Visual Preference Study[1]

Approach

7 Point Likert Study (Qualitative Control Questions)

Research Questions

- Are rollators perceived as **utilitarian** or **aesthetic** objects?
- Is liking driven by **typicality** or **novelty?**
- Whether perceptions differ between users and health professionals, and **what are the driving factors for "liking"** (acceptability) ?

Limitations:

- Data pool of users across Melbourne only.
- Health Professionals across Australia.

Preliminary findings

Differences in Preferences

- Initial data suggests **clear differences** between users and clinicians.
- Likely influenced by differing priorities, individual context, expertise, and experiences.
- Users prefer designs that reflect their personal experiences and practical needs.

1. Shen, J. (2025). PhD Research Data

Client and carer capacity

To transfer on and off the walker seat

To fold and load/unload walker

To inspect and arrange maintenance

To carry out minor adjustments (e.g., brake tightening)

This image was AI generated


This image is from John Preston Medical & Mobility

Upper limb function

Grip
(to hold on to walker handles)

Strength
(to operate brakes)

Motor planning
(to operate brakes)

Shoulder integrity
(for partial weightbearing)

Reach
(to pull up from a sitting position)

Environment

Steps and lips

Stairs & stairlifts

Door widths

Circulation[1]

Surfaces (e.g., carpet pile)

Gradients (e.g., ramps / driveways)

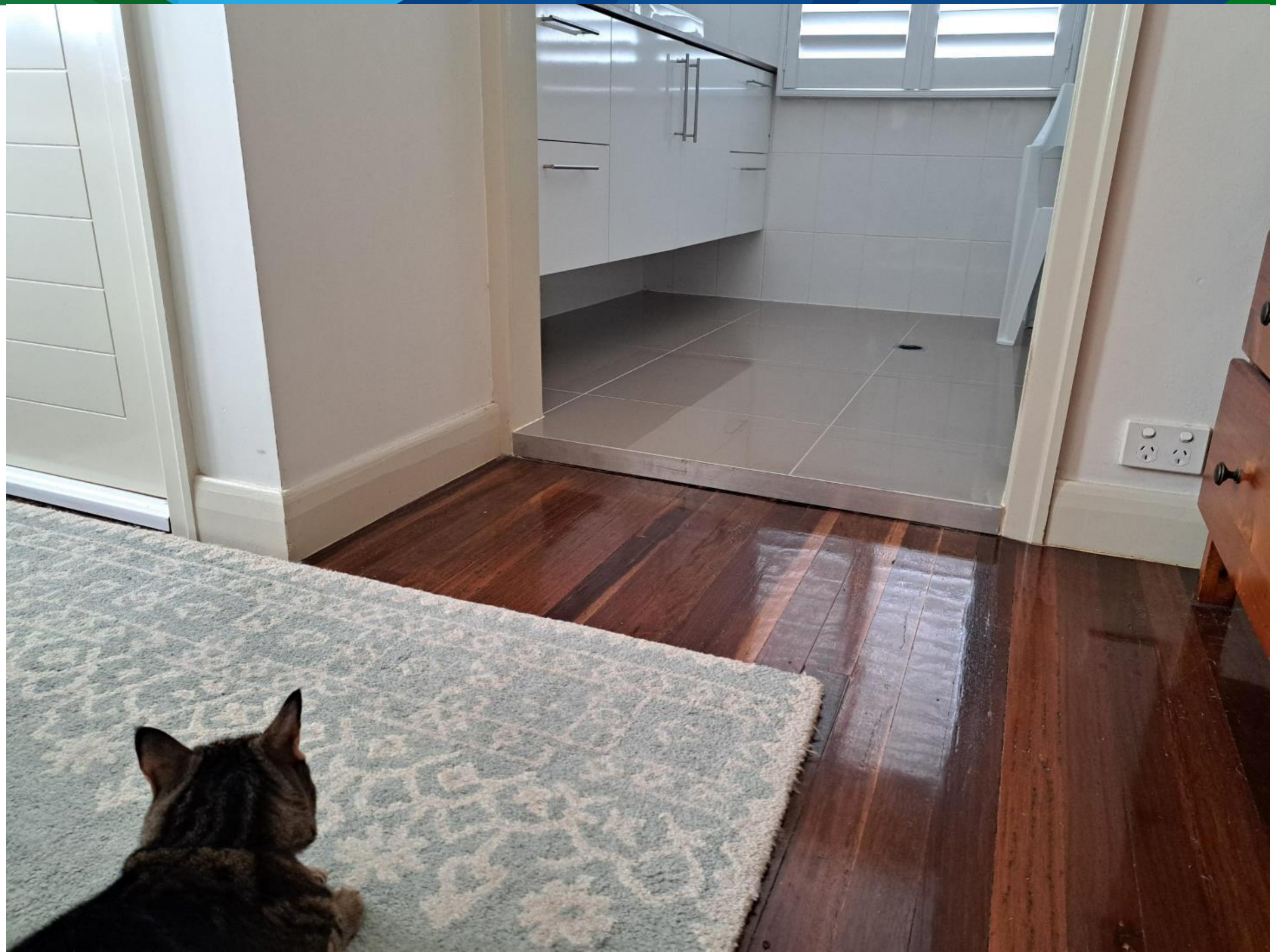
Terrain (e.g., gravel, grass)

Gaps

Outdoors (e.g., shopping, restaurants, paths)[1]

This image was AI generated

1. Shen, J. (2025). Research in progress.



Feature selection

Queensland Government

Categories

Indoor

General

Off Road

MASS Subsidised

ISO 11199 – 2
Electrical Standards
Retro fitted walkers

Smart Walker

Smart Walker Parkinson's

Powered Rollator

4 wheeled walker

ISO 11199 - 2

Trolley Walker

Transport Walker

Standard?

Images: Rollz Flex, Rollz Motion, ByAcre, Aspire Indoor Walker, Aspire Vogue, Zubu Powered Rollator, Rollz Rhythm

Carbon Fibre

Ultra-lightweight

Strong

Brittle

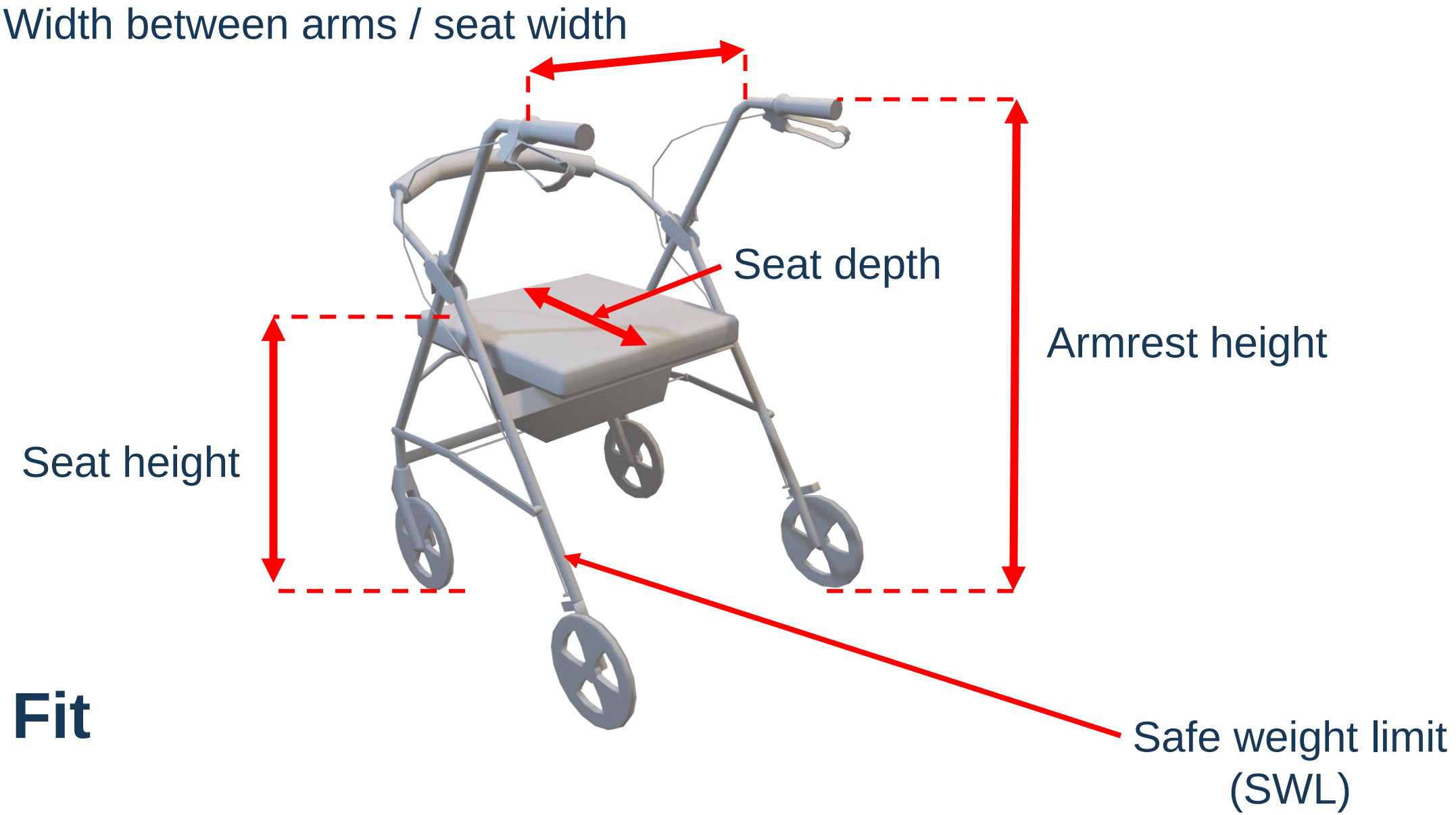
Little warning of failure

Aluminium

Lightweight

Somewhat plastic

Fit


Width between arms / seat width
Seat depth
Armrest height
Seat height
Safe weight limit
(SWL)

Castor materials –
e.g., plastic, rubber –
grip and longevity

Castor diameter – manouverability,
obstacles and rises, gaps

Castor width – gaps

Research Insights: Wheels[1]

Standards Review:

European Standards DIN-EN 1985 *Walking Aid:*

Wheel profile and draining patterns (Not in ISO Standards)

ISO 11199-1, 2, 3: Risk management for different environments, but tests do not encompass wet or slippery surface

Qualitative Insight: Large wheels

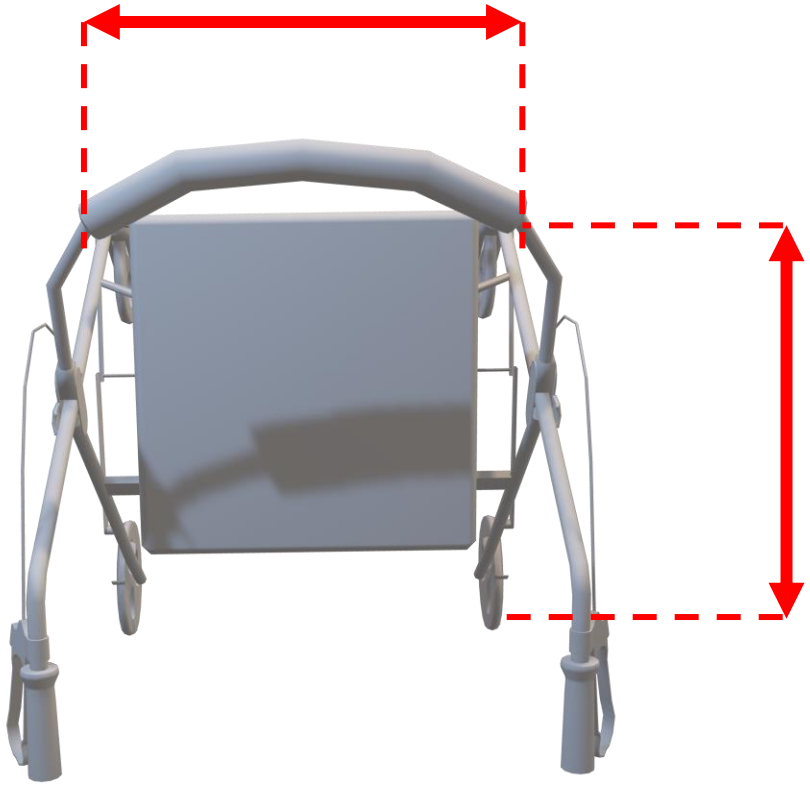
Pros

- Obstacle clearing
- Rough terrains
- Reduced shock

Cons

- Can be impractical indoors
- Trip hazard for some users

1. Shen, J. (2025). Research in progress.



Circulation requirements – balancing stability and manoeuvrability

3D Model – Sketchfab - TapvigoEDU

Brakes

Squeeze / lockable

Push down

Reverse braking system
(e.g., U-Step Walker – not on SOA)

Research gap: Handles and brakes[1]

Product and Standards Review

- Tilted handles promote **15 – 30 Deg elbow flexion[2]** (Instructions lack clarity)
- Grip size; 47.6mm^2 to 65mm^3 diameters
- Commercial grips 20mm to 50mm
- Brake grip span (lack data), likely conform to 75mm bike brake grip span.
- Capacity to activate brake

Qualitative Insights:

- Varying handle preferences (Not common in walkers)
- Some don’t/forget to use brakes

1. Van Hook, F.W., Demonbreun, D., Weiss, B.D. 2003. "Ambulatory Devices for Chronic Gait Disorders in the Elderly." *American Family Physician* 67 (8).
2. Shen, J. (2025). Research in progress.

Research gap: One handed brakes

This image is from Freedom Solutions and Topro

Limited Research

- Have helped users but need improvement
- Need user input
- Most commercial products require customisation

Feedback from Freedom Solutions:

- Braking system needs further development, particularly for single handed brakes

1. Shen, J. (2025). Research in progress.

Folding

Side-folding

Front-folding

Affects:
- seat type
- carrying
- storage
- center of gravity

Research Insight[1]:

- Baskets closer to the centre, can inhibit the user's leg movement[2]
- **Varying comfort preference**; Some prefer rigid seating with cushioning.
- Users stated they used seats as trays (with risks)

SAFETY CONSIDERATIONS WHEN PRESCRIBING SIDE-FOLDING WHEELED WALKING AIDS

Side-folding wheeled walking aids can sometimes be lighter and easier to manoeuvre.

However, if the user adds a basket or heavy load to the front, the walker may be more likely to tip forward when going over bumps or changes in surface level.

Consider a front-folding walker where the basket is between the wheels, or educate your clients in safe use if they intend to carry heavier loads.

Your prescription should consider reasonably anticipated future use.

MEDICAL AIDS SUBSIDY SCHEME
MASS-EDUCATION@HEALTH.QLD.GOV.AU

1. Shen, J. (2025). Research in progress.
2. Spijkerman, J. 2022. "Assistive device for fall prevention in elderly." Master of Product Design, University of Canterbury.

Product weight

Lightweight vs robust

Hero Ultra Light
4.75kg weight

Aspire Vogue Lightweight 2
Aluminium
6.45kg weight

Aspire Vogue Carbon Fibre
Carbon Fibre
6.2-6.35kg weight

Filterable database

Link to download database

Download as an Excel file on
your desktop to enable images
and filters

Other considerations

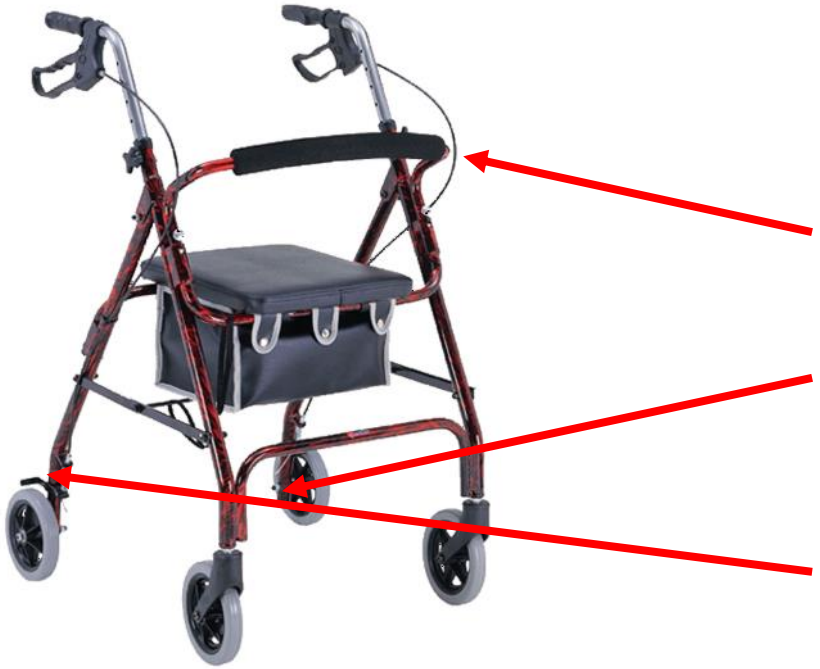
BRO200
Mobylex **– not on SOA**

Frame and hardware → prevent skin tears

Toolless adjustment

Storage dimensions

User modifications[1]



1. Shen, J. (2025). Research in progress.

Wheel position / centre of gravity

Aspire Vogue Adventure

Hero HD Outdoor Lite - Aluminium

Hero Lite Portable Outdoors

Trust Care Let's Go Indoor Walker

Seat type (especially consider bariatric clients)

Royale Premium 8”
Solid seat
Flip up

Hero HD Outdoor Lite – Carbon Fibre
Slung seat
Foldable

Research Insights: Seats[1]

Height Variability: Vary (460 mm – 640 mm)
Easier sit-to-stand transitions
100 mm to 150 mm above the standard seat height (538 mm)[2,3]

Width and Depth Considerations:
Varied **width** (350 mm – 620 mm), **depth** (127 mm – 495 mm)

Seat Size and Comfort: Varies between users
ISO standards do not address seat dimensions and ergonomics
Needs: Seat height, varied body sizes
Preferences: Comfort, pressure

Qualitative interviewed identified varied needs
Not all products have data on seats dimensions (n=32 of 106)

1. Shen, J. (2025). Research in progress.
2. Finkel, J., Fernie, G., Cleghorn, W. 1997. "A Guideline for the design of a four-wheeled walker." *Assistive Technology* 9 (2):116-129.
3. Edelstein, J. 2019. "36 - Canes, Crutches, and Walkers." In *Atlas of Orthoses and Assistive Devices (Fifth Edition)*, edited by J.B. Webster, Murphy, D.P., 377-382.e3. Philadelphia: Elsevier.

Research: Back rests[1]

Back Rest Preferences

- Some users and health professionals preferred the **wide and padded** backrest for better back support

Light Weight, Short Rest vs Support for Daily Activity

- Designed for brief resting intervals[2]
- Daily activities (working at the bench, waiting for taxis) may still require for comfortable seating

1. Shen, J. (2025). Research in progress.
2. Spijkerman, J. 2022. "Assistive device for fall prevention in elderly." Master of Product Design, University of Canterbury.

Forearm walker features

Staebel Navigator

Freedom Forearm Walker HD

SWL 220kg

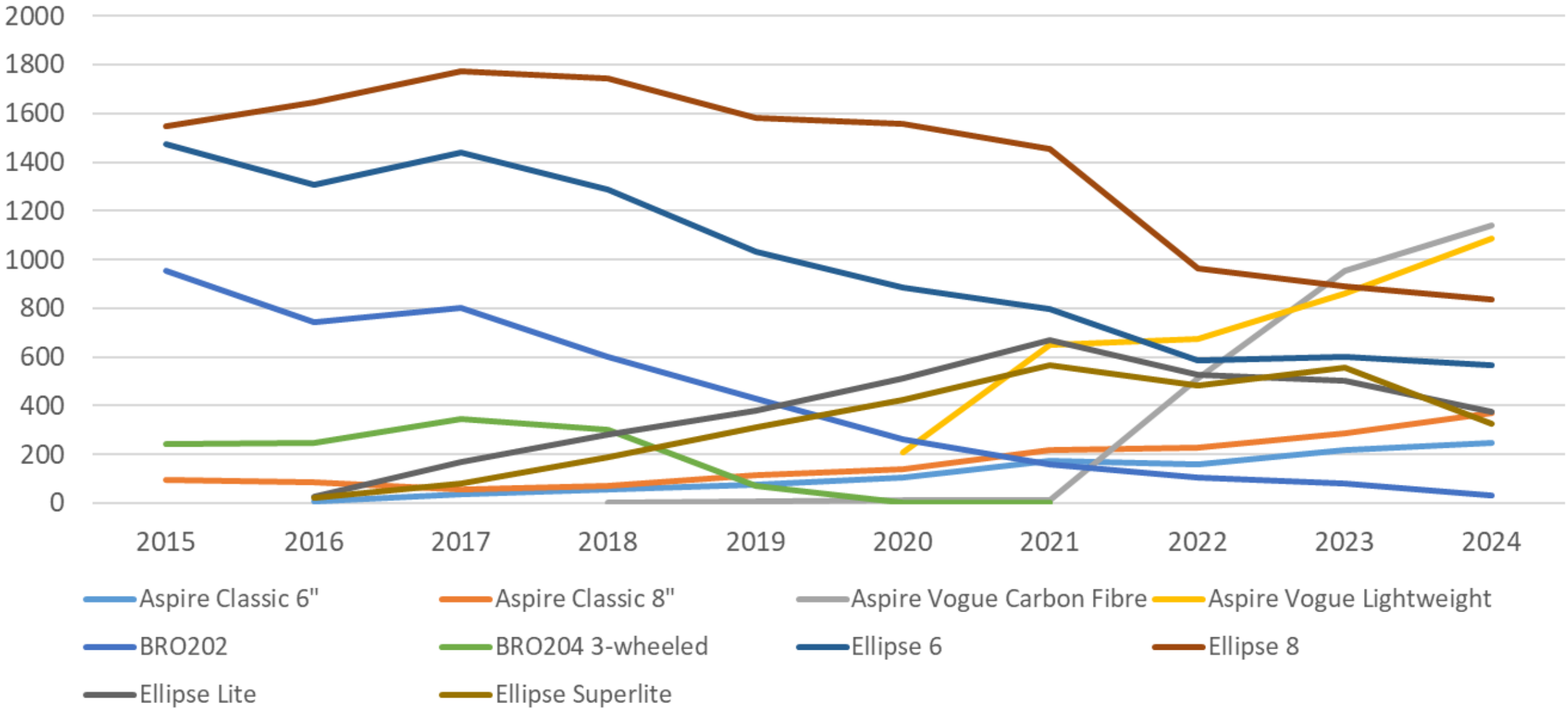
Trends

Queensland Government

Number of WWA per person over 10 years

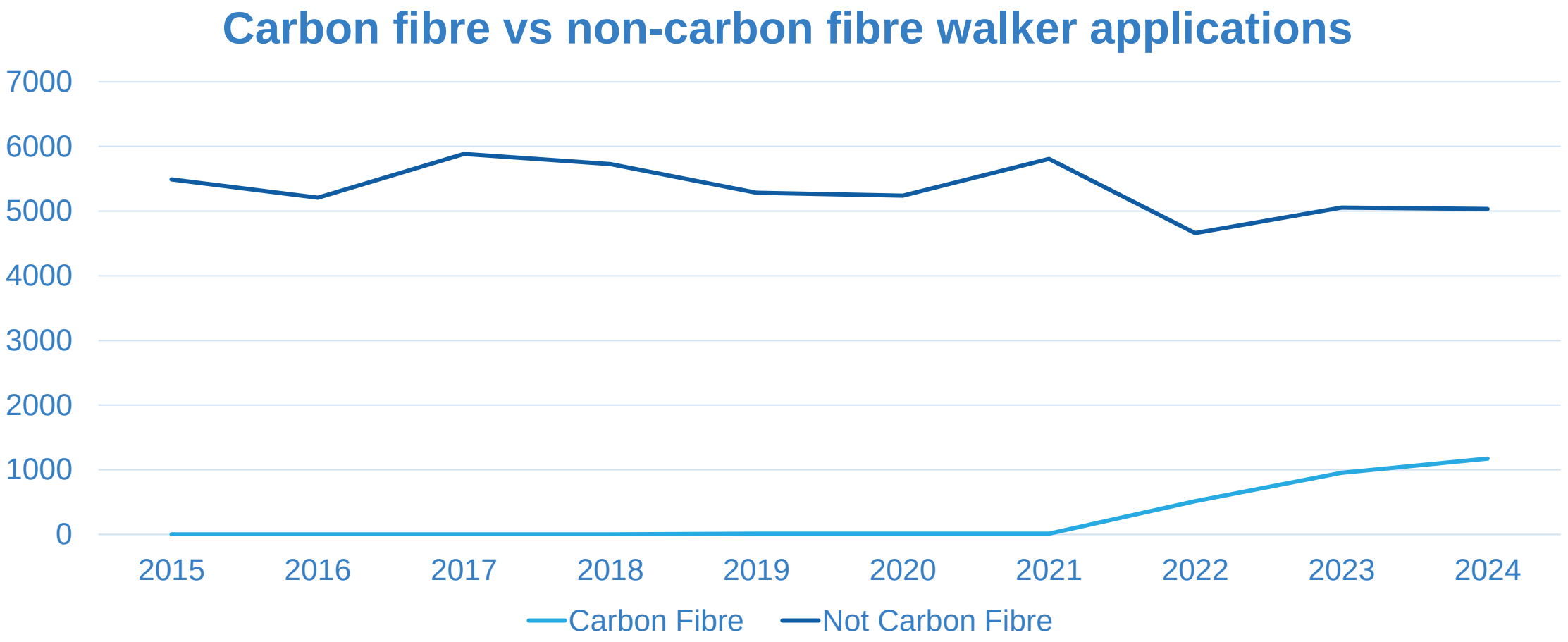
Number of WWAs received by person	Number of people
1	50,756
2	2,849
3	232
4	18
5	3
6	1

10 most popular walkers - 2015 to 2024



MAIS data 2015-2024

Carbon fibre trends



MAIS data 2015-2024

Most popular models (current SOA)

4-wheeled walkers

1. Aspire Vogue Lightweight
2. Aspire Vogue Carbon Fibre
3. Ellipse 8
4. Ellipse 6
5. Aspire Classic 8"
6. Ellipse Lite
7. Aspire Classic 6"
8. Hero Medical Outdoor Lite
9. KCare Premium
10. Aspire Deluxe

Forearm walkers

1. TAiMA Gutter
2. Aspire Vogue Forearm
3. Aspire forearm
4. Staebel Navigator

MASS process

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GOLDEN RULES

- Consider items on the SOA first (within the relevant category)
- Choose the most basic assistive product that meets your client's needs

Standard	Lightweight (may attract additional subsidy)	Heavy duty (may attract additional subsidy
Hero Medical Seat Walker 6” / 8”	Hero Medical Seat Walker Euro Lite	K-Care Maxi 8”
Aspire Flex / Classic / Mini	Aspire Vogue Carbon Fibre	Royale Premium 8”
K-Care Economy Seat Walker 8”	Aspire Vogue Lightweight	Peak Care Mighty Mack Walker
Hero Medical Ultra Light	K-Care Deluxe 6”	Staebel Server HD

Where to start with the most basic wheeled walker

Category – Mobility Aids	Primary Subsidy: Available towards products within the relevant category*	Primary Subsidy inclusions/Additional Funding: provide clinical justification to request consideration of funding*	Clinical Eligibility: Applicant has a permanent and stabilised condition or disability and requires Assistive Products to improve function and safety in the home and:
Wheeled Walking Aid (WWA)	$450	Primary Subsidy includes frame, wheels, brakes.	Is unable to: Walk independently or effectively without support.
		Heavy Duty/non-standard sizing - $250	Requires a higher safe working load, stronger frame or non-standard sizing to accommodate anthropometrics and/or usage.
		Special Clinical Need - $250	Has additional clinical need e.g. forearm/gutter support, lightweight frame. Lightweight frame may be considered to (one or more): • Assist Applicant/Carer negotiating thresholds within the home. • Be carried up/down stairs for use on different levels within the home. • Assist with transportation for Applicant's medical appointments considering Applicant/Carer's existing health conditions/frailty.

MASS WWAs - Other processes

- **Trials -** not required, but recommended. Need to demonstrate how it will be compatible with the home environment
- **Quotes** - not required for off-the-shelf products. A quote is required for all non-SOA and other scripted products
- **Non-SOA WWAs** (e.g. U-Step, super bariatric) - may take extra time to process
- **Basic equipment -** If MASS eligible and only applying for a basic piece of equipment e.g. WWA, will not be asked questions re NDIS
- **SOA supplier requirements -** trial and delivery
- **Equipment to home process (inpatients) -** contact MASS, need to ensure product is on SOA, under maximum subsidy limit

Adjusting, training, maintaining & follow-up

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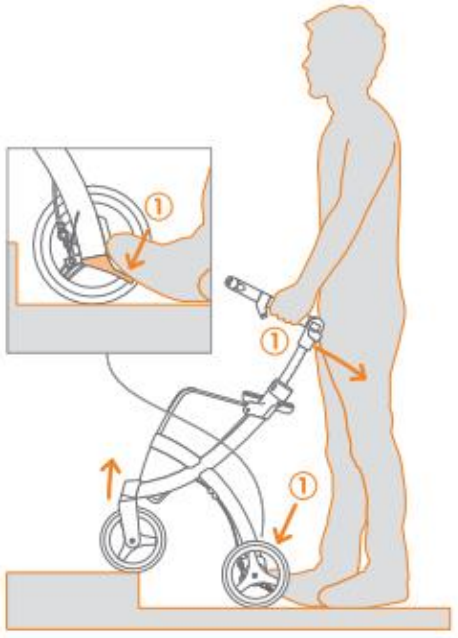
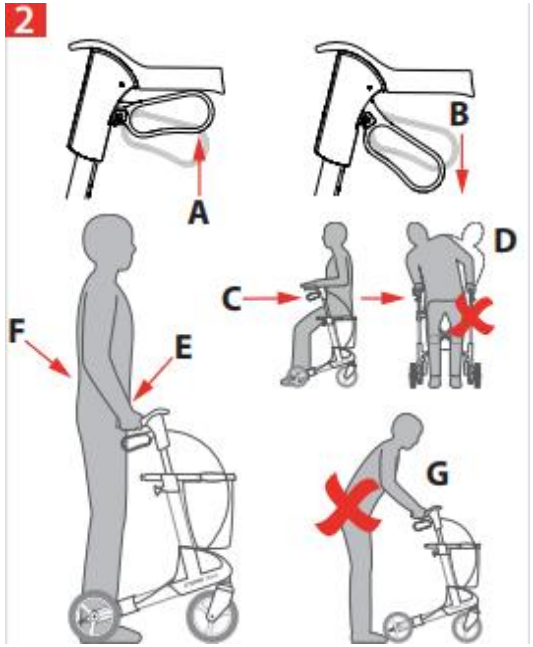
Training

- Ensure brakes are locked ‘on’ when standing up to the walker or sitting down.
- Before sitting on the seat, ensure brakes are locked ‘on’ and the walker is positioned against a wall or large, stable item.
- Do not pull up on the walker. Stand up or sit down using your hands on the piece of furniture you are standing from and gain your balance before holding onto the walker.

Research Insights: Manuals[1]

- **Some variance:** Non-compliance to standards
- **Large variance:** quality of instructions
- Some health professionals: *“Manuals need to be more intuitive and user friendly”*
- Majority of users (interviewed) did not maintain, inspect or service their walkers
- Left outside their dwelling

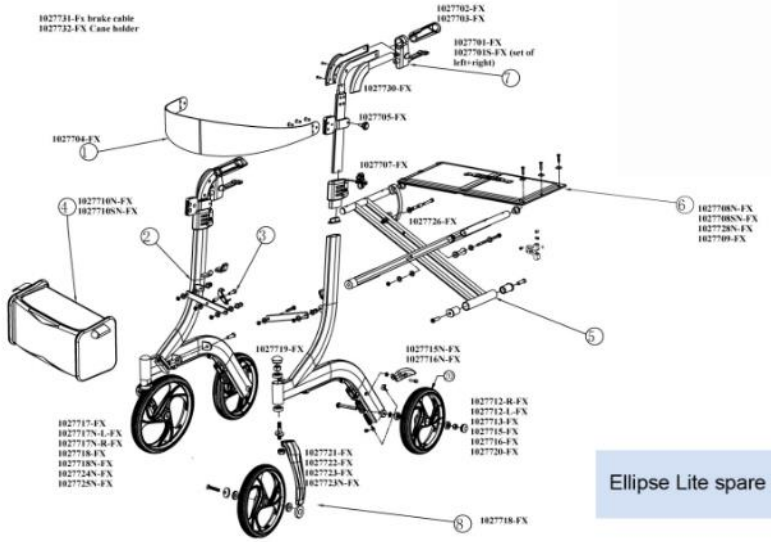




1. Shen, J. (2025). Research in progress.

Research Insights: Maintenance[1]

- **Large variance:** Standards conformity of documents; **maintenance, spare parts, service**
- Most users do not access maintenance
- Those attempted maintenance said it was hard
- Use device until it wears out and buys a new one (some replace within 2 years)
- Majority of the users interviewed had problems adjusting brakes

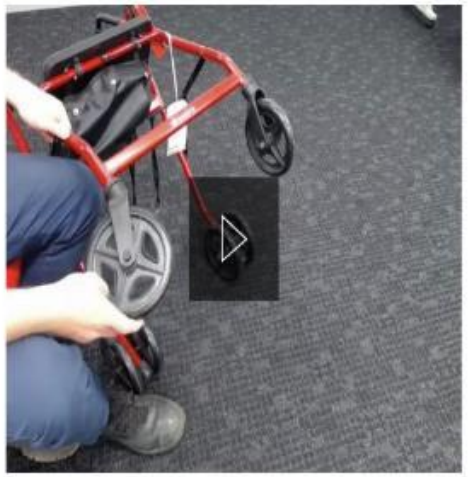


Ellipse Lite spare parts

1. Shen, J. (2025). Research in progress.

Training

brake tension. In the following video you will see a general introduction to inspecting and cleaning a 4-wheeled walker.



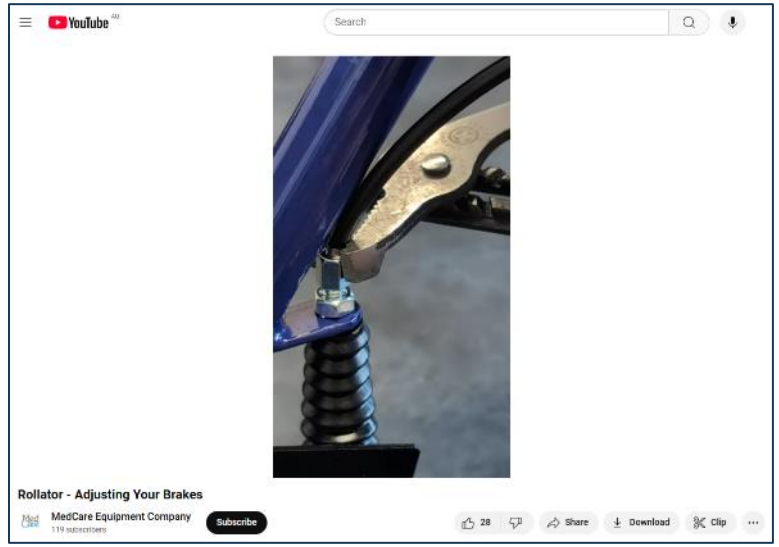
Wheeled walking aid inspection and cleaning

With your wheeled walking aid, you can;

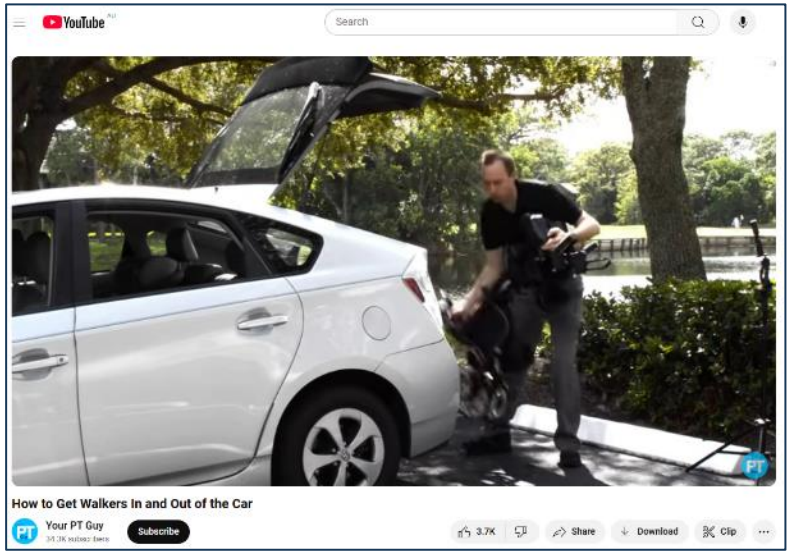
- Change the handle height
- Adjust the brake tension
- Take off and clean the castor wheels

Depending on the walking aid you are using, it may differ from the following video.

Wheeled walking aid adjustment



Rollator - Adjusting Your Brakes



How to Get Walkers In and Out of the Car

Walker failures

Failures

- Front wheel snapped off
- Frame failure

Possible contributors

- Walkers used as a wheelchair
- Reaching while in a sitting position
- Not inspecting issues with steering
- Using walker to push open door
- Asymmetric loading (e.g., forearm walker)
- Applying forces in directions it is not standards-tested under (e.g., pulling up on a walker)

MASS Engineer Records of WWA Failures

Frame failure at seat level

Frame failure at castor level

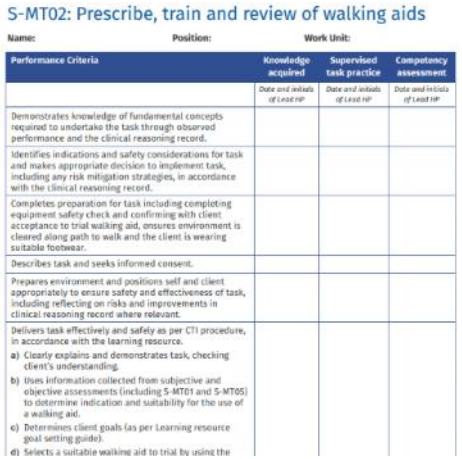
Failure of arm support

AHA involvement in wheeled walking aids

Queensland Government

Resources

- Prescribe, train and review of wheeled walking aids



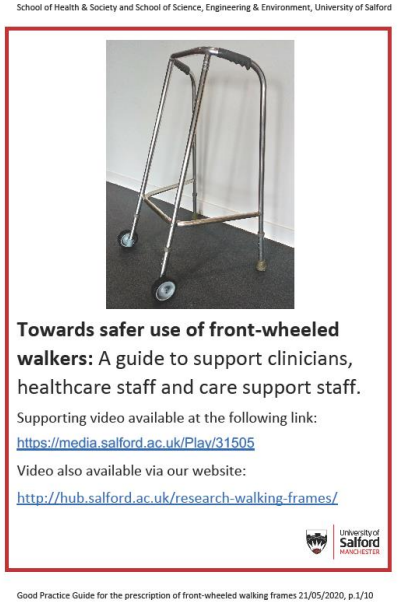
S-MT02: Prescribe, train and review of walking aids

Name: Position: Work Unit:

Performance Criteria	Knowledge acquired	Supervised task practice	Competency assessment
	Date and initials of Lead HP	Date and initials of Lead HP	Date and initials of Lead HP
Demonstrates knowledge of fundamental concepts required to undertake the task through observed performance and the clinical reasoning record.			
Identifies indications and safety considerations for task and makes appropriate decision to implement task, including any risk mitigation strategies, in accordance with the clinical reasoning record.			
Completes preparation for task including completing equipment safety check and confirming with client acceptance to trial walking aid, ensures environment is cleared along path to walk and the client is wearing suitable footwear.			
Describes task and seeks informed consent.			
Prepares environment and positions self and client appropriately to ensure safety and effectiveness of task, including reflecting on risks and improvements in clinical reasoning record where relevant.			
Delivers task effectively and safely as per CTI procedure, in accordance with the learning resource. a) Clearly explains and demonstrates task, checking client's understanding. b) Uses information collected from subjective and objective assessments (including S-MT01 and S-MT05) to determine indication and suitability for the use of a walking aid. c) Determines client goals (as per Learning resource goal setting guide). d) Selects a suitable walking aid to trial by using the			

- Front-Wheeled Walkers: Guidance for practitioner (UK)

- similar concepts to 4 wheeled walking aids



School of Health & Society and School of Science, Engineering & Environment, University of Salford

Towards safer use of front-wheeled walkers: A guide to support clinicians, healthcare staff and care support staff.

Supporting video available at the following link:
https://media.salford.ac.uk/Play/31505

Video also available via our website:
http://hub.salford.ac.uk/research-walking-frames/

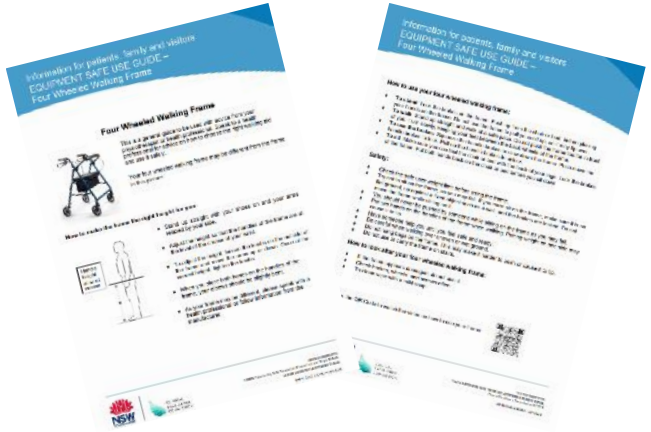
University of Salford MANCHESTER

Good Practice Guide for the prescription of front-wheeled walking frames 21/05/2020, p.1/10

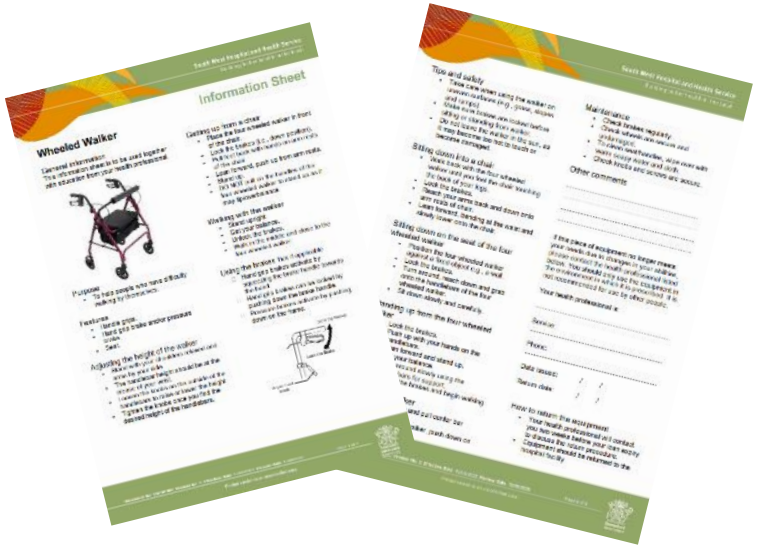
- HOW TO WALK with a four-wheeled walker/ROLLATOR safely and easily | Fit, Use, Accessories and More - YouTube

Patient and Family Information Sheets

NSW Four Wheeled Walking Frame - Equipment safe use guide



Wheeled Walker Information Sheet - access only by Qld Health staff



Study 2 & 3: Qualitative Studies
Interview & Visual Study

Recruiting!
User (15 interviewed)
Physio (1 interviewed)
OT (7 interviewed)
Nurse (1 interviewed)

Health Professionals
Information Statement & Ethics Approval

https://qrco.de/bfLisg

Health Professionals
Screening and Consent

https://swinuw.au1.qualtrics.com/jfe/form/SV_883nhXaPkCxejUG

Feedback

Complete the Wheeled Walking Aids in the Spotlight webinar feedback form to receive a certificate of attendance.

MASS-Education@health.qld.gov.au